ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG) POLICY

Purpose

We believe that the health of the environment and climate as well as operating in a socially and ethical responsible way are moral obligations and critical to the continued and improved well-being of people and communities globally, as well as the sustainability of the company. Therefore, all of us at CGG have a duty to do our part in making continued significant progress in these areas.

Scope

This policy applies to CGG in all its operations as well as contractors and site visitors within CGG's prevailing influence.

Responsibility

As one of our values, responsibility is in the core of everything we do. CGG is committed managing the potentially negative impacts of its operations, mitigating and minimizing them as far as possible, while acting as a positive influence on our stakeholders:

- We act responsibly and ethically and abide by all applicable laws and regulations, providing our employees and contractors with guidance and support to enable compliance.
- We will always have a precautionary approach towards challenges, taking the time to assess risks and manage the potential impacts of our operations.
- We use our prevailing influence with service providers and suppliers to support the continuous improvement of their ESG performance.

Environment

We are committed to measure and reduce our carbon footprint across all levels of our value chain:

- We report environmental data across our operations, measuring and monitoring the Carbon Footprint.
- We are committed to reaching carbon neutrality by 2050 in scopes 1 & 2 of the Greenhouse Gas Protocol.
- We aim to improve the Power Usage Efficiency (PUE) of our data centers.
- We commit to increase the low-carbon content of our energy supply mix.
- We encourage and support local internal initiatives supporting our 2030-2050 carbon neutrality ambitions.
- We work with our Supply Chain to improve their ESG performance.
- We develop and offer products & services enabling environmentally sustainable activities.

Social

Our key aim is to be an exemplary company for all our stakeholders:

- We strengthen our work environment and our culture around diversity and inclusion.
- We ensure our work environment enables the engagement and development of our employees and attracts the best talents.
- We act as a positive influence for our employees, suppliers, and communities.
- We maintain a robust HSE-Operating Management System which is built around and complies with recognized International and Industry standards and supports our ESG commitments.

Governance

Our aim is to set the highest standards of governance which shall guide our operations and ensure the highest level of compliance & ethics are applied in the way we conduct our business.

Sophie ZURQUIYAH
Chief Executive Officer

Date: June 2022 - **Review Period:** 24 months

Care+Protect
WHAT MATTERS

HSE POLICY

Purpose

This policy broadly outlines our commitments to Health, Safety, Environment (HSE) . Our corporate policies, governance, and values as a whole act to drive and assure that CGG remains a healthy, safe, and environmentally conscious company that can sustain the needs of its present demands without compromising needs of the future generations.

HSE principles are integrated into our risk management, business planning and processes. We believe that all incidents are preventable and strive for zero harm to our people, the environment and the communities in which we operate.

Scope

This policy applies to all employees, contractors and site visitors within CGG.

Compliance

We recognize all International Labor Organization conventions and laws and comply with all national and industry HSE regulations.

We contribute to advancing industry standards and seek to establish and apply best practice.

Our HSE Principles

CGG provides a healthy, safe, inclusive and environmentally conscious workplace whilst promoting awareness of workplace hazards.

We protect our employees, contractors and assets from criminal, hostile and malicious acts.

We monitor the health of our employees and promote wellbeing.

We are committed to promoting a working environment that is free from illicit substances and tobacco use.

We apply eco-design principles and mitigation to prevent and remediate harmful effects on the environment.

We respect and promote human rights and maintain mutually beneficial relationships with local communities.

Leadership, Commitment & Responsibilities

The commitment and cooperation of all employees and contractors is essential, including the right and obligation to stop work and intervene.

Willful breach of CGG's 'Rules to Live By' will not be tolerated.

Line management are responsible for implementing this policy, setting relevant HSE objectives and ensuring resources are in place to achieve them.

The HSE OMS

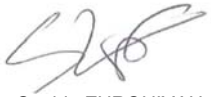
Our Health, Safety, Security, Environment Operating Management System (HSE-OMS) provides a framework for company-wide integrated approach to Risk and Opportunity Management.

Our HSE-OMS is built around and complies with recognized International and Industry standards.

Stakeholders

CGG selects partners and contractors who acknowledge and comply with our HSE Principles whilst supporting them in fulfilling those responsibilities.

We openly engage and dialogue on HSE with our main stakeholders and publicly disclose our performance



Sophie ZURQUIYAH
Chief Executive Officer

Date: June 2022 - **Review Period:** 24 months

REGIA
Marine Seismic Survey

Description of Activity

Appendix A2: REG-EP-002-A2

Rev 7

December 2025

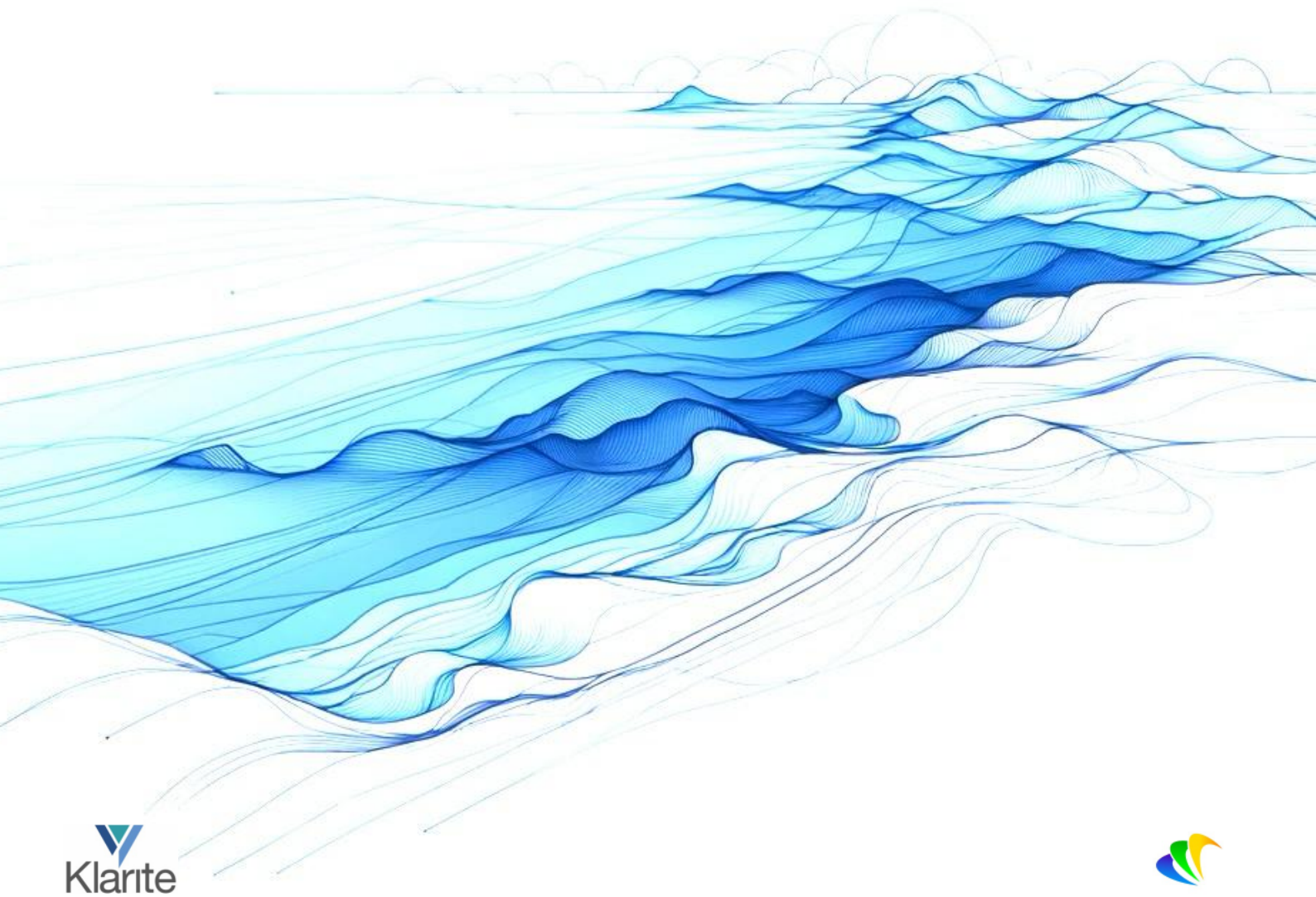


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Table of Contents

1 Introduction ***3***

1.1 Purpose **3**

1.2 Overview **3**

1.3 Environmental Regulations and Guidelines **3**

2 Consultation Input ***5***

3 Description of Activity ***6***

3.1 Purpose and Need **6**

3.2 Project Design, Location and Timing **6**

3.2.1 Design Envelope 6

3.2.2 Operating Envelope 7

3.3 Outline of the Operational Details of the Activity **7**

3.4 Location of Activities **7**

3.4.1 Operational Area 10

3.4.2 Mitigation Source Area 10

3.4.3 Active Source Area 10

3.4.4 Survey Acquisition Area 10

3.5 Seismic Survey **11**

3.5.1 Streamers and Sail Lines 11

3.5.2 Sound Source 12

3.6 Support Activities **14**

3.6.1 Vessels 14

3.6.2 Aircraft 15

4 Additional information relevant to consideration of environmental impacts and risks of the activity ***16***

4.1 Supporting Operations Conducted Outside the Activity Boundary **16**

4.2 Activity Limitations **17**

5 Document Control ***19***

Annex 1 ***20***

Public Comment **20**

Annex 2 ***21***

Objections and claims raised through consultation **21**

1 Introduction

This Description of Activity has been prepared by CGG Services (Australia) Pty Ltd (**CGG**) in its environmental management of the Regia Marine Seismic Survey (**Regia MSS**). This is the content of the Environment Plan (**EP**) that will be submitted to meet the requirements of Section 21(1) of the *Offshore Petroleum and Greenhouse Gas Storage (*Environment*) Regulations* 2023 (the Regulations).

1.1 Purpose

The purpose of this document is to provide a comprehensive description of the activity including the following:

a) the location or locations of the activity.

b) general details of the construction and layout of any facility.

c) an outline of the operational details of the activity and proposed timetables.

d) any additional information relevant to consideration of environmental impacts and risks of the activity.

1.2 Overview

To commence the preparation of the EP for the Regia MSS, initial areas of interest were established for the largest possible activity and the largest possible extent for its environmental effect. These areas were called the Activity Planning Area (**APA**) and the Environmental Planning Area (**EPA**) respectively. The EPA framed the initial studies and community consultation effort. Within the EPA, the APA was established to frame the maximum geographical limits of the activity. The Environmental Planning Area and Activity Planning Area are shown in Figure A2-1 (MAP-REG-EPM-043).

The Environmental Planning Area was set at 155 km around the Activity Planning Area. This distance was selected using professional judgement and a review of previous oil spill risk assessments for similar activities in the region (Appendix B11). Further justifying the distance, the NERA Reference Case: Consequences analysis of an accidental release of diesel (NERA 2018) found that diesel spills under 700m^3 were reliably predicted to disperse within this distance.

1.3 Environmental Regulations and Guidelines

The primary legislation governing the Regia MSS is the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (the Act) and the Regulations. There are numerous additional laws, regulations, and guidelines that apply requirements to the Regia MSS activity. These can be found in Appendix B2 and their relevance to each environmental aspect is considered in each assessment (Appendices D1- D4 and E1 – E9). Any legislative requirements discussed in this document if they are relevant to the management of environmental impacts and risks.

The following terms are used in this document and are defined in the Regulations:

> A **petroleum activity** or **activity** means operation or works in an offshore area undertaken for the purpose of: (a) exercising a right conferred on a petroleum titleholder under the Act by a petroleum title; or (b) discharging an obligation imposed on a petroleum titleholder under the Act or a legislative instrument under the Act.

The following terms are used in this document and have been defined by CGG:

> **Sail line** means the line(s) that are intended to be followed to acquire the geophysical objectives of the survey where the sound source will be discharged at full power. Sail line(s) are indicative only and can only occur within the survey acquisition area. Line turns, run ins

(including ramp up), deployment and retrieval activities of the seismic vessel are not included within this definition.

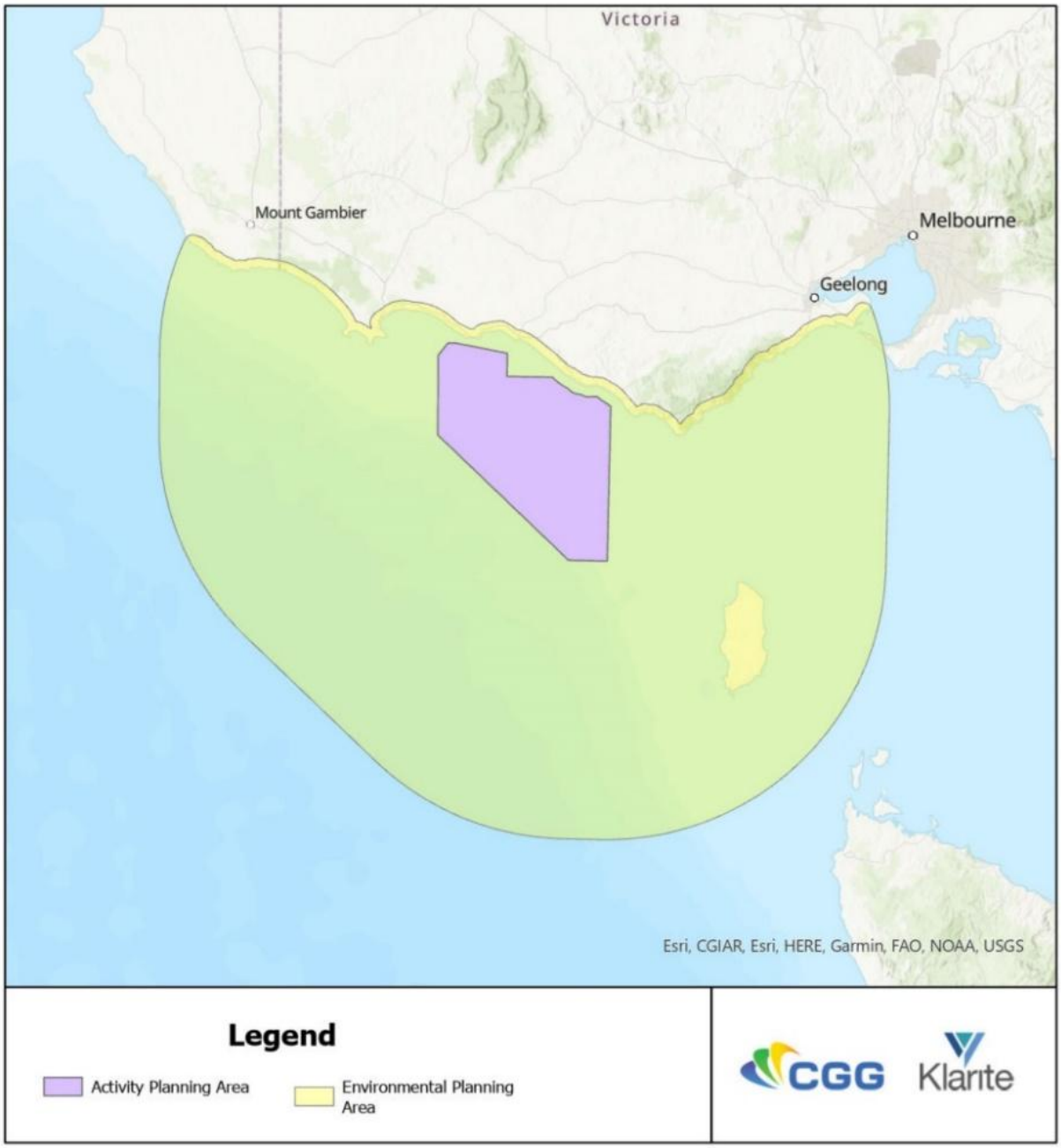

Figure A2-1 - Regia MSS Environmental Planning Area and Activity Planning Area

2 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

3 Description of Activity

3.1 Purpose and Need

The Otway Basin has been producing hydrocarbons since the 1990's and has seen the discovery of several gas fields. Since that time, seismic acquisition and processing technologies have advanced dramatically. The Regia MSS aims to survey areas where 3D geophysical data has not been acquired previously or applying new technologies to overlapping areas of existing 3D data, to improve our understanding of the geophysics of the area. Exploration for new gas reserves has been identified by the Labour Government's Future Gas Strategy[1] as necessary to meet predicted gas supply shortfalls and the Otway basin is explicitly mentioned as a possible source of additional domestic supply.

3.2 Project Design, Location and Timing

Two envelopes define the limits of the activity. A design envelope, which is the broadest timing and location of the activity, and an operating envelope which narrows the timing and location of activities. These envelopes changed during the environmental assessment. The nature of any change and the reasons for it were communicated through the online Regia MSS Consultation Hub and through consultation, where relevant.

3.2.1 Design Envelope

Prior to the activity the vessels contracted by CGG are not part of any petroleum activity. During this time, the vessels are subject to all maritime laws but not the OPGGS Act and Environment Regulations. As such, pre-survey vessel activities such as movements to the region, equipment deployment, water depth monitoring, pre-start whale monitoring, towing equipment and weather avoidance may occur anywhere at any time before the petroleum activity commencement. However, consistent with consultation outcomes with the Director of National Parks (Event ID 6887), towing of equipment outside of the Operational Area must not occur within an Australian Marine Park (AMP) unless under emergency conditions where safety of life at sea is a priority. Prior to the activity the sound source can be in the water but must not be activated, tested, or in any way discharged.

The activity commences in two stages: operations and acquisition.

Operations start when the vessels enter the Operational Area for the purpose of the survey and ends when the vessels leave the Operational Area. The seismic and support vessels will conduct a few days of operational movements to test the equipment within the Operational Area. Testing of the sound source may only occur within the Active Source Area. Any contracted vessels may leave and return to the Operational Area at any time throughout the survey any number of times to conduct activities such as fauna monitoring, weather avoidance, or for any safety related reason.

If the survey vessel leaves the Active Source Area the sound source must not be activated, tested, or in any way discharged at full power. When any contracted vessel is outside the Operational Area, they are subject to all maritime laws but not the OPGGS Act and Environment Regulations.

Acquisition starts when the sound source is discharged at full power for the first time and ends when the sound source is discharged at full power for the final time. The parameters in Table A2-1 set the timings within the design envelope:

There will be no petroleum activities within a designated Australian Marine Park (State and Commonwealth).

[1] https://www.industry.gov.au/sites/default/files/2024-05/future-gas-strategy.pdf

Table A2-1 - Design envelope parameters

Parameter	Details
Earliest start date (operations)	00:01 AEST on 16 September 2025
Earliest start date (acquisition)	00:01 AEST on 16 September 2025
Latest finish date (acquisition)	23:59 AEST on 31 December 2028
Latest finish date (operations)	23:59 AEST on 31 December 2028
Night-time operations	Yes

3.2.2 Operating Envelope

Acquisition may occur 24 hours a day over consecutive days, or at unspecified intervals due to time for equipment deployment, weather delays, fauna instigated shutdowns, contractor downtime, line turns, and equipment retrieval. The following parameters set the operating envelope:

Table A2-2 - Operating envelope parameters

Parameter	Details
Maximum days (operations)	90 continuous days in a single phase (i.e. once started the activity cannot be restarted at another time).
Maximum days (acquisition)	60 days total within the 90 days (i.e. once started acquisition may start and stop any number of times making these non-continuous days).
Maximum survey acquisition area	2750 km^2

3.3 Outline of the Operational Details of the Activity

The activity is the acquisition of geophysical data (a seismic survey) and any other activities (support activities) required to support acquisition, carried out within the operational area prior to and after acquisition.

3.4 Location of Activities

There are several progressively smaller areas that govern the various component parts of the activity, these are described below and shown in Figure A2-2 and Figure A2-3:

- **Operational Area (OA):** an area in which survey vessel activities can occur including equipment maintenance and deployment/recovery, crew change and resupply. The sound source cannot be active in the Operational Area, outside of the Active Source Area and Mitigation Source Area.
- **Mitigation Source Area (MSA):** an area at the end and beginning of the sail lines where a very small source (~ 70 cu in) will be discharged during line changes to alert marine fauna to the presence of the activity.
- **Active Source Area (ASA):** an area within the Operational Area in which the sound source can be active. Line run-ins occur within this area (including ramp ups) and

outside of the Survey Acquisition Area. The sound source cannot be discharged at full power within the Active Source Area and outside of the Survey Acquisition Area.

- **Survey Acquisition Area (SAA):** the primary target area (full fold) for the survey and the area in which seismic data will be recorded, including run outs, and the sound source can be discharged at full power.

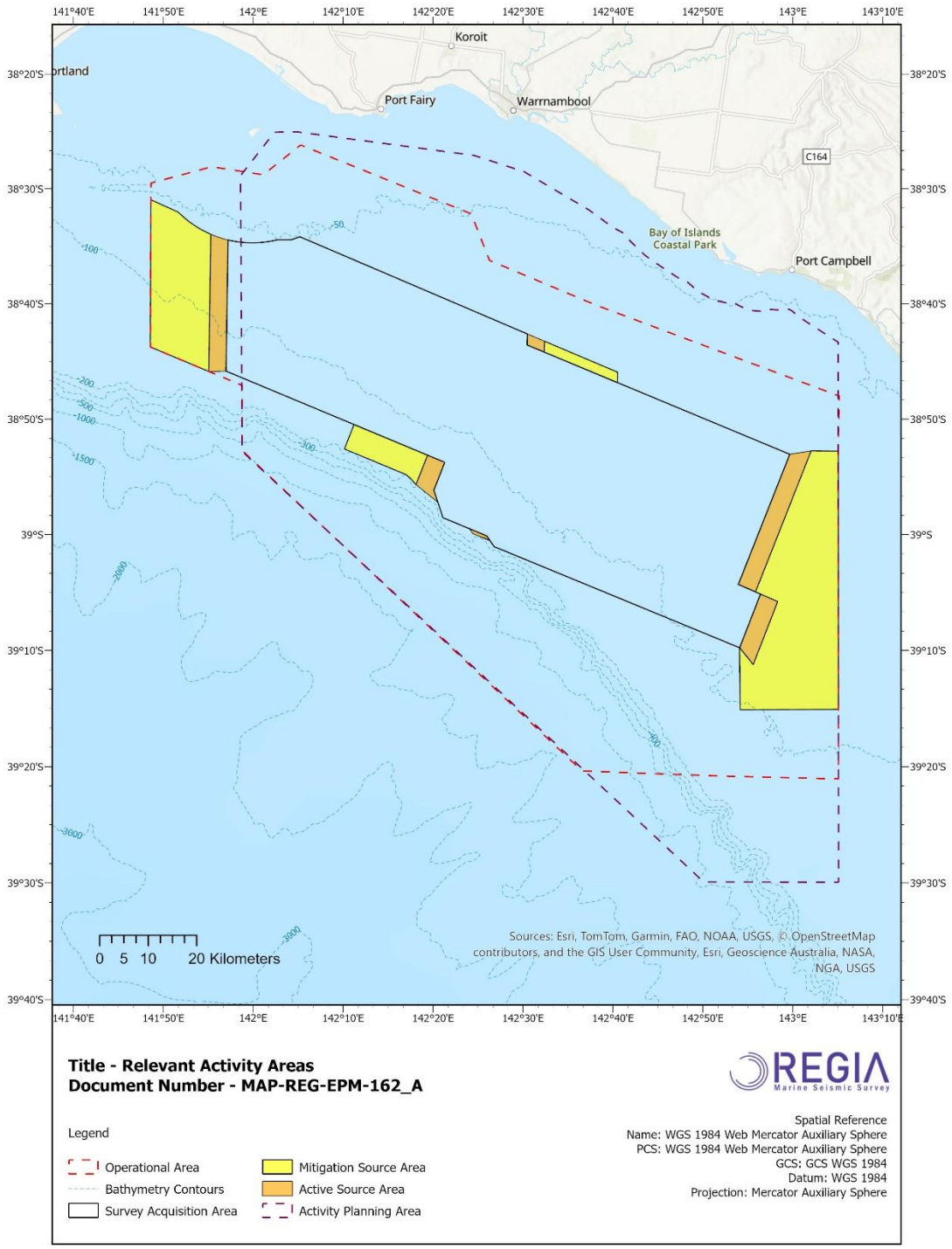

Figure A2-2 – Map of Relevant Activity Areas

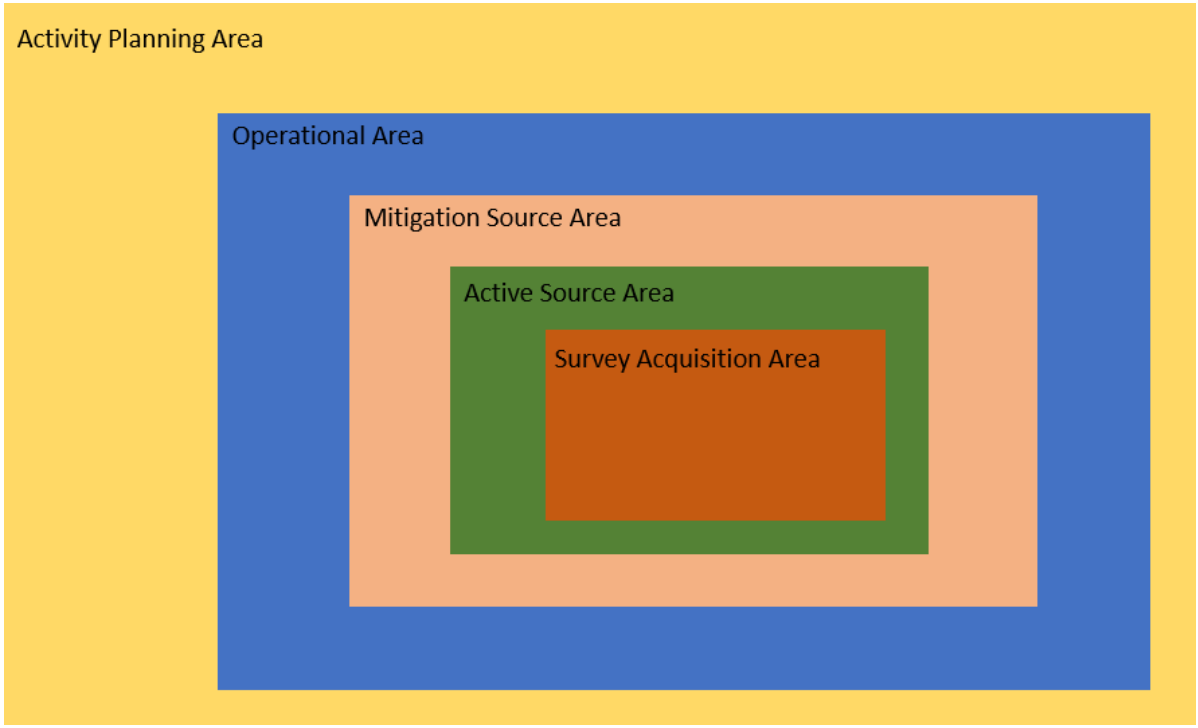

Figure A2-3 – Graphic of Relevant Activity Areas

3.4.1 Operational Area

The Operational Area for the Regia MSS has been refined through consultation and throughout the environmental assessment process. In May 2023, it was decided that the Operational Area needed to extend westward to meet geophysical objectives of acquiring full data up to the boundary of petroleum title Vic/P79. This required an extension to the Operational Area beyond the Activity Planning Area. This change was communicated at community sessions throughout May and in the May newsletter. The final coordinates for the Operational Area are shown in Appendix B12 MAP-REG-EPM-041_B.

3.4.2 Mitigation Source Area

The Mitigation Source Area has been added to the activity description following confirmation of the Survey Acquisition Area such that draft sail lines are known and to clarify when low-power sound discharges can be made.

3.4.3 Active Source Area

The Active Source Area for the Regia MSS has been reduced through consultation and thorough environmental assessment. Like the Operational Area, in May 2023, it was decided that the Active Source Area needed to extend westward to meet geophysical objectives. This required an extension to the Active Source Area up to the western edge of the Activity Planning Area. This change was communicated at community sessions throughout May and in the May newsletter. The final coordinates for the Active Source Area are shown in Map 042 (MAP-REG-EPM-042).

3.4.4 Survey Acquisition Area

The Survey Acquisition Area for the Regia MSS has been reduced through consultation and through environmental assessment. It is entirely contained within the Active Source Area and the activity

limitations related to depth contours adopted through consultation provide the boundary of the area. The sail lines are entirely contained within the Survey Acquisition Area. The final coordinates for the Survey Acquisition Area are shown in Map 088 (MAP-REG-EPM-088).

3.5 Seismic Survey

Seismic surveying is a widely used exploration method to define and analyse subsurface geological structures in the marine environment. Seismic surveying uses a technique that directs acoustic energy into subsurface geological structures from equipment deployed from a specifically design survey vessel. This activity is called a marine seismic survey (MSS) and includes the towing of a sound source and multiple streamers along sail lines, day, and night.

3.5.1 Streamers and Sail Lines

The survey vessel will tow streamers. The streamers contain sound sensors that detect the pressure and velocity of sound levels reflected from the geological structures being targeted. Table A2-3 provides relevant environmental management details about the streamers and sail lines. The survey may be carried out in sections allowing flexibility for the activities to adapt to environmental features and occurrences such as marine fauna observations. Indicative sail lines have been numbered to facilitate communication with other marine users and inclusion of some limitations on lines acquisition order (see Activity Limitation 12). The indicative sail line numbers can be found in Map 163 (MAP-REG-EPM-163).

Table A2-3: Environmentally Relevant Details for Streamers and Sail Lines

Parameter	Details	Environmentally relevant information
Maximum number of streamers	16	Using more streamers lessens the acquisition time. The highest number of streamers will be used that meet geophysical objectives of the survey and vessel recording capability.
Maximum length	8,100 m	The streamers will trail behind the survey vessel and present a hazard to navigation and marine fauna.
Maximum depth below sea surface	25 m	
Average and maximum streamer horizontal separation	100 m (average) 200 m (maximum)	Separation distance will be maximised whilst meeting survey objectives and vessel capability to lower the acquisition time. Streamer fanning will be used to increase the swath width at the end of the streamer array to minimise the need for in-fill lines.
Streamer type	Solid or gel core	The streamers are made of a solid core construction, with either a solid foam core or a solid gel core used for internal ballast.
Maximum number of sail lines in the racetrack survey design	Unknown	Number of sail lines will be minimised to reduce acquisition time.
Likely sail line orientation	North-west to South-east	Decreases acquisition time and decreases sound levels received at mainland Victoria due to increased sound profile forward and aft of the sound source.
Minimum line separations	500 m	Separation distance will be maximised whilst still meeting geophysical objectives.

Within the streamers, acoustic transponders, also known as Ultra-short BaseLine (USBL) acoustic positioning beacons, form part of the seismic spread and will be used intermittently for streamer and equipment micro-positioning. These systems are narrow band high-frequency (65 kHz), short-

duration (milliseconds), relatively small sources (60 – 100 cui) like typical vessel-based fish finders /echosounders. The sound emitted from the USBL's is designed to communicate very precise location data to receivers placed in the adjacent streamers (i.e. within hundreds of meters). This ancillary source of sound is managed under the same control framework as the sound source which entirely subsumes the small acoustic footprint of the USBL's (Event ID EVT352).

3.5.2 Sound Source

The survey vessel will acquire the seismic data by towing three acoustic source arrays with three sources per array operating sequentially, one array discharging as the others recompress. Details about the sound source that are relevant to environmental management are provided in Table A2-4. These details provide the basis upon which predictions of sound levels and attenuation in the marine environment can be made.

Table A2-4: Environmentally relevant details of the sound source

Parameter	Details	Environmentally relevant information
Number of source arrays	Three	Nil
Maximum tow depth	8 m	Nil
Working Frequency range	0-200 Hz	Nil
Low-power mode	70 – 100 cui	Used to transit between survey lines anywhere in the Operational Area. Used to manage impacts to flocks of foraging seabirds observed within 500 m of the survey vessel.
Maximum total volume	2,630 cui	Minimised to achieve survey objectives.
Core operating pressure	2000 psi (~1950-2050 psi)	Minimised to achieve survey objectives.
Shot point interval	12.5m	Minimised to achieve survey objectives.
Towing speed	4-6 knots	Speed over ground, minimised the risk of collisions with marine fauna.

The sound source will be towed along a series of adjacent and parallel sail lines in a 'racetrack' like pattern. At the end of the first line, the vessel will turn in a wide arc to position itself for another parallel line in the opposite direction, offset by several kilometres from the previous line. The vessel will then turn again to position itself to return in the original direction along a third parallel line, offset from the first line. This pattern is repeated in the survey acquisition area until the required coverage is completed.

To obtain full coverage of the eventual acquisition area the seismic source must remain at full power for at least half a streamer length prior to the vessel turn. This 'run out' of the acquisition area occurs each time the vessel ends an acquisition sequence and occurs entirely within the Active Source Area. Then, during the 'run in' to the Survey Acquisition Area, soft-start procedures (see Appendix G1 or G2 for details), begin with the operation of the single smallest air chamber in the array and then the gradual ramp-up to include additional air chambers until the source is at full power for the commencement of full power acquisition at the Survey Acquisition Area boundary.

The source may be operated below full power for short durations in the Active Source Area for maintenance and testing. These activities are infrequent and typically involve intermittent discharge of individual air chambers.

3.6 Support Activities

Support activities include:

- Survey vessel when the sound source is not active.
- Support vessel operations for safety, resupply, staff transfers, and maritime observations.
- Aviation operations for staff transfers and resupply.

In the unlikely event of an emergency additional vessels and aircraft may be deployed to assist the response efforts.

3.6.1 Vessels

The survey will be conducted using a purpose-built seismic survey vessel. Its purpose is to tow the sound source and streamers along the sail lines. The survey vessel will have a small on-board workboat, which may be launched to assist with equipment deployment and retrieval, or to carry out streamer maintenance activities. The survey vessel will also have a fast rescue craft (FRC) on-board. Environmentally relevant details of the survey vessel are included in Table A2-5.

Table A2-5: Environmentally Relevant Details of the Survey Vessel

Parameter	Details	Environmentally relevant information
Vessel length	90 – 130 m	Potential for interference with other marine users, inform expected sound source.
Total crew accommodation	70 - 80 people	Accommodating crew results in the discharge of sewage, greywater, reverse osmosis brine from water treatment, and food wastes.
Vessel class	1A1	This class has two fully independent propulsion systems providing redundancy in the event of loss of steerage.
Endurance at sea	32 days	Refuelling, crew transfers, bulk transfers of chemicals, waste, and supplies will occur during the activity.
Largest fuel tank size	257.4 m^3	Results in a worse-case credible oil spill risk in event of a vessel collision. Note: a volume of 250m^3 has been used as the worst-case release because fuel tanks are rarely topped out and hydrostatic pressure and/or ballasting can prevent release of the full inventory.
Dynamic positioning	No	Informs expected level and sound source of continuous sound from vessels.
Propulsion and power	Main engines, generators, and bow thrusters.	Results in discharges of cooling water and bilge water.
Vessel lighting – navigation	Minimum for safe navigation.	Mandatory indication of the 'restricted ability to manoeuvre.'
Vessel lighting – safe work	Minimum for safe work.	The working deck areas will be lit as required to provide for safe work.

At least two (2), and no more than three (3) support vessels, comprising a 'supply vessel' and at least one or two smaller 'escort vessel(s)', will accompany the survey vessel to provide logistical, safety and

equipment management duties. At least one vessel will be rigged and capable of towing the survey vessel in the case of an emergency. The support vessels will mobilise to and from the mainland to undertake re-supply, refuelling and other support functions for the activity.

The support vessels may be required to leave the operational area to respond to unplanned events such as retrieval of accidentally over boarded floating objects, or communicating with a third-party vessel, or for other logistical and safety reasons. The support vessels transit between the port and the activity at a frequency dependent on logistics schedules and/or issues arising.

In addition, there will be one (1) spotter vessel as part of the marine spread dedicated to marine fauna observation. It will be used near the survey vessel and tasked as required by the prevailing circumstances to improve marine fauna detection capabilities.

3.6.2 Aircraft

Aircraft maybe used for crew changes, critical equipment supply, surveillance and emergency response uses. Aircraft includes helicopters, fixed wing planes, and drones. Helicopter operations occur as needed, which is approximately once every 3-4 weeks.

4 Additional information relevant to consideration of environmental impacts and risks of the activity

4.1 Supporting Operations Conducted Outside the Activity Boundary

For the purposes of this EP, the petroleum activity boundary has been drawn to coincide with the boundary of the petroleum title area and the Operational Area. This defined boundary encompasses all operations involving the use of the seismic sound source, associated survey lines, and the physical presence of the source and support vessels during acquisition (Section 3). Two supporting operations essential to the effective implementation of fauna management measures will be conducted outside the petroleum activity boundary:

1. **Marine Fauna Spotter Vessel Operations:** A dedicated spotter vessel will operate at variable distances beyond the activity boundary to visually detect marine fauna, particularly cetaceans, in accordance with defined performance standards and shutdown procedures. Its role is to support implementation of control measures designed to reduce risk of exposure to underwater sound and ensure impacts are reduced to ALARP and acceptable levels.
2. **Deployment of Passive Acoustic Monitoring Buoy(s):** One or more autonomous acoustic monitoring devices may be deployed outside the activity boundary in fixed locations to supplement visual monitoring and detect exceedances of ambient sound levels.

While both the spotter vessel and PAM buoy(s) are located outside the defined boundary of the petroleum activity, these operations are functionally and operationally integral to the conduct of the petroleum activity as described in this EP. These operations:

- Are necessary for the management of environmental risks associated with the petroleum activity, particularly underwater sound exposure to marine fauna.
- Are being carried out in connection with the exercise of a right under a petroleum title, and do not constitute standalone works or independent research activities.
- Are not being undertaken for the purpose of acquiring data to discover, evaluate, or assess the commercial potential of petroleum resources, and therefore do not constitute ‘exploration’ as defined under section 19 of the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act).
- Do not require a separate petroleum title or access authority under the OPGGS Act.
- Have been fully described and assessed within the impact and risk assessment sections of this EP, including all environmental impacts and risks associated with their off-boundary location.

As such, while no separate title is required for these support operations (consistent with section 19 of the OPGGS Act and NOPTA’s guidance on the extended meaning of “explore”), the associated impacts and risks have been fully described and assessed in this EP.

Map 168 (MAP-REG-EPM-168) shows the Operational Area and the Support Operations Area (**SOA**) to illustrate the petroleum activity boundary and the indicative zones in which the spotter vessel and buoy may be deployed. It represents an area 23 km from the Active Source Area, clipped to the Operational Area on the southern boundary, and extended to the boundary of Commonwealth waters to the north of the survey.

CGG’s consultation approach of total transparency ensured that relevant persons were consulted in relation to these support operations prior to the formal definition of the SOA. While these operations are not part of the petroleum activity as defined under Regulation 5 of the Environment Regulations, they were disclosed in consultation materials and discussed with potentially affected parties to

ensure transparency regarding their purpose and location. No material concerns were raised in relation to these support operations, and the recent delineation of the Supporting Operations Area reflects updated guidance and improved clarity, rather than a change in the nature or scope of the activity consulted upon.

4.2 Activity Limitations

Following consultation with relevant persons, and completion of the environmental assessments, the following activity limitations have been adopted. These activity limitations have been referred to throughout the environmental assessment, consultation, and public comment processes.

Activity Limitations Relevant to Protecting Environmental Values and Sensitivities

1. No seismic acquisition within 17 km of Deen Maar / Lady Percy Julia Island. [2]
2. No anchoring permitted within the operational area to eliminate benthic disturbance.
3. In September, October, November or December, the acquisition lines will be acquired working from the deepest lines first.[3]
4. Operate the sound source at low power during line turns and if transiting between sail lines anywhere in the Mitigation Source Area, Active Source Area, and Survey Acquisition Area.[4]
5. The seismic vessel will operate at up to 6 knots speed over ground during acquisition.[5]
6. Data acquisition will follow along the 293°/113° azimuth orientation.[6]
7. No petroleum activity to be carried out between 1 January and 15 September.
8. Only commence lines 1 -30 after 1 November and if SRW are confirmed to have been absent from the reproduction BIA (between and inclusive of Cape Bridgewater and Cape Otway) for 24-hours .[7]
9. No vessel movements in between Deen Maar/Lady Percy Julia Island and the mainland.

Activity Limitations Relevant to Protected Areas

10. No discharge of the sound source within the West Tasmania Canyons KEF.
11. No discharge of the sound source within the Bonney Upwelling KEF.
12. Bunkering operations will not occur within 50 km of a Commonwealth or State marine park.
13. Ballast water exchange activities will be conducted outside of Marine Protected Areas.
14. No vessel movements within 5 km of the Twelve Apostles State Marine Park.[8]
15. No activities within a designated Australian Marine Park (State and Commonwealth).

[2] 17 km is based on the furthest distance from the Active Source Area to Deen Maar. It was set as a more tangible limitation beyond the 50 m bathymetry contour which moves and differs across datasets. It also covers relevant effects to other values such as pinnipeds and divers.
[3] The deepest line is the most southerly line (i.e. from line 67, see Mapp 088). Measure designed to mitigate interactions with Blue Whales who might traverse the intended MSS area as they move towards their summer feeding grounds recognising historical feeding patterns and timing.
[4] As requested by the Director of National Parks.
[5] Measure adopted to minimise risks of collisions with marine fauna.
[6] This aligns with the modelled approach ensure impacts are as predicted by the sound propagation modelling.
[7] This measure has been adopted following further assessment (Appendix F3) related to managing predictive uncertainty associated with behavioural disturbance to SRW in the reproduction BIA.
[8] 5 km is based on a reasonable buffer to reduce IMS risks to the park values following consultation with Parks Victoria.

Activity Limitations Relevant to Compliance

16. The sound will not be emitted above the stated capacity.
17. The sound source will not be discharged at full power while stationary.

Activity Limitations Relevant to Protecting Other Marine Users

18. Excise areas of the acquisition area that have been identified to cause exceedances of safe diving thresholds.[9]
19. In waters deeper than 200 m, interfere with commercial fishers to no greater extent than is necessary for the efficient completion of the survey.[10]
20. No MSS acquisition beyond 200 m depth contour.[11]
21. No vessel movements within 700 m of fishing blocks G12, G13, H13, and H14.[12]
22. No vessel movement within 4 nautical miles of the coast, except in case of emergency.[13]
23. No sound source discharges within the Orange Roughy research program areas.[14]

[9] [Sentence has been updated in response to Matter F17].

[10] Measure adopted to manage interference with trawl fishers subject to their cooperation.

[11] Measure adopted to manage interference with trawl fishers and to protect commercial target fish and invertebrate species in this area.

[12] 700m is based on the no effect distance for invertebrates, the target species of the fisher in these blocks.

[13] This limitation ensures no overlap with local yacht races and was set before the depth contour limitations. This means that there is further distance between the activity and the local yacht races.

[14] This limitation was adopted following consultation with the trawl fishing industry association.

5 Document Control

Table A2-6 - Revision history

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	24 March 2023	MS	Initial version taken from Activity Overview flyer which was published 1.2.23.
0.1	29 March 2023	LT/PR	Review by CGG.
0.2	30 March 2023	MS	Updated following CGG review.
1.0	31 March 2023	MS	Published on Regia MSS Consultation Hub website.
1.1	30 June 2023	MS	Updated following consultation to include commitments for activity limitations (not published).
1.2	14 September 2023	MS	Updated following completion of impact and risk assessments to add further activity limitations. Also added the proposed active source area and operational area (not published).
1.3	26 September 2023	PR/LT	CGG Review.
2.0	30 September 2023	MS	Published on Regia MSS website.
2.1	31 October 2023	MS	Updates to include refined activity limitations following consultation.
3.0	29 December 2023	MS	Reviewed following updates to Appendices D1 – D4 and E1 – E10. Preparation for submission to NOPSEMA for public comment.
4.0	11 May 2024	MS/PR/LT	Additional activity limitations added because of passage of time, new literature, public comments, and revision of the EP. Also added spotter vessel to marine spread.
5.0	31 October 2024	MS/PR/LT/DT	Updated following NOPSEMA assessment and inclusion of the survey acquisition area.
6.0	16 April 2025	MS/PR/IB/PS	Updated following NOPSEMA OMR 1 Letter
7.0	23 June 2025	MS/IB	Alignment of ASA, OA, and MSA text.
8.0	17 November 2025	MS/CT/RH	Updated to reflect the lower source, removal of the April – June operational window, removal of the first two weeks of September, feedback about transducer usage, and other consequential changes because of responding to the OMR letter.

Annex 1

Public Comment

Table A2-7 shows how the Matters raised during public comment have been incorporated into the EP in this document.

Table A2-7 - List of changes arising from public comment matters

Matter	Matter ID	Changes made arising from public comment
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and M#01: Activity limitation, to reflect that the sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the safety criterion human health safety criterion for recreational divers, surfers and swimmers along the coastline. CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F1 F3, and G1.).

Annex 2

Objections and claims raised through consultation

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4097	Excising Giant Crab and Southern Rock Lobster habitat within the canyons as necessary to reduce impact to these species.	The titleholder responded with information relating to the exclusion zone that will be implemented: No acquisition within the West Tasmania Canyons KEF. (Event ID: 1751)	653
4144	Off-shore Portland is special and needs protection from seismic interference	There are a variety of environmental protections in place for the offshore Portland area. There includes activity limitations found in A2 and measures adopted to manage each environmental aspect of the activity best reviewed in Annex 2 of the EP Summary.	3021
4171	Seismic array to operate at low power during line turns to minimise the risk of SRW and BW entering the zone of potential TTS or behavioural disturbance during shut down.	The titleholder responded with an explanation that this is a standard control and will be implemented as will soft starts of the seismic source after completing a line turn. (Event ID: 1751)	653
4172	Seismic array to operate at low power during line turns to minimise the risk of SRW and BW entering the zone of potential TTS or behavioural disturbance during shut down.	The titleholder responded with an explanation that this is a standard control measure and will be implemented along with soft starts of the seismic source after completing a line turn (Event ID 1751).	1751
4185	Significant risk to the ecologically sensitive Bonny upwelling.	The titleholder provided a justification for the need for petroleum activities under the current government policy and provided information on how the survey has been designed the to ensure potential impacts are reduced to acceptable levels (Event ID 2630).	4808
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4232	The feedback expresses frustration over repeated seismic blasts in the same area, emphasising the significant environmental impacts associated with these activities. It calls for accountability from NOPSEMA to prevent future occurrences, highlighting the ongoing threat to the environment.	The Regia MSS is targeting areas that have not been surveyed before though we acknowledge there may be some overlap with previous surveys. We must show that the environmental impacts are short-term, localised, or recoverable and that they are controllable with appropriate measures in place.	2104
4245	The fisher objected to seismic activities, noting adverse impact on the local fishing industry. He described how seismic activities have driven other fishers away, and he thinks he is the last remaining commercial fisher out of Port Campbell.	CGG acknowledges that the fishing industry has few vessels now than historical averages. CGG studied the catch history block by block in the region and found more than 70% of SRL catch was from inshore waters. This led to depth exclusions for the survey. Further, for this fisher, they shared that they fish only in blocks near to Port Campbell. Therefore, CGG decided to exclude all activities from these blocks.	2026
4279	The stakeholder expresses concern that the proposed seismic blasting will disrupt the travel paths of whales, particularly after efforts have been made to allow their populations to recover. They emphasise the potential harm to these animals from creating explosions in their migratory routes, arguing against any activities that threaten their sustainability.	We are working hard to design our survey so that we limit our impacts to acceptable levels. Our activity is no more than 90 days, so we'll find an appropriate window to operate in. We will not destroy any wildlife habitat because of our activity (Event ID 2109).	2109
4283	The stakeholder noted concern about the impact of the project on the Twelve Apostles Marine Park.	There will be no activities within the Twelve Apostles Marine Park and consultation with Parks Victoria has resulted in a limitation to avoid the park.	2282

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4290	The stakeholder raised a concern during an in-person meeting with the titleholder. The stakeholder fishes for Giant Crab and Blue-eyed Trevalla to a depth of 90-200 fathoms (+200m). The stakeholder's concerns were in relation to interference with all year-round fishing activities and the Giant Crab spawning activity September – November each year.	CGG has agreed to avoid the +200m area for acquisition and minimise it operation time in these depths.	4076
4298	The stakeholder stated Australia has adequate gas reserves and was concerned that exploration was to take place in a region that is a whale sanctuary and unspoiled.	We understand community views about the ongoing need for gas in Australia (or lack thereof) as the country navigates the energy transition. The current government policy is that more gas is needed, and petroleum exploration titles continue to authorise the exploration process, including seismic surveys. Matters of national energy policy are not within the purview of CGG or the Regia MSS. We will register claims related to the ongoing need for gas and provide those to NOPSEMA. We also advise that these concerns are better directed to your State or Federal members of parliament and/or the State or Federal Resources Ministers. The Otway Basin has been one of Australia's largest producing gas fields since the 1980's, servicing both domestic and commercial energy needs for the East Coast. It is for this reason that the government has awarded titles for further exploration.	1747
4360	The Stakeholder noted concerns about the impacts of activity on the view.	The titleholder acknowledged this concern, regarding the disruption of ocean view, the titleholder advised the stakeholder the seismic survey vessel activity will be limited to a maximum of 90 days, during which it will be in continuous movement in the activity area. It will be approximately 7nm offshore, at its closest point, with the rest of the survey much further offshore. The Regia MSS will not impact the view of the ocean.	970

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4491	Claims about the SRW and BW BIAs. States proposed activity will cause unacceptable impacts to all Karntubul species, including temporary & permanent hearing loss, displacement from BIAs, vessel strike, prey depletion during peak feeding/migration period, calving interruption, and impact to ecosystems and cultural landscapes as a result of the cumulative impact of these.	CGG has identified all Biologically Important Areas (BIAs) relevant to blue whales (BWs) and southern right whales (SRWs) and incorporated seasonal BIA use into the survey design through substantial temporal and spatial restrictions detailed in the EP. Predicted underwater-sound impacts on these Karntubul species, along with mitigation measures presented in Appendices E7 and F3, demonstrate impacts will remain acceptable and will avoid auditory impairment or displacement from BIAs or Habitats Critical to Survival (HCTS). CGG further notes that vessel-strike risk is already extremely low during seismic surveys and that additional controls in Appendix D2 ensure this risk is prevented and acceptable. It concludes that no changes to ecosystem structure, diversity, or function are expected from the one-off survey, with sound exposure too limited in extent and duration to affect prey, food webs, or predator–prey relationships. A cumulative impact assessment found residual cumulative effects to be low, reduced to ALARP, and acceptable, with no impacts predicted for regional marine parks. CGG also asserts consistency with the National Recovery Plan for Southern Right Whales and the Blue Whale Conservation Management Plan, stating that their objectives and recommended measures have been incorporated. Finally, CGG maintains that all marine mammal species likely to occur in the region have been adequately assessed using up-to-date EPBC Protected Matters data, and that mitigation measures ensure impacts to all listed species will remain acceptable and not inconsistent with EPBC Act protection provisions.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4492	Claims that the eastern population of the Southern Right Whale, estimated at only 200–300 individuals, is at particularly high risk because its migration and reproduction Biologically Important Areas (BIAs) overlap directly with CGG's Operational Area and sound propagation footprint. According to the Southern Right Whale Recovery Plan, these whales use the affected region for reproduction between May and September and for migration between April and October. The Recovery Plan also notes that Southern Right Whales do not feed in coastal waters but are expected to feed, and possibly conceive, within the Australian Whale Sanctuary—an area entirely overlapped by the proposed Regia MSS activity. As a result, the seismic survey could occur within, or affect, conceiving, calving, and feeding grounds for this critically endangered sub-population. The species is particularly vulnerable to human impacts due to its low reproductive rate, long lifespan, and strong site fidelity to key habitats. The submission therefore emphasises the relevance of underwater noise, habitat degradation, and vessel-strike risks in the context of the proposed seismic activities.	The Recovery Plan explains that BIAs can be designated for key behaviours such as reproduction, foraging, migration, and resting. While Southern Right Whale BIAs in the Plan cover reproduction and migration, the Plan notes that foraging occurs across a much broader offshore latitudinal range (30°S–65°S) and is not linked to these BIAs. Because the Regia MSS is not located in Antarctic waters, it will not affect cetaceans that forage there. CGG states the survey will avoid peak SRW abundance in the mapped BIA and apply mitigation measures to ensure no SRWs are harmed, injured, or interfered with.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4496	GMTOAC objects to CGG removing a previous control measure limiting seismic discharge in the Pygmy Blue Whale foraging BIA during periods of low whale presence, replacing it with a vague condition requiring CGG to determine whether whale presence is "compatible" with proceeding. GMTOAC argues this new measure lacks detail on how whale presence or "unacceptable disturbance" will be assessed, and that it fails to reference Recovery Plans which define unacceptable impacts. GMTOAC warns that the proposed survey timing (April–June 2026) coincides with peak Pygmy Blue Whale foraging season and Southern Right Whale migration and calving periods, meaning the seismic survey is likely to occur when both species are using their BIAs. Preventing whales from accessing these areas, or exposing them to injury while they remain, would constitute unacceptable impacts inconsistent with Recovery Plan objectives.	CGG has further reduced the likelihood of interactions with marine mammals by excluding the April–June period and commencing the survey only after 16th September. Because blue whales typically do not arrive from Western Australia until November, CGG argues that most of the survey will occur when blue whales are absent from the area. It adds that sighting data show very few blue whales in November and December, with peak abundance occurring later, from January to March during the Bonney Upwelling.	EVT352

4503	GMTOAC claims inconsistencies and contradictions within CGG's April 2025 EP, particularly regarding the enforceable activity limitations intended to reduce risks to Southern Right Whales and Blue Whales. GMTOAC notes that NOPSEMA previously identified this issue in 2024, stating that duplication and inconsistencies left "no single source of truth" for assessing the EP. GMTOAC believes this fundamental flaw remains unresolved in the April 2025 version, undermining the reliability and enforceability of CGG's proposed control measures. GMTOAC provided the following examples: • Although the EP states that Appendix A2 contains the "final" list of enforceable activity limitations, it later states that Appendix G1 is "controlling" and overrides other lists. GMTOAC notes that many measures appear in one appendix but not the other, and others contain conflicting descriptions. For example, Appendix A2 and Appendix G1 both outline conditions for discharging the sound source in the Southern Right Whale reproduction BIA, but the conditions differ in scope and detail. GMTOAC warns that such internal discrepancies create confusion for vessel crews and contractors and could jeopardise the species the measures are intended to protect. • GMTOAC highlights conflicting and unclear role descriptions across appendices, particularly for key positions such as the Survey Environment Advisor and Environmental Officer. Responsibilities differ between Appendix G1 and G2, creating uncertainty about who is accountable for shutdowns, communication, monitoring, aerial surveys, technology trials, and 24/7 oversight. GMTOAC notes that the EP does not clarify whether multiple staff will be appointed to fulfil these demanding roles. • Several measures appear in one appendix but not another. For instance, Appendix G2 requires pre-survey aerial surveys, but this requirement is	CGG rejects claims of inconsistency between Appendices A2, G1 and G2, however the stakeholder may have misunderstood the distinction between activity limitations and control measures. Appendix A2 sets enforceable activity limits, measures that restrict operations to avoid or reduce impacts—while Appendix G1 details the control measures, performance standards, and procedures used to implement those limits in line with NOPSEMA's definition of controls. A2 and G1 serve different but complementary purposes, with A2 defining mandatory constraints and G1 outlining the operational steps required to meet them, together ensuring SRWs are protected from behavioural disturbance. G1 and G2 are also complementary rather than conflicting: G2 defines roles and responsibilities, while G1 outlines the controls and measurement criteria used to verify them. CGG maintains that the Environmental Officer and Survey Environment Advisor roles are clearly aligned across both appendices, collectively providing continuous oversight, shutdown authority, monitoring coordination, and expert engagement. CGG also notes that activity-level commitments, such as drone and satellite detection trials, rightly sit in G1, while position-specific duties like aerial surveys sit in G2. It states that the EP is intentionally structured so A2, G1 and G2 each fulfil distinct functions within an integrated management system, providing operators with clear instructions, objective decision-making criteria, and independent oversight from the Expert Panel. CGG concludes that this framework ensures transparent, robust management and effective protection of Southern Right Whales and Pygmy Blue Whales.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	absent from the controlling Appendix G1. Similarly, Appendix G1 includes commitments to trial drone and satellite detection technologies, but these are not included in the Fauna Management Plan, leaving unclear whether they are required or how their effectiveness will be assessed. • GMTOAC claims that these inconsistencies make it difficult, if not impossible, for operators to understand or correctly implement the required measures, with potential serious consequences for Nyamat Mirring, its ecosystems, and culturally significant species such as Southern Right Whales and Pygmy Blue Whales. They also express concern that CGG's qualitative measures, such as determining whether disturbance is "acceptable", lack objective criteria and fail to involve the Whale Expert Panel or reference Recovery Plan standards.		

4504	GMTOAC objects to the weakening and inconsistency of shutdown measures between the November 2024 and April 2025 versions of CGG's EP. The earlier EP committed to shutting down the sound source if any whale was within 2 km (with larger buffers for Southern Right and Blue Whales), but the April 2025 EP introduces a much smaller 500 m shutdown zone for most whales, which GMTOAC argues increases the risk of exposure to harmful sound levels. GMTOAC notes that the April 2025 EP creates confusion by implying that CGG's "shutdown zone" is actually a 2 km low-power zone, despite providing no explanation of what "low-power" means, what sound levels it produces, or how continuous low-power operation affects Karntubul, other cetaceans, or cumulative noise exposure. This contradicts Appendix G2, which states CGG will use a shutdown zone rather than a low-power zone, consistent with EPBC Policy Statement 2.1. GMTOAC warns that such internal contradictions undermine the reliability and enforceability of mitigation measures. GMTOAC questions CGG's assumption that a 10 km behavioural shutdown zone will protect Blue Whales, given scientific uncertainty about behavioural impact distances. They highlight evidence that seismic noise can mask baleen whale calls across thousands of kilometres, that ambient noise levels can be elevated by 25 dB over 40 km from air-gun operations, and that reverberated pulses can create near-continuous noise for months. GMTOAC argues that such persistent elevated noise levels could impair communication, migration, and calf–mother cohesion, posing cultural and ecological harm, and that CGG's 10 km buffer is therefore not precautionary. GMTOAC is also concerned about ambiguity over whether shutdown means turning the source off or merely reducing power, noting that this	All relevant details of the sound source, including low-power mode, is in Appendix A2. We have also committed to a full shutdown if any whale enters the 2 km shutdown zone, far more precautionary than the EPBC Policy 2.1 requirement of a 2 km low-power zone and a 500 m shutdown zone. This approach exceeds industry standards and legislative requirements for mitigating potential impacts from seismic sound sources. Our EP applies a suite of measures designed to ensure impacts to Blue Whales and Southern Right Whales remain at acceptable levels. We will shut down the sound source immediately upon detection of any SRW, including cow–calf pairs, and we will manage to ambient sound levels in the SRW reproduction BIA to ensure those levels are never exceeded. The Regia MSS is a short, temporary activity, 90 days in total, including 60 days of acquisition, so any increase in ambient noise will be brief and localised. No exceedance of ambient sound levels will occur in the SRW reproduction BIA during the reproductive season, ensuring cow–calf pairs are not exposed to elevated noise or displaced from critical habitat. Our shutdown zones include highly conservative buffers well beyond standard requirements, further reducing potential impacts. Collectively, these measures ensure any short-term noise increases are managed to acceptable levels, consistent with the precautionary intent of relevant recovery plans. Appendix B8 addresses acoustic masking using recent scientific literature, not the older references cited by GMTOAC. For example, Nieukirk et al. (2012) showed that airgun signals detected thousands of kilometres from fin whales were unlikely to have direct effects, with the most probable impact being reduced communication range. Even then, the study had major limitations, including uncertainty about the actual distance between vocalising whales and receivers. Key context from Estabrook et al. (2016) is omitted, which analysed multiple seismic surveys over multiple years. That study does not represent received levels for animals closer to the sound source and therefore is not applicable to the Regia MSS. No other seismic	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	ambiguity is not precautionary and risks behavioural impacts for Blue Whales.	surveys are currently planned in the Otway region, further limiting the relevance of that study's conclusions	

REGIA
Marine Seismic Survey

Legislation and Other Requirements Relevant to the Environmental Management of the Activity

Appendix B2: REG-EP-005-B2

Rev 5

December 2025

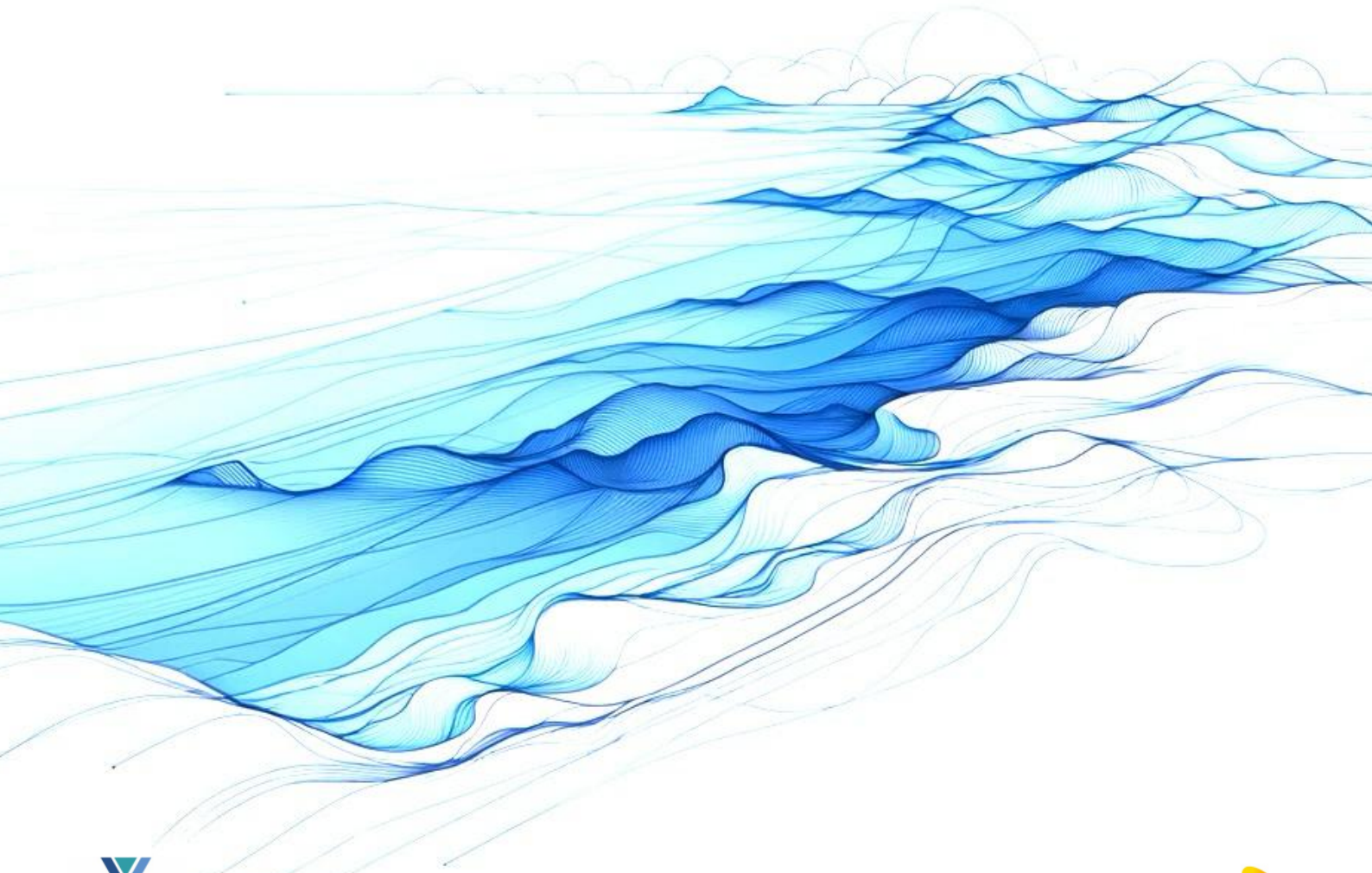

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Table of Contents

1 Introduction 3
1.1 Background 3
1.2 Purpose 3
1.3 EBPC Act Streamlining 3
2 Compliance with Legislation and Other Requirements 4
3 Principles of Ecologically Sustainable Development 5
4 Relevant Person Consultation 5
5 Legislative and Other Requirements 6
6 Document Control 54

1 Introduction

The impact and risk analysis documents (Appendix D1 to D4 and E1 to E9) demonstrate how the requirements identified as relevant to the Regia MSS will be met throughout the activity.

This document will be updated over time to reflect changes to the regulatory framework, including the introduction of new and updates to existing legislation and other requirements. These changes will be reviewed against the impact and risk analysis documents (Appendix D1 to D4 and E1 to E9) and where appropriate these documents will be updated to include details about how the new or updated legislation and other requirements will be met throughout the activity. A register is provided at the end of the document to record changes to the document.

1.1 Background

The legislation that governs offshore activities in Australian waters is designed to ensure the protection and preservation of the marine environment and the sustainability of its resources.

The process used to identify legislation and other requirements that apply to the environmental management of the proposed activity involved a comprehensive review of legislation, policies, guidelines, and advice at the Commonwealth and State (Victorian and Tasmanian) levels. This was initially done in March 2023 based on the Activity Planning Area which was within Commonwealth waters and the Environmental Planning Area which is within Commonwealth, Victorian and Tasmanian (King Island) waters. Since then, the Operational Area has been defined and supersedes the Activity Planning Area. The Operational Area, like the Activity Planning Area, is totally within Commonwealth waters. A review of this document was undertaken in January 2024, and more recently in April 2025 to identify any new or changes to legislation and other requirements applicable to the Operational Area.

Environment Plans previously submitted and accepted by NOPSEMA were used to validate the process.

1.2 Purpose

This document aims to provide a comprehensive overview of the legislation and other requirements that currently apply to environmental management of the proposed activity. Where legislation and other requirements were identified to be relevant to the Regia MSS the impact and risk analysis documents (Appendix D1 to D4 and E1 to E9) demonstrate how they will be met throughout the activity.

By complying with all applicable legislation and other requirements and updating this document as needed, the proposed activity can be carried out in an environmentally responsible and sustainable manner.

The following concepts have been identified in the NOPSEMA guidelines and form the structure of this document:

- Compliance with legislation and other requirements.
- Best practice environmental management.
- Application of the precautionary principle.
- Adaptive management approach.
- Relevant person consultation.
- Monitoring and reporting.

1.3 EBPC Act Streamlining

In 2014, the Commonwealth government amended the *Environmental Protection and Biodiversity Conservation* (EPBC) *Act* to streamline environmental approvals for offshore petroleum activities under the *Offshore Petroleum and Greenhouse Gas Storage* (OPGGS) *Act*. This amendment allows for the OPGGS (Environment) Regulations to be used as the primary mechanism for environmental

assessment and approval under the EPBC Act for offshore petroleum activities. As a result, NOPSEMA is now responsible for assessing the environmental impact of proposed offshore petroleum activities and ensuring compliance with the EPBC Act and associated policies, guidelines, and advices.

In conducting their assessment, NOPSEMA is required to have regard to a range of documents under the EPBC Act, including threatened species and ecological communities' lists, conservation advices, recovery plans, conservation agreements, and management plans (Available on the Department of Climate Change, Energy, the Environment and Water (DCCEEW)). This requirement ensures that the potential impacts of the proposed activity on the environment are assessed and managed in accordance with the regulatory framework for environmental protection in Australian waters.

- Threatened species and ecological communities' lists: These are lists of species and ecological communities that are listed as threatened under the EPBC Act 1999. The list is maintained under the EPBC Regulations 2000. These lists are used to identify and manage potential impacts of the proposed activity on these species and communities.
- Conservation advice: These documents provide information about the ecology and conservation status of listed threatened species and ecological communities. They are issued under the EPBC Act 1999 and provide guidance on the management of potential impacts of the proposed activity on these species and communities.
- Recovery plans: These plans set out the actions necessary to recover listed threatened species and ecological communities. Recovery plans are prepared under the EPBC Act 1999 and provide guidance on how the potential impacts of the proposed activity on these species and communities can be managed.
- Conservation agreements: These are voluntary agreements between the Commonwealth government and landholders or other stakeholders for the conservation and management of threatened species and ecological communities. Conservation agreements are made under the EPBC Act 1999 and the EPBC Regulations 2000. Conservation agreements can provide additional guidance on the management of potential impacts of the proposed activity on these species and communities.
- Management plans: These are plans that set out the objectives and actions for the management of protected areas, such as National Parks or Marine Parks. Management plans are made under various pieces of legislation, including the EPBC Act 1999, the National Parks and Wildlife Conservation Act 1975, and the Environment Protection and Biodiversity Conservation Regulations 2000. Management plans can provide guidance on how the potential impacts of the proposed activity on these areas can be managed.

In summary, each type of EPBC Act document provides guidance on how to manage potential impacts of the proposed activity on the environment. They help to ensure that the proposed activity is carried out in a way that is consistent with the regulatory framework for environmental protection in Australian waters, as set out in various pieces of legislation and other requirements.

2 Compliance with Legislation and Other Requirements

The proposed activity must comply with all relevant legislation and other requirements. The legislative and other requirements relevant to the environmental management of the proposed activity have been identified and are described in Section 5 of this document.

The proposed activity will be designed to comply with these legislative and requirements. Any changes to the proposed activity that may impact compliance with these legislative and other requirements will be assessed and managed through the Management of Change Process described in the Implementation Strategy (Appendix B3).

3 Principles of Ecologically Sustainable Development

CGG has completed a dedicated assessment of the Regia MSS EP preparation process for consistency with the principles of ecologically sustainable development. This can be found in Appendix F4.

4 Relevant Person Consultation

Relevant persons consultation with relevant authorities is an important part of the management of the proposed activity in accordance with the applicable legislation. The consultation with the relevant authorities ensures the proper application of legislative and other requirements that apply to the environmental management of the activity. Details of the consultation with relevant authorities can be found in Relevant Person Consultation (Appendices C1 and C2).

5 Legislative and Other Requirements

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
International Convention	Agreement on the Conservation of Albatrosses and Petrels (ACAP)	ACAP is a multilateral agreement which seeks to conserve listed albatrosses, petrels and shearwaters by coordinating international activity to mitigate known threats to their populations. Albatrosses, petrels and shearwaters are protected under the Environment Protection and Biodiversity Conservation Act 1999.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
International Convention	China-Australia Migratory Bird Agreement (CAMBA)	This agreement provides for the protection and conservation of migratory birds and their important habitats, protection from take or trade except under limited circumstances, the exchange of information, and building cooperative relationships. Birds listed in the annex of this agreement are required to be listed as migratory species under the Environment Protection and Biodiversity Conservation Act 1999.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
International Convention	Convention on Biological Diversity (CBD)	The CBD aims to conserve biodiversity, sustainably use its components, and share the benefits from the use of genetic resources. Seismic surveys may impact marine biodiversity through noise pollution or other means, so it is important to consider the potential impacts on biodiversity during the survey. In Australia, the CBD has been given effect by the Environment Protection and Biodiversity Conservation Act 1999.	Regia MSS EP has adopted specific measures to protect biodiversity refer to Appendix A2 for Activity Limitations
International Convention	Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)	The Conn Convention aims to conserve terrestrial, aquatic and avian migratory species throughout their range. Marine seismic surveys may impact migratory species such as whales or dolphins, so it is important to consider potential impacts during the survey. In Australia, the CMS has been given effect by the Environment Protection and Biodiversity Conservation Act 1999.	Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks Refer to Appendix E7 Marine Mammals for assessment of seismic effects. Also refer to G2 Fauna Management Plan

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
International Convention	Convention on the International Regulations for Preventing Collisions at Sea (COLREG)	COLREG establishes the navigation rules to be followed by ships and other vessels at sea to prevent collisions between two or more vessels. Seismic surveys may involve the use of vessels that must comply with the safety standards set out in this convention. In Australia, COLREG is implemented through the Navigation Act 2012.	This convention is implemented in Australia through the Navigation Act and the POTS package of legislation which is administered by AMSA.
International Convention	International Convention on Civil Liability for Oil Pollution Damage (CLC)	The CLC aims to ensure that victims of oil pollution are compensated for the damage caused. Seismic surveys may involve the use of vessels that carry oil or other pollutants, so it is important to consider the potential for oil spills during the survey. In Australia, the CLC is implemented through the Protection of the Sea (Civil Liability for Bunker Oil Pollution Damage) Act 2008.	This convention is implemented in Australia through the Navigation Act and the POTS package of legislation which is administered by AMSA.
International Convention	International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS)	The AFS convention aims to prohibit the use of harmful anti-fouling systems on ships, which can release toxic substances into the marine environment. Seismic surveys may involve the use of vessels that must comply with the regulations of this convention. In Australia, the convention is implemented through the Protection of the Sea (Harmful Anti-fouling Systems) Act 2006.	Refer to Appendix D1 Release of materials or waste overboard Also refer to Appendix D3 Risk assessment for introduction of marine pest species.
International Convention	International Convention on Load Lines (LL)	The convention pertains specifically to a ship's load line (also referred to as the "waterline"), a marking of the highest point on a ship's hull that can safely meet the surface of the water; a ship that is loaded to the point where its load line is underwater and no longer visible has exceeded its draft and is in danger because its capacity has been exceeded. In Australia, this requirement is implemented through the Navigation Act 2012.	This convention is implemented in Australia through the Navigation Act and the POTS package of legislation which is administered by AMSA.
International Convention	International Convention for the Control and Management of Ships' Ballast Water and Sediments	The convention is a 2004 international maritime treaty which requires signatory flag states to ensure that ships flagged by them comply with standards and procedures for the management and control of ships' ballast water and sediments. In Australia, the convention is implemented through the Biosecurity Act 2015 and associated regulations.	The CGG IMS Risk Assessment Procedure aligns with national legislative standards for IMS management.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
International Convention	International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)	The OPRC convention aims to establish an international framework for preparedness and response to marine oil pollution incidents. Seismic surveys may increase the risk of oil spills due to the use of vessels carrying fuel or other pollutants, so it is important to have a plan in place to respond to any potential spills. In Australia, the convention is implemented through the Protection of the Sea (Prevention of Pollution from Ships) Act 1983.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
International Convention	International Convention for the Prevention of Pollution from Ships (MARPOL)	This convention regulates the discharge of pollutants from ships into the sea, including discharges of oil, chemicals, sewage and garbage. Marine seismic surveys may involve the use of vessels that must comply with the regulations of this convention. In Australia, the convention is implemented through the Protection of the Sea (Prevention of Pollution from Ships) Act 1983.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
International Convention	International Convention for the Safety of Life at Sea (SOLAS)	SOLAS establishes minimum safety standards for ships, including requirements for equipment, construction, and operation.	All vessels will comply with the safety standards set out in the SOLAS convention which is implemented through the Navigation Act 2012.
International Convention	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)	STCW sets the standards of competence and certification for seafarers internationally. Seismic surveys may involve the use of vessels that must comply with the training and certification standards set out in this convention. In Australia, STCW is implemented through the Navigation Act 2012.	All vessels will comply with the STCW convention.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
International Convention	Japan-Australia Migratory Bird Agreement (JAMBA)	This agreements provides for the protection and conservation of migratory birds and their important habitats, protection from take or trade except under limited circumstances, the exchange of information, and building cooperative relationships. Birds listed in the annex of this agreement are required to be listed as migratory species under the Environment Protection and Biodiversity Conservation Act 1999.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
International Convention	Minamata Convention on Mercury	The Minamata Convention on Mercury is an international treaty that seeks to protect human health and the environment from anthropogenic (caused by humans) emissions and releases of mercury and mercury compounds.	No mercury emissions are predicted associated with the seismic survey.
International Convention	Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol)	This protocol controls the production and import of chemicals that deplete the ozone layer. In Australia, the protocol is implemented through the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989.	This convention is implemented in Australia through the Navigation Act and the POTS package of legislation which is administered by AMSA.
International Convention	Ramsar Convention on Wetlands (Ramsar Convention)	The Ramsar Convention encourages the designation of sites containing representative, rare or unique wetlands, or wetlands that are important for conserving biological diversity. Once designated, these sites are added to the Convention's List of Wetlands of International Importance and become known as Ramsar sites. Wetlands of International Importance are managed under the Environment Protection and Biodiversity Conservation Act 1999.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
International Convention	Republic of Korea-Australia Migratory Bird Agreement (CAMBA)	This agreements provides for the protection and conservation of migratory birds and their important habitats, protection from take or trade except under limited circumstances, the exchange of information, and building cooperative relationships. Birds listed in the annex of this agreement are required to be listed as migratory species under the Environment Protection and Biodiversity Conservation Act 1999.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
International Convention	United Nations Convention on the Law of the Sea (UNCLOS)	UNCLOS provides the legal framework for all activities in the ocean, including marine seismic surveys. The convention establishes the rights and responsibilities of states in their use of the world's oceans, establishing guidelines for businesses and governments to operate within maritime boundaries. In Australia, UNCLOS has been given effect by the Seas and Submerged Lands Act 1973.	This convention is implemented in Australia through the Navigation Act and the POTS package of legislation which is administered by AMSA.
International Convention	UNESCO 2001 Convention for the Protection of the Underwater Cultural Heritage (UNESCO 20021 Convention)	The Convention aims to protect underwater cultural heritage to assist countries in managing and preserving their unique underwater cultural heritage. The Convention defines underwater cultural heritage as all traces of human existence having cultural, historical or archaeological character which have been partially or totally underwater, periodically or continuously for at least 100 years. It does not include installations still in operation such as submarine cables or piers, jetties and wharves that have been utilised with the last 100 years., In this convention has been given effect by the Underwater Cultural Heritage Act 2018.	Refer to Appendix B10 - Cultural Heritage Assessment. Mitigation measures to protect cultural features, including those intangible, from relevant aspects can be found in Appendices E1-E9 - Section 8.4 - Measures Adopted to Manage Environmental Impacts.
Commonwealth Legislation	Aboriginal and Torres Strait Islander Heritage Protection Act 1984	The act provides for the protection and conservation of Aboriginal and Torres Strait Islander heritage in Commonwealth waters, including those that may be impacted by seismic surveys.	Refer to Appendix B10 - Cultural Heritage Assessment. Mitigation measures to protect cultural features, including those intangible, from relevant aspects can be found in Appendices E1-E9 - Section 8.4 - Measures Adopted to Manage Environmental Impacts.
Commonwealth Legislation	Australian Maritime Safety Authority Act 1990	The act establishes the Australian Maritime Safety Authority (AMSA), which is responsible for ensuring the safety of vessels and seafarers, including those associated with seismic surveys.	Vessels are required to implement safety requirements as per the Navigation Act and applicable marine orders. AMSA is the designated Control Agency for oil spills from vessels in Commonwealth waters.
Commonwealth Legislation	AMSA Advisory note for the offshore petroleum industry on environmental plans and oil pollution emergency plans	As of 2021, AMSA will no longer be entering into any direct agreements with Titleholders for support with oil spill preparedness and response into the future. AMSA will continue to fulfil its obligations under the National Plan for Maritime Environmental Emergencies for non-ship source pollution incidents on the formal request from the respective Offshore Petroleum Incident Controller/s.	In the event of an oil spill from a vessel associated with the Regia MSS, AMSA is the Control Agency with CGG providing support and resources as directed by AMSA.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Commonwealth Legislation	Biosecurity Act 2015 (Amended 2024)	The act provides a framework for managing biosecurity risks associated with the import and export of goods and vessels, which may be associated with seismic surveys.	All vessels will be operating under multiple control measures to manage biosecurity risks. Refer to Appendix D3 Section 8.3 for Measures Adopted to Manage Environmental Impacts related to introduction of invasive marine species
Commonwealth Legislation	Biosecurity Amendment (Biofouling Management) Regulations 2021	The regulations require operators of all vessels, including those associated with seismic surveys, to provide information on biofouling management practices prior to arriving in Australia.	All vessels will be operating under multiple control measures to manage biosecurity risks. Refer to Appendix D3 Section 8.3 for Measures Adopted to Manage Environmental Impacts related to introduction of invasive marine species
Commonwealth Legislation	Climate Change Act 2022	This Act sets out Australia's greenhouse gas emissions reduction targets. The Minister must prepare an annual climate change statement. The Climate Change Authority is to give the Minister advice that relates to the preparation of an annual climate change statement.	GHG emissions have been assessed and are evaluated as minor. Refer to PEIRA Appendix B4 Atmospheric Emissions
Commonwealth Legislation	Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The act regulates activities that may have a significant impact on the environment, including seismic surveys, and requires that these activities are assessed and approved before they can be carried out.	The Regia MSS EIA is operating under the principles of ecologically sustainable development as stated in Section 3A of the EPBC Act. Refer to Appendix B1 Section 3.12.
Commonwealth Legislation	EPBC Regulations 2000 – Part 8 Interacting with Cetaceans and Whale Watching	The regulations specify how vessels, aircraft and people must behave around whales and dolphins.	All vessels will be operating under EPBC regulations and guidelines. Refer to Appendix E1 Section 8 which relates to managing physical presence and Appendix E7 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to the interaction of marine mammals and seismic.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Commonwealth Legislation	Environment Protection (Sea Dumping Act) 1981	The act regulates the loading and dumping of waste at sea and the creation of artificial reefs in Australian waters.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
Commonwealth Legislation	Fisheries Management Act 1991	The Fisheries Management Act 1991 establishes the legislative framework for the sustainable use and conservation of fisheries resources, and for the management of fishing activities by commercial, recreational, and Indigenous fishers. The act provides for the setting of total allowable catches, fishing quotas, and other management measures, as well as the regulation of fishing gear, fishing methods, and fishing licenses.	The Regia MSS EIA has assessed all impacts to fisheries resources and fishers and has provided management and mitigation measures as appropriate. Refer to Appendices E3, E4 and F3. Also refer to Otway Adjustment Protocol.
Commonwealth Legislation	Fisheries Management Regulations 2009	The Fisheries Management Regulations 2009 provide more detailed regulations for the implementation of the Fisheries Management Act 1991, including provisions for monitoring, compliance, and enforcement of fisheries management measures. The regulations set out requirements for the reporting of fishing activities, the monitoring of fishing vessels, and the handling of fish and other seafood products.	The Regia MSS EIA has assessed all impacts to fisheries resources and fishers and has provided management and mitigation measures as appropriate. Refer to Appendices E3, E4 and F3. Also refer to Otway Adjustment Protocol.
Commonwealth Legislation	Marine Order 21 (Safety and Emergency Arrangements)	The marine order provides guidance on the safety and emergency arrangements for vessels, which may be associated with seismic surveys.	All vessels are required to have safety and emergency arrangements dealing with life-saving appliances and arrangements, safety of navigation and special measures to enhance maritime safety in accordance with the marine order.
Commonwealth Legislation	Marine Orders Part 27 (Safety of Navigation and Radio Equipment)	The marine order provides guidance on the safety of navigation and radio equipment for vessels, which may be associated with seismic surveys.	Vessels are required to have navigation and radio equipment that meets the marine order requirements.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Commonwealth Legislation	Marine Order 30 (Prevention of Collisions)	The marine order provides guidance on the prevention of collisions between vessels, including those associated with seismic surveys.	Vessels are required to have onboard navigation, radar equipment, and lighting that meets the International Rules for Preventing Collisions at Sea (COLREGs).
Commonwealth Legislation	Marine Order 31 SOLAS and non-SOLAS certification	The marine order provides guidance on the survey, certification and maintenance of certificates for regulated Australian vessels and certification of foreign vessels, which may be associated with seismic surveys.	Vessels are required to have in date certification in accordance with AMSA MO 31: SOLAS and non-SOLAS certification.
Commonwealth Legislation	Marine Order 70 (Seafarer Certification)	The marine order provides guidance on the certification of seafarers, including those associated with seismic surveys.	Vessel crew are required to be certified and trained as per the marine order requirements
Commonwealth Legislation	Marine Order 71 (Masters and Deck Officers)	The marine order provides guidance on the certification and training of masters and deck officers for vessels, including those associated with seismic surveys.	Vessel crew are required to be certified and trained as per the marine order requirements
Commonwealth Legislation	Marine Order 72 (Engineer Officers)	The marine order provides guidance on the certification and training of engineer officers for vessels, including those associated with seismic surveys.	Vessel crew are required to be certified and trained as per the marine order requirements
Commonwealth Legislation	Marine Order 91 - Marine pollution prevention - oil	Marine Order 91 sets out the requirements for the prevention of marine pollution by oil from ships in Australian waters. The order establishes procedures for reporting, investigating, and responding to pollution incidents, as well as measures for the clean-up and disposal of spilled pollutants. It also sets out the requirements for pollution emergency plans, contingency planning, and pollution response equipment and training.	Vessels are required to have a Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (according to class) developed based upon the Guidelines for the Development of Shipboard Oil Pollution Emergency Plans and approved by AMSA.
Commonwealth Legislation	Marine Order 93 - Marine pollution prevention - noxious liquid substances	Marine Order 93 sets out the requirements for the prevention of marine pollution from liquids and chemicals in Australian waters, including measures to prevent spills, leaks, and discharges of noxious liquids from ships. The order establishes procedures for reporting, investigating, and responding to noxious liquid pollution incidents, as well as measures for the clean-up and disposal of spilled noxious liquids. It also sets out the requirements for noxious liquids pollution emergency plans, contingency planning, and pollution response equipment and training.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Commonwealth Legislation	Marine order 94—Marine pollution prevention – packaged harmful substances	Marine Order 94 sets out the requirements for the prevention of marine pollution from packaged harmful substances in Australian waters, including management of harmful substances in packaged form, washing substances overboard and notifying and reporting an incident.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
Commonwealth Legislation	Marine Order 95 - Marine pollution prevention - garbage	Marine Order 95 sets out the requirements for the prevention of marine pollution from garbage in Australian waters, including measures to prevent the discharge of garbage from ships. The order establishes procedures for the storage, processing, and disposal of garbage, as well as the requirements for garbage management plans and records.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
Commonwealth Legislation	Marine Order 96 - Marine pollution prevention - sewage	Marine Order 96 sets out the requirements for the prevention of marine pollution from sewage in Australian waters, including measures to prevent the discharge of untreated sewage from ships. The order establishes requirements for the design and operation of sewage treatment systems on board ships, as well as the requirements for sewage management plans and records.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Commonwealth Legislation	Marine Order 97 - Marine pollution prevention - air	Marine Order 97 sets out the requirements for the prevention of air pollution from ships in Australian waters, including measures to reduce emissions of pollutants from ships' engines and boilers. The order establishes requirements for the use of low-sulphur fuels and the installation of emission control systems on board ships.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
Commonwealth Legislation	Marine Order 98 - Marine pollution prevention - antifouling systems	Marine Order 98 sets out the requirements for the use of antifouling solutions on ships in Australian waters. The order establishes restrictions on the use of certain types of antifouling coatings, as well as requirements for the management of hull cleaning and maintenance.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
Commonwealth Legislation	National Plan for Maritime Emergencies (AMSA 2020)	The National Plan implements Australia's obligations under the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969; United Nations Convention on the Law of the Sea, 1982; the International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990; and the Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 with respect to the management of maritime environmental emergencies.	The Regia MSS EP has an Oil Pollution Emergency Plan (OPEP). Refer to Appendix G3

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Commonwealth Legislation	Native Title Act 1993	The main objects of this Act are: – to provide for the recognition and protection of native title; and – to establish ways in which future dealings affecting native title may proceed and to set standards for those dealings; and – to establish a mechanism for determining claims to native title; and – to provide for, or permit, the validation of past acts, and intermediate period acts, invalidated because of the existence of native title. – Native title may be associated with seismic surveys.	Native Title has not been identified to occur within the Operational Area.
Commonwealth Legislation	Navigation Act 2012 (amended version 2024)	Covers international ship and seafarer safety, protects the marine environment where it relates to shipping and the actions of seafarers in Australian waters. Regulates vessel safety, pollution, navigation amongst others.	Vessels are required to implement navigation requirements as detailed in the Act and associated marine orders.
Commonwealth Legislation	NOPSEMA Petroleum activities and Australian Marine Parks Guidance Note	The purpose of this guidance note is to provide guidance on the key management arrangements and requirements that are relevant to petroleum and greenhouse gas activities that may affect Australian Marine Parks (AMPs). The intent is to assist titleholders in preparing EPs that comply with regulatory requirements.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
Commonwealth Legislation	Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act)	The act provides a regulatory framework for offshore petroleum and greenhouse gas storage activities, which includes seismic surveys.	Section 280 requires that a person carrying on activities in an offshore area under the permit, lease, licence, authority or consent must carry on those activities in a manner that does not interfere with navigation or fishing (among others) to a greater extent than is necessary for the reasonable exercise of the rights.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Commonwealth Legislation	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023	The regulations provide additional guidance on the environmental impact assessment process for offshore petroleum and greenhouse gas storage activities, including seismic surveys. The Regia MSS will not occur in Victorian State waters.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
Commonwealth Legislation	Ozone Protection and Synthetic Greenhouse Gas Management Act 1989	The act regulates the import, export, manufacture, and use of ozone-depleting substances (ODSs) and synthetic greenhouse gases (SGGs) in Australia. The act establishes a framework for the phase-out of ODSs and the reduction of SGG emissions, in order to protect the ozone layer and mitigate climate change. The act provides for the licensing of persons involved in the handling of ODSs and SGGs, as well as the regulation of equipment containing these substances. It also establishes penalties for non-compliance with the regulations under the act.	No such substances will be used as part of the petroleum activity.
Commonwealth Legislation	Protection of the Sea (Prevention of Pollution from Ships) Act 1983	The act regulates the prevention of pollution from ships, which may be associated with the transportation of personnel and equipment during seismic surveys.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Commonwealth Legislation	Protection of the Sea (Harmful Antifouling Systems) Act 2006	The act regulates the use of antifouling systems, which may be used on vessels associated with seismic surveys.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
Commonwealth Legislation	Underwater Cultural Heritage Act 2018	The act provides for the protection of underwater cultural heritage, which may be affected by the activities associated with seismic surveys.	Refer to Appendix B10 - Cultural Heritage Assessment. Also refer to Appendix E1 - Physical Presence, Section 8.4 - Measures Adopted to Manage Environmental Impacts for relevant activity limitations.
Victorian Legislation	Aboriginal Heritage Act 2006	This Act provides for the protection of Aboriginal cultural heritage in Victoria, including Aboriginal cultural heritage that may be affected by the operation of seismic surveys.	Refer to Appendix B10 - Cultural Heritage Assessment. Mitigation measures to protect cultural features, including those intangible, from relevant aspects can be found in Appendices E1-E9 - Section 8 - Measures Adopted to Manage Environmental Impacts.
Victorian Legislation	Aboriginal Heritage Regulations 2018	The Regulations give effect to the Aboriginal Heritage Act. The Regulations prescribe standards, set out the circumstances in which a Cultural Heritage Management Plans should be prepared, including where Aboriginal cultural heritage may be affected by the operation of seismic surveys.	Refer to Appendix B10 - Cultural Heritage Assessment. Mitigation measures to protect cultural features, including those intangible, from relevant aspects can be found in Appendices E1-E9 - Section 8 - Measures Adopted to Manage Environmental Impacts.
Victorian Legislation	Emergency Management Act 2013	This act provides for the management of emergencies, including natural disasters and other incidents that threaten public safety, health or welfare. It establishes a framework for emergency management at the federal, state and local levels, and sets out the roles and responsibilities of emergency management agencies.	The Regia MSS EP has an Oil Pollution Emergency Plan (OPEP). Refer to Appendix G3

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Victorian Legislation	Environment Protection Act 2017	The act regulates the prevention and management of pollution and waste, including those generated by seismic surveys, and provides for the protection of the environment and human health.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel.
Victorian Legislation	Flora and Fauna Guarantee Act 1988 (FFG Act)	The act provides for the conservation of flora and fauna, including marine species that may be affected by the operation of seismic surveys.	Mitigation measures to protect relevant biological receptors from relevant aspects can be found in Appendices D1-D4 and E2-E9 - Section 8 - Measures Adopted to Manage Environmental Impacts. These measures ensure potential impact/risk is below the predefined acceptable level outlined in Section 6 of these assessments.
Victorian Legislation	Heritage Act 2017 (Heritage Act 1995 repealed and replaced by the Heritage Act 2017)	The Heritage Act 2017 establishes a framework for the identification, protection, and conservation of cultural heritage, including historic shipwrecks and artefacts, the Act primarily governs heritage matters within the state of Victoria's jurisdiction.	There are no activities planned within Victorian waters.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Victorian Legislation	Marine and Coastal Act 2018	The act provides a framework for the management of marine and coastal environments in Victoria, including the assessment and management of environmental impacts of activities such as seismic surveys.	Mitigation measures to protect relevant receptors from relevant aspects can be found in Appendices D1-D4 and E2-E9 - Section 8 - Measures Adopted to Manage Environmental Impacts/Risks. These measures ensure potential impact/risk is below the predefined acceptable level outlined in Section 6 of these assessments.
Victorian Legislation	Marine (Drug, Alcohol and Pollution) Act 1988	This act regulates the use of drugs and alcohol by seafarers and provides measures for preventing marine pollution. It aims to promote safety and protect the marine environment from the harmful effects of pollution caused by ships.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel. The Regia MSS EP has an Oil Pollution Emergency Plan (OPEP). Refer to Appendix G3
Victorian Legislation	Marine Safety Act 2010	This act provides for safe marine operations in Victoria State waters, including imposing safety duties on owners, managers and designers of vessels, marine infrastructure and marine safety equipment; marine safety workers, masters and passengers on vessels; regulation and management of vessel use and navigation in Victorian State waters.	There are no activities planned within Victorian waters.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Victorian Legislation	National Parks Act 1975	This act establishes a framework for the protection and management of national parks in Australia. It provides for the conservation of natural and cultural resources, the provision of recreational opportunities, and the management of park use.	Mitigation measures to protect relevant receptors/features from relevant aspects can be found in Appendices D1-D4 and E2-E9 - Section 8 - Measures Adopted to Manage Environmental Impacts. These measures ensure potential impact/risk is below the predefined acceptable level outlined in Section 6 of these assessments.
Victorian Legislation	Pollution of Waters by Oil and Noxious Substances Act 1986 (POWBONS)	This act provides measures for preventing, controlling and cleaning up pollution caused by oil and other noxious substances in Australian waters. It aims to reduce the risk of damage to the environment and protect public health and safety.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel. The Regia MSS EP has an Oil Pollution Emergency Plan (OPEP). Refer to Appendix G3
Victorian Legislation	Wildlife Act 1975	This act provides for the conservation and management of wildlife in Victoria, Australia. It regulates the hunting and trapping of wildlife, establishes protected areas for wildlife, and provides for the protection of threatened and endangered species.	Mitigation measures to protect relevant biological receptors from relevant aspects can be found in Appendices D1-D4 and E2-E9 - Section 8 - Measures Adopted to Manage Environmental Impacts. These measures ensure potential impact/risk is below the predefined acceptable level outlined in Section 6 of these assessments.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Victorian Legislation	Wildlife (Marine Mammals) Regulations 2019 (2009 version revoked and replaced by 2019 version)	The regulations provide guidance on the management and protection of marine mammals, which may be affected by the underwater noise generated by seismic surveys.	Refer to Appendix E7 Marine Mammals, F3 Section 3, Appendix G2 Fauna Management Plan
Tasmanian Legislation	Environmental Management and Pollution Control Act 1994	The act regulates the management and control of pollution, including those generated by seismic surveys, and provides for the protection and conservation of the environment and human health in Tasmania.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel. The Regia MSS EP has an Oil Pollution Emergency Plan (OPEP). Refer to Appendix G3
Tasmanian Legislation	Marine-related Incidents (MARPOL Implementation) Act 2020	This act deals specifically with discharges of oil and other pollutants from ships, including those associated with seismic surveys.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Also Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks related to accidental release of fuel. The Regia MSS EP has an Oil Pollution Emergency Plan (OPEP). Refer to Appendix G3

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Tasmanian Legislation	Nature Conservation (Wildlife) Regulations 2021	These regulations establish rules for the protection, management, and conservation of wildlife in Tasmania. It includes provisions on the handling, disturbance, and harm of protected species, as well as licensing requirements for activities that may impact wildlife.	There are no activities planned within Tasmanian waters.
Policy Statement	Australian Ballast Water Management Requirements	The requirements provide guidance on how vessel operators should manage ballast water when operating within Australian seas to comply with the Biosecurity Act 2015, including those conducting a marine seismic survey. They align to the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species
Policy Statement	Australia Biofouling Management Requirements	The requirements set out vessel operator obligations for the management of biofouling when operating vessels under biosecurity control within Australian territorial seas, including those conducting a marine seismic survey.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Policy Statement	EPBC Act Policy Statement 1.1 – Significant Impact Guidelines – Matters of National Environmental Significance	The policy statement provides guidance on the assessment and management of activities that may have a significant impact on matters of national environmental significance, including marine habitats and species.	Refer to relevant receptor impact assessments presented in Appendices E1-E9. Refer to relevant risk assessments presented in Appendices D1-D4. Section 6 of the these documents define acceptable levels of impact or risk associated with the activity.
Policy Statement	EPBC Act Policy Statement 2.1 – Interaction between offshore seismic activities and whales (DEWHA 2008)	The policy statement provides guidance on how to minimise the impact of seismic surveys on whale populations, which may be affected by underwater noise and disturbance caused by these activities.	Refer to Appendix E7 Marine Mammals, F3 Section 3, Appendix G2 Fauna Management Plan
Policy Statement	EPBC Act Policy Statement 3.21—Industry Guidelines for Avoiding, Assessing and Mitigating Impacts on EPBC Act Listed Migratory Shorebird Species (CoA 2017)	The purpose of this policy statement is to assist proponents in avoiding, assessing, and mitigating significant impacts on migratory shorebirds listed under the EPBC Act. This policy statement is a key action under the Wildlife Conservation Plan for Migratory Shorebirds.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
Policy Statement	Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species (Biofouling Guidelines)	Provide a globally consistent approach to the management of biofouling.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Policy Statement	Marine Pest Plan 2018–2023: National Strategic Plan for Marine Pest Biosecurity	The plan outlines a coordinated approach to building Australia's capabilities to manage the threat of marine pests over the next five years. It represents agreed priorities and actions of governments, marine industries, and other stakeholders to achieve a common purpose: to manage the risks posed by marine pests and minimise their potential harm to marine industries, communities and the environment, which may be associated with seismic surveys.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species
Policy Statement	National Biofouling Management Guidance for the Petroleum Production and Exploration Industry 2009	The guidance provides a framework for managing the biofouling of vessels, which may be associated with seismic surveys.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species
Policy Statement	National Light Pollution Guidelines for Wildlife (CoA 2023)	provide users with the information required to assess whether artificial lighting is likely to affect wildlife, and the management tools to minimise and mitigate that effect	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts
Policy Statement	National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (CoA 2017c)	guiding framework for identifying species most at risk of vessel collision; areas where these species are most at risk of vessel collision, and appropriate mitigation measures to reduce the risk of vessel collisions with marine megafauna.	Refer to Appendix G2 Fauna Management Plan
Policy Statement	Threat Abatement Plan for the Impacts of Marine Debris on Vertebrate Wildlife of Australia's Coasts and Ocean	The plan provides national guidance on action to prevent and mitigate the impacts of harmful marine debris on vertebrate marine life, which may be affected by the operation of vessels associated with seismic surveys.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard.
Policy Statement	Victorian Marine and Coastal Strategy	The strategic plan provides guidance on the management of coastal environments in Victoria, including the management of environmental impacts of activities such as seismic surveys.	Refer to Appendix G2 Fauna Management Plan

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Policy Statement	Victorian Coastal Strategy	The strategy provides a framework for the management of the Victorian coast, including the protection and conservation of marine environments that may be impacted by seismic surveys.	Refer to Appendix G2 Fauna Management Plan
Policy Statement	Victorian Marine and Coastal Discovery Centre Guidelines	The guidelines provide guidance on the responsible interaction with marine environments, including the operation of vessels associated with seismic surveys.	Refer to Appendix G2 Fauna Management Plan
Policy Statement	Victorian Marine and Coastal Policy 2020	The policy provides guidance on the sustainable use and management of marine and coastal environments in Victoria, including the management of environmental impacts of activities such as seismic surveys.	Mitigation measures to protect relevant biological receptors from relevant aspects can be found in Appendices D1-D4 and E2-E9 - Section 8 - Measures Adopted to Manage Environmental Impacts/Risks. These measures ensure potential impact/risk is below the predefined acceptable level outlined in Section 6 of these assessments.
Policy Statement	Victorian Emergency Animal Welfare Plan	The emergency response plan provides guidance on the response to cetacean strandings, , entanglements, vessel strikes and other incidents, which may be associated with the operation of vessels associated with seismic surveys.	Refer to Appendix D2 Collisions with Marine Fauna for risk assessment and management of incidents. Also Appendix G2 Fauna Management Plan
Policy Statement	Coastal and Marine Management Plan Guidelines - Victoria	These guidelines emphasise protecting environmental, social, cultural, and economic values while balancing competing uses and promoting ecosystem resilience, including environments that may be impacted by seismic surveys.	Refer to Appendix E1 - Physical Presence for impact assessment and management of potential impacts. Also refer to Appendices D1-D4 for risk assessments and management of risks.
Policy Statement	Victorian Marine Pest Management Strategy	The strategy provides guidance on the management of marine pests, which may be associated with the operation of vessels associated with seismic surveys.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
State Legislation	Tasmanian State Coastal Policy 1996 (Revised 2003)	The policy provides guidance on the sustainable development of resources and maintenance of ecological processes and biodiversity.	Regia MSS EP has adopted specific measures to protect biodiversity refer to Appendix A2 for Activity Limitations
Policy Statement	Australian South-east Marine Region Profile	The South-east Marine Region Profile provides an overview of the ecological, economic, and social characteristics of the South-east Marine Region, which includes waters off Tasmania and Victoria. It outlines key marine ecosystems, species, industries (such as fishing and oil exploration), and conservation priorities, forming the basis for marine bioregional planning under the EPBC Act.	Regia MSS EP has adopted specific measures to protect biodiversity refer to Appendix A2 for Activity Limitations. The activity will be operating under EPBC regulations and guidelines. Refer to Appendix E1 Section 8 which relates to managing physical presence.
Policy Statement	Tasmanian Reserve Management Code of Practice	The code provides guidance for managing Tasmania's protected areas, focusing on conservation, land use, and minimizing human impact on natural ecosystems.	Regia MSS EP has adopted specific measures to protect biodiversity refer to Appendix A2 for Activity Limitations
International or Industry Standard	Diving Medical Advisory Committee (DMAC 2020)	Provide recommendations for managing seismic survey impacts to divers.	A SIMOPS plan will be developed in consultation with divers with an appropriate risk assessment undertaken to reduce risks and impacts to ALARP and Acceptable levels. Such a SIMOPS plan will be consistent with DMAC guidelines.
International or Industry Standard	AS/NZS ISO 31000:2018 Risk Management	The standard provides guidance on the management of risk associated with the activities associated with seismic surveys.	The methodology primarily used in the Preliminary Environmental Impact and Risk Assessment (PEIRA) - Appendix B4 was developed based on these principles and guidelines.
International or Industry Standard	International Association of Geophysical Contractors (IAGC) Environment Manual for Worldwide Geophysical Operations (2013)	Provides guidance on the management of risk associated with the activities associated with seismic surveys.	Refer to Appendices D1, D2, D3, D4 which all provide risk assessments of activities associated with the Regia MSS. Also refer to B8 Seismic Studies
International or Industry Standard	Recommended monitoring and mitigation measures for cetaceans during marine seismic survey geophysical operations (IOGP-IAGC, 2017)	Provides recommendations on applying mitigation measures for cetaceans during seismic surveys.	Refer to Appendix D2 Collisions with Marine Fauna for risk assessment and management of incidents. Also Appendix G2 Fauna Management Plan

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
International or Industry Standard	Technical Guidance for Assessing the Effects of Anthropogenic Hearing (NOAA 2018)	This technical manual provides guidance on assessing the effects of anthropogenic hearing on marine mammals, which may be affected by the underwater noise generated by seismic surveys.	This reference has been used along with others to inform and set thresholds for seismic sound evaluations and modelling.
International or Industry Standard	Environmental Management in the Upstream Oil and Gas Industry (IOGP-IPIECA, 2020)	Managing the risk from potential impacts to the natural environment during exploration and production of oil and gas.	Refer to Appendix A2 Section 4 for list of Activity Limitations
EPBC Advice	Conservation Advice *Neophoca cinerea* Australian Sea Lion (TSSC 2020b)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Refer to Appendix E7 Section 4.4
EPBC Advice	Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaC 2013)	The overarching objective of this recovery plan is to halt the decline and assist the recovery of the Australian sea lion throughout its range in Australian waters by increasing the total population size while maintaining the number and distribution of breeding colonies. It includes ensuring that anthropogenic activities do not hinder recovery in the near future, or impact on the conservation status of the species in the future.	Refer to Appendix E7 Section 4.5
EPBC Advice	Guidance on key terms within the Blue Whale Conservation Management Plan (DAWE 2021)	The document provides guidance on keys terms with the Conservation Management Plan for the Blue Whale.	Refer to Appendix D2 Collisions with marine fauna
EPBC Advice	Listing Advice *Megaptera novaeangliae* Humpback Whale (DAWE 2022a)	Recommends removal as a threaten species but remain a Matter of National Environmental Significance under the EPBC Act as a listed Migratory Species.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations
EPBC Advice	Recovery Plan for Marine Turtles (DoEE 2017)	The long-term recovery plan objective for marine turtles is to minimise anthropogenic threats to allow for the conservation status of marine turtles to improve so that they can be removed from the EPBC Act threatened species list.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations. Also Appendix D2 Collisions with marine fauna
EPBC Advice	Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle) (DEWHA 2008)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations. Also Appendix D2 Collisions with marine fauna

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Commonwealth Legislation	EPBC Regulations 2000 – Part 8 Interacting with Cetaceans and Whale Watching	The regulations specify how vessels, aircraft and people must behave around whales and dolphins.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations. Also Appendix D2 Collisions with marine fauna
EPBC Advice	EPBC Act Policy Statement 2.1 – Interaction between offshore seismic activities and whales (DEWHA 2008)	The policy statement provides guidance on how to minimise the impact of seismic surveys on whale populations, which may be affected by underwater noise and disturbance caused by these activities.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations. Also Appendix D2 Collisions with marine fauna
Policy Statement	National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (CoA 2017c)	guiding framework for identifying species most at risk of vessel collision; areas where these species are most at risk of vessel collision, and appropriate mitigation measures to reduce the risk of vessel collisions with marine megafauna.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations. Also Appendix D2 Collisions with marine fauna
EPBC Advice	Conservation Management Plan for the Blue Whale (DoE 2015)	The long-term recovery objective for Blue Whales is to minimise anthropogenic threats to allow for their conservation status to improve so that they can be removed from the EPBC Act threatened species list.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations. Also Appendix D2 Collisions with marine fauna. Fuel spills are identified as a threat. Refer to Appendix D4 for Measures Adopted to Manage Environmental Risks.
EPBC Advice	Conservation Advice *Balaenoptera physalus* Fin Whale (TSSC 2015b)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations. Also Appendix D2 Collisions with marine fauna. Fuel spills are identified as a threat. Refer to Appendix D4 for Measures Adopted to Manage Environmental Risks.
EPBC Advice	Listing Advice *Megaptera novaeangliae* Humpback Whale (DAWE 2022a)	Recommends removal as a threaten species but remain a Matter of National Environmental Significance under the EPBC Act as a listed Migratory Species.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations. Also Appendix D2 Collisions with marine fauna

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	Conservation Advice *Balaenoptera borealis* sei whale (TSSC 2015c)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations. Also Appendix D2 Collisions with marine fauna. Fuel spills are identified as a threat. Refer to Appendix D4 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Management Plan for the Southern Right Whale (CoA 2012) superceded by National Recovery Plan for the Southern Right Whale (DCCEEW 2024)	The long-term recovery objective is to minimise anthropogenic threats to allow the conservation status of the southern right whale to improve so that it can be removed from the threatened species list under the EPBC Act.	Refer to Appendix G2 Fauna Management Plan and Appendix A2 for Activity Limitations. Also Appendix D2 Collisions with marine fauna. Fuel spills are identified as a threat. Refer to Appendix D4 for Measures Adopted to Manage Environmental Risks.
Policy Statement	EPA Tasmania – Offshore Petroleum Industry Guidance Note	The purpose of the guidance note is to inform Offshore Petroleum Titleholders (Petroleum Titleholders) of the Tasmanian emergency management arrangements in respect to Marine Oil Pollution emergencies in State waters. The guidance note outlines Petroleum Titleholders obligations under those arrangements and the Department of Primary Industry Parks Water and Environment – EPA Tasmania (EPA) expectations.	CGG is required to have an Oil Pollution Emergency Plan (OPEP), accepted by NOPSEMA before the Regia MSS can commence.
EPBC Advice	Wildlife Conservation Plan for Seabirds (CoA 2020a)	The plan aims to provide a national framework for the research and management of listed marine and migratory seabirds and to outline national activities to support the conservation of listed seabirds in Australia and beyond. Threatened species are not covered by the plan and receive separate, approved conservation advice and, in some cases, a recovery plan which sets out what should be done to stop the decline and support the recovery of the species.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	The plan provides a framework to guide the conservation of migratory shorebirds and their habitat in Australia and, in recognition of their migratory habits, outlines national activities to support their appreciation and conservation throughout the East Asian-Australasian Flyway (EAAF).	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
Policy Statement	EPBC Act Policy Statement 3.21—Industry Guidelines for Avoiding, Assessing and Mitigating Impacts on EPBC Act Listed Migratory Shorebird Species (CoA 2017)	The purpose of this policy statement is to assist proponents in avoiding, assessing, and mitigating significant impacts on migratory shorebirds listed under the EPBC Act. This policy statement is a key action under the Wildlife Conservation Plan for Migratory Shorebirds.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	National Recovery Plan for Albatrosses and Petrels (CoA 2022)	The recovery plan provides a national strategy to guide the activities of government, industry, research organisations, and other stakeholders in the protection, conservation and management of listed threatened albatross and petrel species.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Neophema chrysostoma* (Blue-winged Parrot) (DCCEEW 2023l)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	Conservation Advice *Botaurus poiciloptilus* Australasian Bittern (TSSC 2019a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	National Recovery Plan for the Australian Fairy Tern (*Sternula nereis nereis*) (DAWE 2020)	The plan considers the conservation requirements of the species across its range and identifies the actions to be taken to ensure the long-term viability of the species, and the parties that will undertake those actions.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Approved Conservation Advice for *Sternula nereis nereis* (Fairy Tern) (DSEWPaC 2011)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Limosa limosa* (Black-tailed Godwit) (DCCEEW 2024i)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	Conservation Advice for *Pluvialis squatarola* (Grey Plover) (DCCEEW 2024h	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Approved Conservation Advice for *Rostratula australis* (Australian Painted Snipe) (DSEWPaC 2013)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	National Recovery Plan for the Australian Painted Snipe (*Rostratula australis*) (CoA 2022a)	The plan considers the conservation requirements of the species across its range and identifies the actions to be taken to ensure the species' long-term viability in the wild, and the parties that will undertake those actions.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Limosa lapponica baueri* Bar-tailed Godwit (Western Alaskan) (DCCEEW 2024b)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	Commonwealth Listing Advice on Black-browed Albatross (*Thalassarche melanopris*) (TSSC 2005)	Eligible for listing as vulnerable under the EPBC Act.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Xenus cinereus* (Terek Sandpiper) (DCCEEW 2024g)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Tringa nebularia* (Common Greenshank).(DCCEEW 2024e)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Ardenna grisea* (Sooty Shearwater) (DCCEEW 2023i)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	Conservation Advice for *Gallinago hardwickii* (Latham's Snipe) (DCCEEW 2024d)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice *Halobaena caerulea* Blue Petrel (TSS 2015)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Calidris ferruginea* Curlew Sandpiper (DCCEEW 2023m)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Numenius madagascariensis* (Far Eastern Curlew) (DCCEEW 2023n)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	Conservation Advice *Pachyptila turtur subantarctica* fairy prion (southern) (TSSC.2015e)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Arenaria interpres* (Ruddy Turnstone) (DCCEEW 2024c)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Commonwealth Listing Advice on *Ardenna carneipes* (Flesh-footed Shearwater) (TSSC 2014)	Assessed as ineligible for listing.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Gould's Petrel (*Pterodroma leucoptera leucoptera*) Recovery Plan (DEC NSW 2006)	Constitutes the formal Commonwealth and New South Wales recovery plan for Gould's Petrel. It identifies the actions to be taken to ensure the long-term viability of the Gould's Petrel in nature and the parties who will carry these out.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	Conservation Advice for *Calidris acuminata* (Sharp-tailed Sandpiper) (DCCEEW 2024a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Calidris tenuirostris* (Great Knot) (DCCEEW 2024f)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Charadrius leschenaultia* (Greater Sand Plover) (DCCEEW 2023o)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Approved Conservation Advice for *Thalassarche chrysostoma* (Grey-headed Albatross) (DEWHA 2009)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	Conservation Advice *Charadrius mongolus* Lesser Sand Plover (TSSC 2016)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Commonwealth Listing Advice on *Sterna albifrons sinensis* (Little Tern (western Pacific)) (TSSC 2002)	Advice is that it is ineligible for listing as conservation dependent.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Commonwealth Listing Advice on *Macronectes halli* (Northern Giant-Petrel) (TSSC 2001)	Assessed as ineligible for listing.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Commonwealth Listing Advice on *Neophema chrysogaster* Orange-bellied Parrot (TSSC 2006)	TSSC recommends that the list referred to in section 178 of the EPBC Act be amended by transferring from the endangered category to the critically endangered category.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

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EPBC Advice	National Recovery Plan for the Orange-bellied Parrot, *Neophema chrysogaster* (DEWLP 2016)	The recovery plan outlines the long-term strategy, and short-term objectives and actions, for the recovery of the Orange-bellied Parrot.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice *Pedionomus torquatus* Plains-wanderer (DoE 2015a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*) (DoE and SA DEWNR 2016)	The plan considers the conservation requirements of the species across its range and identifies the actions to be taken to ensure the species long-term viability in nature, and the parties that will undertake those actions.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Calidris canutus* Red Knot (DCCEEW 2024)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

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EPBC Advice	Conservation Advice *Thalassarche cauta* Shy Albatross (TSS 2020)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice *Pterodroma mollis* Soft-plumaged Petrel (TSS 2015a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	
EPBC Advice	Commonwealth Listing Advice on *Macronectes giganteus* (Southern Giant-Petrel) (TSSC 2001a)	Recommends that the species be listed as Endangered under the EPBC Act	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice *Lathamus discolor* Swift Parrot (TSSC 2016a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	National Recovery Plan for the Swift Parrot (*Lathamus discolor*) (Saunders & Tzaros 2011)	The plan considers the conservation requirements of the species across its range, identifies the actions to be taken to ensure its long-term viability in nature and the parties who will undertake these actions.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice *Hirundapus caudacutus* White-throated Needletail (TSSC 2019)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Commonwealth Listing Advice *Seriolella brama* Blue Warehou (TSSC 2015)	Recommends that the species be listed in the conservation dependent category under the EPBC Act.	Listing advice does not identify oil spills as a threat.
EPBC Advice	National Recovery Plan for the Dwarf Galaxias (*Galaxiella pusilla*) (Saddlier et al. 2010)	The long-term objective of recovery plan is to minimise the probability of extinction and ensure long-term survival of Dwarf Galaxias in the wild and to increase the probability of important population becoming self-sustaining in the long term.	The recovery plan does not identify oil spills as a threat.
EPBC Advice	Conservation Advice for *Galaxiella pusilla* (Dwarf Galaxias) (DCCEEW 2023j)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify oil spill as a threat.
EPBC Advice	Commonwealth Listing Advice on *Rexea solandri*. Threatened Species Scientific Committee (TSSC 2009)	Recommends that the species be listed in the conservation dependent category under the EPBC Act.	The recovery plan does not identify oil spills as a threat.
EPBC Advice	Commonwealth Listing Advice on *Thunnus maccoyii* (Southern Bluefin Tuna) (TSSC 2010)	Recommends that the species be listed in the conservation dependent category under the EPBC Act.	Listing advice does not identify oil spills as a threat.

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EPBC Advice	Conservation Advice for *Nannoperca obscura* (Yarra Pygmy Perch) (DCCEEW 2023k)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify oil spill as a threat.
EPBC Advice	National Recovery Plan for the Yarra Pygmy Perch (*Nannoperca obscura*) (Sadler and Hammer 2010)	Recommends that the species be listed in the conservation dependent category under the EPBC Act.	The recovery plan does not identify oil spills as a threat.
EPBC Advice	Commonwealth Listing Advice on *Centrophorus zeehaani* (southern dogfish) (TSSC 2013a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify oil spill as a threat.
EPBC Advice	Commonwealth Listing Advice on *Galeorhinus galeus (*TSSC 2009a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify oil spill as a threat.
EPBC Advice	Listing Advice *Isurus oxyrinchus* shortfin mako shark (TSSC) (2014)	Recommends as not listing.	Listing advice does not identify oil spills as a threat.
EPBC Advice	Recovery Plan for the White Shark (*Carcharodon carcharias*). (DSEWPaC 2013b)	The plan considers the conservation requirements of the species across its range and identifies the actions to be taken to ensure the species' long-term viability in nature and the parties that will undertake those actions.	The recovery plan does not identify oil spills as a threat.
EPBC Advice	Conservation Advice for Giant Kelp Marine Forests of South East Australia (TSSC 2012)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify oil spill as a threat.
EPBC Advice	Conservation Advice Subtropical and Temperate Coastal Saltmarsh. Threatened Species Scientific Committee (TSSC 2013)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	The conservation advice identifies coastal saltmarsh as important habitat in all oil spill contingency planning at national and State levels and monitor the application of protocols on the management of spills involving saltmarshes.
EPBC Advice	Approved Conservation Advice (including Listing Advice) for the Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community (DoEE 2018a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify oil spill as a threat.

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EPBC Advice	Recovery Plan for Marine Turtles (DoEE 2017)	The long-term recovery plan objective for marine turtles is to minimise anthropogenic threats to allow for the conservation status of marine turtles to improve so that they can be removed from the EPBC Act threatened species list.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle*) (*DEWHA 2008)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify oil spill as a threat.
EPBC Advice	Conservation Advice *Neophoca cinerea* Australian Sea Lion (TSSC 2020b)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Fuel spills are identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Recovery Plan for the Australian Sea Lion (Neophoca cinerea) (DSEWPaC 2013)	The overarching objective of this recovery plan is to halt the decline and assist the recovery of the Australian sea lion throughout its range in Australian waters by increasing the total population size while maintaining the number and distribution of breeding colonies. It includes ensuring that anthropogenic activities do not hinder recovery in the near future, or impact on the conservation status of the species in the future.	Fuel spills are identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Listing Advice *Megaptera novaeangliae* Humpback Whale (DAWE 2022a)	Recommends removal as a threaten species but remain a Matter of National Environmental Significance under the EPBC Act as a listed Migratory Species.	Fuel spills are identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
Victorian Legislation	Ngootyoong Gunditj Ngootyoong Mara South West Management Plan (Parks Victoria 2015)	The Ngootyoong Gunditj Ngootyoong Mara South West Management Plan is a strategic guide for managing and protecting over 130 parks, reserves and Indigenous Protected Areas in south-west Victoria. It takes a multiple park planning approach within a geographic landscape and covers over 116 000 hectares.	Fuel spills are identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
Victorian Legislation	Twelve Apostles Marine National Park and The Arches Marine Sanctuary Management Plan (Parks Victoria 2006b).	The plan provides the basis for the future management of Twelve Apostles Marine National Park and The Arches Marine Sanctuary	Fuel spills are identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

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EPBC Advice	Conservation Advice for Giant Kelp Marine Forests of South East Australia (DSEWPaC 2012a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Refer to Appendix D3 Introduction of marine pest species
EPBC Advice	Commonwealth Listing Advice on Giant Kelp Marine Forests of South East Australia (TSSC 2012a)	Recommends the ecological community's inclusion on the EPBC Act list of threatened ecological communities.	Refer to Appendix D3 Introduction of marine pest species
Commonwealth Legislation	Biosecurity Act 2015 (Biosecurity Act)	The act provides a framework for managing biosecurity risks associated with the import and export of goods and vessels, which may be associated with seismic surveys.	Refer to Appendix D3 Introduction of marine pest species
Commonwealth Legislation	Biosecurity Regulations 2016	The regulations provide additional guidance on the management of biosecurity risks associated with the import and export of goods and vessels.	Antifouling system certification for vessels is current and in accordance with AMSA Marine Order Part 98 (Antifouling systems)
Commonwealth Legislation	Biosecurity Amendment (Biofouling Management) Regulations 2021	The regulations require operators of all vessels to provide information on biofouling management practices prior to arriving in Australia.	Vessels used for the Regia MSS are required to undertake the following:
Commonwealth Legislation	Marine Order 98 - Marine pollution prevention - antifouling systems	Marine Order 98 sets out the requirements for the use of antifouling solutions on ships in Australian waters. The order establishes restrictions on the use of certain types of antifouling coatings, as well as requirements for the management of hull cleaning and maintenance.	Vessels used for the Regia MSS are required to meet the requirements of Marine Order 98 in relation to antifouling coatings and management of hull cleaning and maintenance.
Commonwealth Legislation	Australian Ballast Water Management Requirements	The requirements provide guidance on how vessel operators should manage ballast water when operating within Australian seas in order to comply with the Biosecurity Act 2015. They align to the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species

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Commonwealth Legislation	Australia Biofouling Management Requirements	The requirements provide guidance on how vessel operators should manage ballast water when operating within Australian seas in order to comply with the Biosecurity Act 2015, including those conducting a marine seismic survey. They align to the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species
Commonwealth Legislation	Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species (Biofouling Guidelines)	Provide a globally consistent approach to the management of biofouling.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species
Commonwealth Legislation	Marine Pest Plan 2018–2023: National Strategic Plan for Marine Pest Biosecurity	The plan outlines a coordinated approach to building Australia's capabilities to manage the threat of marine pests over the next five years. It represents agreed priorities and actions of governments, marine industries, and other stakeholders to achieve a common purpose: to manage the risks posed by marine pests and minimise their potential harm to marine industries, communities, and the environment.	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species

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Commonwealth Legislation	National Biofouling Management Guidance for the Petroleum Production and Exploration Industry 2009	Includes the following for operators of petroleum industry related vessels, equipment, and infrastructure:	All vessels used will comply with MARPOL requirements. Refer to Appendix D1 Section 8.4 for Measures Adopted to Manage Environmental Impacts related to release of material or waste overboard. Refer to Appendix D3 Introduction of marine pest species
Commonwealth Legislation	Navigation Act 2012 (amended version 2024)	Covers international ship and seafarer safety, protects the marine environment where it relates to shipping and the actions of seafarers in Australian waters. Regulates vessel safety, pollution, navigation amongst others.	Vessels are required to implement navigation requirements as detailed in the Act and associated marine orders.
Policy Statement	National Light Pollution Guidelines for Wildlife (CoA 2023)	provide users with the information required to assess whether artificial lighting is likely to affect wildlife, and the management tools to minimise and mitigate that effect	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts
EPBC Advice	Wildlife Conservation Plan for Seabirds (CoA 2020a)	The plan aims to provide a national framework for the research and management of listed marine and migratory seabirds and to outline national activities to support the conservation of listed seabirds in Australia and beyond. Threatened species are not covered by the plan and receive separate, approved conservation advice and, in some cases, a recovery plan which sets out what should be done to stop the decline and support the recovery of the species.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts. Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	The plan provides a framework to guide the conservation of migratory shorebirds and their habitat in Australia and, in recognition of their migratory habits, outlines national activities to support their appreciation and conservation throughout the East Asian-Australasian Flyway (EAAF).	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks

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Policy Statement	EPBC Act Policy Statement 3.21—Industry Guidelines for Avoiding, Assessing and Mitigating Impacts on EPBC Act Listed Migratory Shorebird Species (CoA 2017)	The purpose of this policy statement is to assist proponents in avoiding, assessing, and mitigating significant impacts on migratory shorebirds listed under the EPBC Act. This policy statement is a key action under the Wildlife Conservation Plan for Migratory Shorebirds.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	National Recovery Plan for Albatrosses and Petrels (CoA 2022)	The recovery plan provides a national strategy to guide the activities of government, industry, research organisations, and other stakeholders in the protection, conservation and management of listed threatened albatross and petrel species.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice for *Neophema chrysostoma* (Blue-winged Parrot) (DCCEEW 2023l)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice *Botaurus poiciloptilus* Australasian Bittern (TSSC 2019a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	National Recovery Plan for the Australian Fairy Tern (*Sternula nereis nereis*) (DAWE 2020)	The plan considers the conservation requirements of the species across its range and identifies the actions to be taken to ensure the long-term viability of the species, and the parties that will undertake those actions.	The recovery plan does not identify light as a threat.
EPBC Advice	Approved Conservation Advice for *Rostratula australis* (Australian Painted Snipe) (DSEWPaC 2013)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	National Recovery Plan for the Australian Painted Snipe (*Rostratula australis*) (CoA 2022a)	The plan considers the conservation requirements of the species across its range and identifies the actions to be taken to ensure the species' long-term viability in the wild, and the parties that will undertake those actions.	The recovery plan does not identify light as a threat.

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EPBC Advice	Conservation Advice for *Calidris acuminata* (Sharp-tailed Sandpiper) (DCCEEW 2024a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice for *Limosa lapponica baueri* Bar-tailed Godwit (western Alaskan) (DCCEEW 2024b)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Commonwealth Listing Advice on Black-browed Albatross (*Thalassarche melanopris*) (TSSC 2005)	Eligible for listing as vulnerable under the EPBC Act.	Listing advice does not identify light as a threat.
EPBC Advice	Conservation Advice for *Tringa nebularia* (Common Greenshank).(DCCEEW 2024e)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice for *Ardenna grisea* (Sooty Shearwater) (DCCEEW 2023i)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice for *Gallinago hardwickii* (Latham's Snipe) (DCCEEW 2024d)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice *Halobaena caerulea* Blue Petrel (TSS 2015)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice for *Calidris ferruginea* Curlew Sandpiper (DCCEEW 2023m)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice for *Numenius madagascariensis* (Far Eastern Curlew) (DCCEEW 2023n)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.

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EPBC Advice	Approved Conservation Advice for *Sternula nereis nereis* (Fairy Tern) (DSEWPaC 2011)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice for *Arenaria interpres* (Ruddy Turnstone) (DCCEEW 2024c)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Commonwealth Listing Advice on *Ardenna carneipes* (Flesh-footed Shearwater) (TSSC 2014).	Assessed as ineligible for listing.	Listing advice does not identify light as a threat.
EPBC Advice	Conservation Advice for *Callocephalon fimbriatum* (Gang-gang Cockatoo) (DAWE 2022)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Gould's Petrel (*Pterodroma leucoptera leucoptera*) Recovery Plan (DEC NSW 2006)	Constitutes the formal Commonwealth and New South Wales recovery plan for Gould's Petrel. It identifies the actions to be taken to ensure the long-term viability of the Gould's Petrel in nature and the parties who will carry these out.	The recovery plan does not identify light as a threat.
EPBC Advice	Conservation Advice for *Charadrius leschenaultia* (Greater Sand Plover) (DCCEEW 2023o)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Approved Conservation Advice for *Thalassarche chrysostoma* (Grey-headed Albatross) (DEWHA 2009)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice *Falco hypoleucos* Grey Falcon (TSSC 2020a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice *Thinornis rubricollis rubricollis* Hooded Plover (eastern) (DoE 2014)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.

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EPBC Advice	Conservation Advice *Charadrius mongolus* Lesser Sand Plover (TSSC 2016)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Commonwealth Listing Advice on *Sterna albifrons sinensis* (Little Tern (western Pacific)) (TSSC 2002)	Advice is that it is ineligible for listing as conservation dependent.	Listing advice does not identify light as a threat.
EPBC Advice	Commonwealth Listing Advice on *Macronectes halli* (Northern Giant-Petrel) (TSSC 2001)	Assessed as ineligible for listing.	Listing advice does not identify light as a threat.
EPBC Advice	Commonwealth Listing Advice on *Neophema chrysogaster* Orange-bellied Parrot (TSSC 2006)	TSSC recommends that the list referred to in section 178 of the EPBC Act be amended by transferring from the endangered category to the critically endangered category.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	National Recovery Plan for the Orange-bellied Parrot, *Neophema chrysogaster* (DEWLP 2016)	The recovery plan outlines the long-term strategy, and short-term objectives and actions, for the recovery of the Orange-bellied Parrot.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Conservation Advice *Grantiella picta* Painted Honeyeater (DoE 2015b)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	National Recovery Plan for the Painted Honeyeater (*Grantiella picta*). (DAWE 2021)	The plan considers the conservation requirements of the species across its range and identifies the actions to be taken to ensure the species' long-term viability in nature, and the responsible agencies that will undertake those actions.	The recovery plan does not identify light as a threat.
EPBC Advice	Conservation Advice *Pedionomus torquatus* Plains-wanderer (DoE 2015a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*) (DoE and SA DEWNR 2016)	The plan considers the conservation requirements of the species across its range and identifies the actions to be taken to ensure the species long-term viability in nature, and the parties that will undertake those actions.	The recovery plan does not identify light as a threat.
EPBC Advice	Conservation Advice *Calidris canutus* Red Knot (DCCEEW 2024)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice *Anthochaera Phrygia* Regent Honeyeater (DoE 2015)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) (DoE 2016)	The plan considers the conservation requirements of the species across its range and identifies the actions that need to be taken to improve the species' long-term viability in nature.	The recovery plan does not identify light as a threat.
EPBC Advice	Conservation Advice *Thalassarche cauta* Shy Albatross (TSS 2020)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice *Pterodroma mollis* Soft-plumaged Petrel (TSS 2015a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Commonwealth Listing Advice on *Macronectes giganteus* (Southern Giant-Petrel) (TSSC 2001a)	Recommends that the species be listed as Endangered under the EPBC Act	Listing advice does not identify light as a threat.
EPBC Advice	Conservation Advice *Lathamus discolor* Swift Parrot (TSSC 2016a)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	National Recovery Plan for the Swift Parrot (*Lathamus discolor*) (Saunders & Tzaros 2011)	The plan considers the conservation requirements of the species across its range, identifies the actions to be taken to ensure its long-term viability in nature and the parties who will undertake these actions.	The recovery plan does not identify light as a threat.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
EPBC Advice	Conservation Advice *Hirundapus caudacutus* White-throated Needletail (TSSC 2019)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice *Prototroctes maraena* Australian Grayling (TSSC 2021)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Commonwealth Listing Advice *Seriolella brama* Blue Warehou (TSSC 2015)	Recommends that the species be listed in the conservation dependent category under the EPBC Act.	Listing advice does not identify light as a threat.
EPBC Advice	Commonwealth Listing Advice on *Thunnus maccoyii* (Southern Bluefin Tuna) (TSSC 2010)	Recommends that the species be listed in the conservation dependent category under the EPBC Act.	Listing advice does not identify light as a threat.
EPBC Advice	Recovery Plan for Marine Turtles (DoEE 2017)	The long-term recovery plan objective for marine turtles is to minimise anthropogenic threats to allow for the conservation status of marine turtles to improve so that they can be removed from the EPBC Act threatened species list.	All vessels have a Vessel Lighting Management Plan. Refer to Appendix E9 Section 8.2 for Measures Adopted to Manage Environmental Impacts Fuel spills are also identified as a threat. Refer to Appendix D4 Section 8.6 for Measures Adopted to Manage Environmental Risks
EPBC Advice	Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle*) (*DEWHA 2008)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light as a threat.
EPBC Advice	Conservation Advice for *Sternula albifrons* (Little Tern) (DCCEEW 2025)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light or oil spill as a threat.
EPBC Advice	Approved Conservation Advice for the King Island scrub complex (DCCEEW 2024)	Conservation advice guides recovery planning and identifies actions required for conservation and recovery of the threatened species or ecological community.	Conservation advice does not identify light or oil spill as a threat.

Instrument Type	Instrument	Description of Relevance to Environmental Management of the Activity	Relevance the Regia MSS
Policy Statement	South-east Marine Parks Network Management Plan (2025)	The plan introduces revised zoning and regulations to enhance the protection of unique marine habitats and species, such as black coral trees, golden kelp forests, pygmy blue whales, and shy albatross. It also incorporates a First Nations-authored statement reflecting the aspirations of the South-east Saltwater Council, aiming to strengthen partnerships with Traditional Owners in managing Sea Country.	Mitigation measures to protect relevant biological receptors from relevant aspects can be found in Appendices D1-D4 and E2-E9 - Section 8 - Measures Adopted to Manage Environmental Impacts/Risks. These measures ensure potential impact/risk is below the predefined acceptable level outlined in Section 6 of these assessments.
EPBC Advice	Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*)	The document outlines a plan to support the recovery of the Grey Nurse Shark in Australia. It focuses on reducing threats, protecting habitats, and improving awareness and research.	The recovery plan does not identify sound, light, or oil spill as a threat.

6 Document Control

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	24 March 2023	MS	Initial version
0.1	25 March 2023	LT/PR	Review by CGG
0.2	31 March 2023	MS	Updated following CGG review
1.0	31 March 2023	MS	Published on Regia MSS Consultation Hub website
2.0	1 January 2024	SJ	Updated for EP Submission to NOPSEMA
3	30 October 2024	MS/RH/AH	Updated for EP resubmission following NOPSEMA's assessment.
4	7 April 2025	RH	Updated for EP Submission to NOPSEMA
5	6 December 2025	RH	Updated for EP Submission to NOPSEMA

REGIA
Marine Seismic Survey

Implementation Strategy

Appendix B3: REG-EP-006-B3

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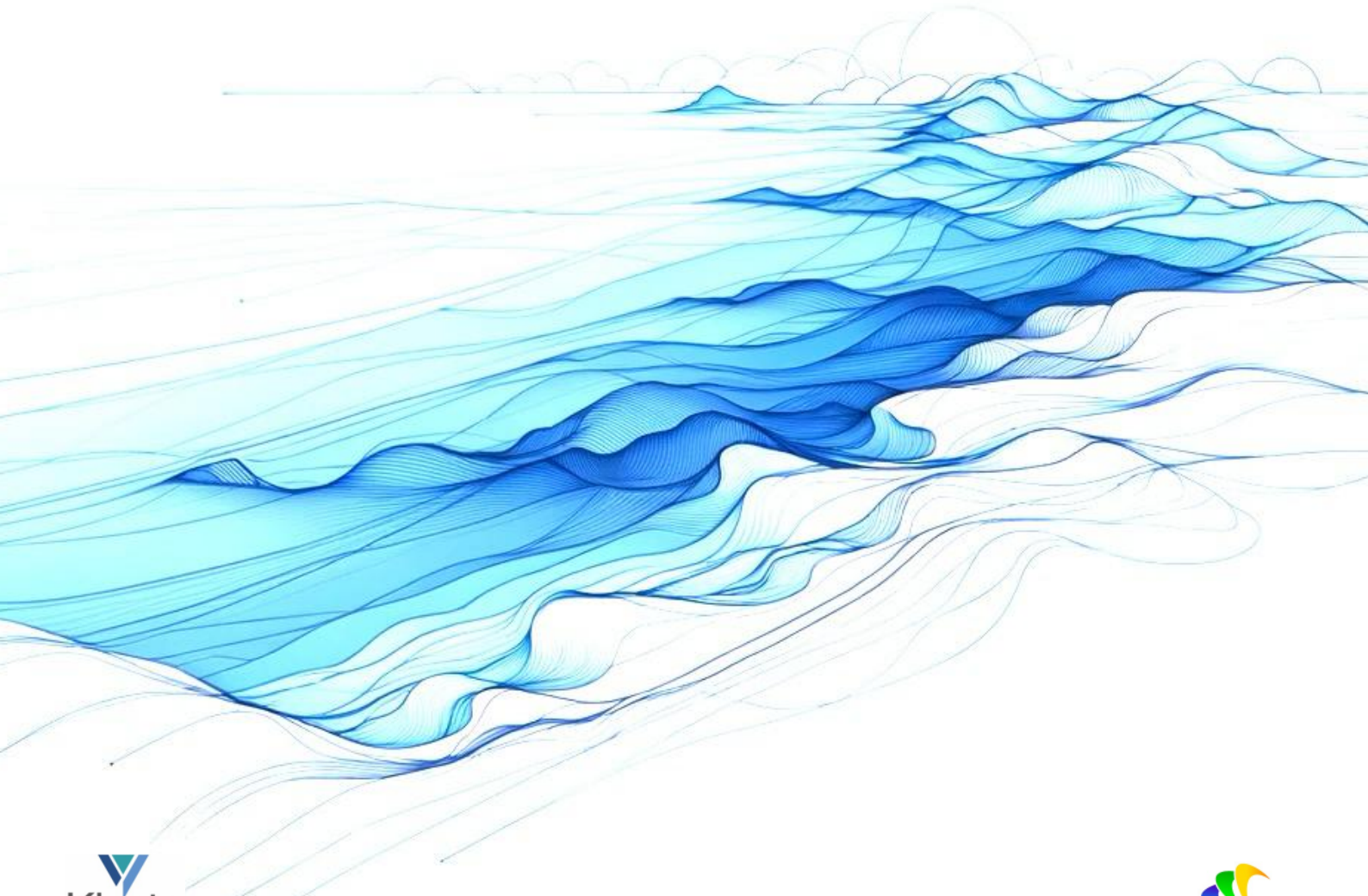

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Table of Contents

1 Introduction ***4***

2 Purpose ***4***

3 Consultation Input ***4***

4 Implementation Strategy ***5***

5 Section 22(2): Environmental Management System ***6***

5.1 Specific measures to continually identify and reduce risks to ALARP **6**
5.1.1 Oil Pollution Emergency Plan 7
5.1.2 OPEP Testing 7
5.1.3 Operational and Scientific Monitoring Program 8

5.2 Specific measures to continually identify and reduce impacts to ALARP **8**
5.2.1 Otway Adjustment Protocol 9
5.2.2 Petroleum SIMOPS Plan 10
5.2.3 Diving SIMOPS Plan 10
5.2.4 SRW Coastal Monitoring Program Implementation Plan 10
5.2.5 Active Source Area Reduction 10

5.3 Specific measures to ensure effectiveness of control measures **11**
5.3.1 Acquire seismic on paper workshop 11
5.3.2 Management of Change Process 11
5.3.3 Environmental Assessment 13
5.3.4 Management of Knowledge Process 15
5.3.5 Management of Communications Process 18
5.3.6 Management of Adverse Weather Process 18
5.3.7 Contractor and Supplier Management Process 19

5.4 Specific measures to ensure environmental performance is being met **19**
5.4.1 On water Communications Plan 20
5.4.2 Consultation Plan 20
5.4.3 Fauna Management Plan 20
5.4.4 Sail Line Plan 21
5.4.5 Sea Country Protection Plan 21
5.4.6 Chain of Command 22
5.4.7 Roles and Responsibilities – Implementation, Management & Review 23
5.4.8 Roles and Responsibilities – Emergency Conditions 25
5.4.9 Emergency Response 26

5.5 Awareness of EP Responsibilities **26**
5.5.1 Activity Specific Inductions 26
5.5.2 Competency and Ongoing Awareness 27

5.6 Managing Environmental Performance **29**
5.6.1 Monitoring of Environmental Performance 29
5.6.2 Recording of Environmental Performance 29
5.6.3 Audits and Inspections 29
5.6.4 Review of Environmental Performance 31
5.6.5 Management of Non-Conformance 32

6 Monitoring of Emissions and Discharges ***33***

6.1 Monitoring Emissions and Discharges **33**

7 Environmental Performance Reporting ***34***
7.1 Regulatory Reporting **34**
7.2 Notifications and Reporting **34**
7.3 External Routine Notification and Reporting Requirements **37**
8 Ongoing Consultation ***38***
8.1 Specific Notifications **38**
8.2 Consultations **38**
8.3 Activity Website **39**
8.4 Webinars **39**
8.5 Project Updates **39**
8.6 Continual Identification of Relevant Persons **39**
9 Compliance with the Act, the regulations, and all other environmental legislation ***41***
9.1 Record Management **41**
10 Document Control ***42***
Annex 1 – Impact Assessment Tables ***43***
Annex 2 – Risk Assessment Tables ***45***
Annex 3 - Objections and Claims raised from consultation. ***47***

1 Introduction

This document has been prepared to support CGG Services (Australia) Pty Ltd (**CGG**) in its environmental management of the Regia Marine Seismic Survey (**Regia MSS**). The Implementation Strategy follows a standardised methodology for monitoring and managing environmental performance of offshore petroleum activities and has been developed by CGG over many years of successfully operating in Australia without major incidents.

2 Purpose

This document aims to communicate the basis for environmental performance monitoring and management before, during and after the proposed Regia MSS. It is structured to align with the prescribed content of an implementation strategy as per Section 22 of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (**the Regulations**).

3 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 3 - Objections and Claims raised from consultation.

4 Implementation Strategy

This implementation strategy has been developed to comply with the requirements of Section 22(1) of the Regulations and describes the specific measures and arrangements that will be implemented for the duration of the activity to ensure that:

- All environmental impacts and risks of the activity will be continually identified and reduced to a level that is as low as reasonably practicable (**ALARP**).
- Management and mitigation measures detailed in the EP are effective in reducing the environmental impacts and risks of the activity to ALARP and acceptable levels.
- Environmental performance outcomes and standards set out in the environment plan (**EP**) are met.
- Arrangements are in place to respond to, and monitor impacts of, oil pollution emergencies.
- Consultation is maintained throughout the activity as appropriate.

The implementation strategy outlines a systematic approach that describes:

- The management systems by which the management and mitigation measures identified in the impact and risk assessment will be implemented.
- The implementation of management and mitigation measures will be monitored to ensure environmental risks continue to be managed to ALARP.
- The ongoing consultation process prior to and during the activity.
- Monitoring, auditing, and reporting of environmental performance for activities carried out under the EP.
- Arrangements in place to respond to, and monitor impacts of, oil pollution emergencies.

The implementation strategy for this EP has considered lessons learnt from the implementation of previous campaigns and inspection recommendations.

5 Section 22(2): Environmental Management System

The Regia MSS will be conducted under the framework of the CGG Environment Policy (Appendix A1), CGG Environmental Management Procedure, CGG Health, Safety, Environment and Social Responsibility Operating Management System (**HSE-OMS**) and the survey and support vessel's HSE Management System.

The activity will also operate under an activity specific HSE Plan that CGG, and the vessel operators will develop together. The HSE Plan is a tailored document that ensures CGG's environmental management standards and intended environmental performance outcomes are achieved at an operational level throughout the activity. The HSE Plan identifies and enables the selected seismic and support vessels contractor's own procedures to be utilised where appropriate, for example, for specific vessel operational control measures. At all times, however, the seismic and vessel contractors will be required as a minimum to comply with all relevant requirements of CGG's HSE policies and standards. As described in CGG Environment Management Procedure, the HSE Plan will incorporate regulatory and EP requirements including procedures for the following:

- Emergency response.
- Waste management.
- Hazardous materials and handling.
- Fuel/oil spills.
- Bunkering.
- Light.

The seismic and vessel contractor's HSE documentation will be reviewed for compliance with the relevant requirements described in this EP prior to the commencement of the activity. In the event of a gap between the existing plans and procedures and the requirements of this EP, a bridging document will be developed to ensure all control measures are adequately covered in the implementation of the EP and the hierarchy of control established.

5.1 Specific measures to continually identify and reduce risks to ALARP

CGG is required by its corporate policies and the Regulations to continually improve its performance. This includes adopting specific measures to continually identify and reduce risks to ALARP. The risk pathways identified by the environmental assessments include:

- Release of material or waste overboard.
- Collisions with marine fauna.
- Introduction of invasive species.
- Accidental release of fuel.

The following sections describe the processes that will be in place to ensure these risks are continually monitored and reduced to ALARP.

The following measures will be in place to continually identify and reduce the risk of release of materials and waste overboard to ALARP:

- Raising awareness about the requirements and handling of garbage in the activity inductions that are attended by all personnel deployed offshore.
- Vessel audits will confirm garbage segregation and enclosed storage of garbage.
- Investigation of any reported loss of waste or materials overboard.

The measures in place for fauna detection greatly exceed the usual requirements that apply to transiting vessels for protection of marine fauna. Similarly, the measures in place to detect marine

fauna, and continually reduce the impacts from elevated level of sound, will apply equally to the management of this risk.

The measures in place to continually identify and reduce risks from invasive marine species are all inspection based. Details can be found in Section 5.6.3.

Under the OPGGS (Environmental) Regulations, NOPSEMA requires that a petroleum activity have an accepted **Oil Pollution Emergency Plan** (**OPEP**) and **Operational and Scientific Monitoring Plan** (**OSMP)** (as part of the EP acceptance) in place before the activity commences. In the event of a vessel loss of containment, the OPEP and OSMP will be implemented. CGG has adopted an OPEP, OPEP testing arrangements, and an OSMP. These are each described in more detail below.

5.1.1 Oil Pollution Emergency Plan

This section satisfies regulations sections 22(8), 22(9), & 22(11). The OPEP is available in Appendix G3. The OPEP consists of the following:

- Survey / support vessel(s) SOPEPs[1]
- CGG Regia MSS OPEP[2]

These response arrangements are consistent with, and supported by, the:

- National Plan for Maritime Environmental Emergencies (NATPLAN): Australian Maritime Safety Authority (**AMSA**) – has jurisdiction and is the Control Agency for vessel spills, which affect Commonwealth waters.
- State Hazard Plan for Maritime Environmental Emergencies (State Hazard Plan): The Victorian Department of Transport and Planning (**DTP**) is the Control Agency for marine oil spills in Victorian state waters.

The seismic and support vessels (if ≥400 gross tonnes) must have IMO compliant SOPEP, prepared in accordance with IMO guidelines for the development of shipboard oil pollution emergency plans (resolution MEPC.54 (32) as amended by resolution MEPC.86 (44)), include oil spill response arrangements and provisions for testing the SOPEP (oil pollution emergency drills).

CGG will ensure that support vessels under 400 gross tonnes (that are not obligated legislatively to have a SOPEP), do have vessel-specific spill response plans (to an equivalent standard) that cover spill response arrangements. The SOPEP is designed to ensure a rapid and appropriate response to any oil spill and provide practical information required to undertake a rapid, effective response, and reporting procedures in the event of a spill.

5.1.2 OPEP Testing

This section satisfies regulatory sections 22(12), 22(13) & 22(14). The OPEP will be tested:

- Prior to the survey commencing.
- Following any significant amendment of the response arrangements.
- When a new seismic vessel is engaged for the activity.
- Not later than 12 months after the most recent test.

[1] Required for vessels ≥400 gross tonnes involved in the survey or equivalent for lesser tonnage vessels that manage the environmental impacts of a spill and vessel-based operational monitoring (agreement OPRC 90)
[2] This document supports the individual vessel-based SOPEPs by detailing the interaction between contractor-related spill response plans and CGG response arrangements.

Vessel-based SOPEP tests are undertaken by vessels routinely as per MARPOL Annex I (Section 15) requirements, and drill outcomes reviewed as part of the ongoing monitoring and improvement of emergency response control measures.

A desktop drill of the Regia MSS OPEP, including the vessel SOPEP, will be conducted to assess the effectiveness of the response arrangements. Specifically, the drill will be completed at least 8 weeks prior to carrying out the activity and will test the following:

- Roles and responsibilities of those involved in oil spill response are clear and understood.
- Communication sequence from the vessel master to vessel-contractor onshore management and the Control Agency, including notification of the AMSA JRCC is adequate, current and includes all relevant details.
- Communication between the CGG offshore representative and CGG Acquisition Project Manager and subsequent notification authorities is adequate and timely.
- Ensures Type 1 operational monitoring such as spill surveillance and tracking is appropriate, understood and practised.
- Equipment and procedures intended for source control on-board the vessels are available for use as outlined in the vessel SOPEP.

The outcomes of the drill will be documented, reviewed and improvements identified (as needed). Should any inadequacies, altered contractual arrangements or improvements to arrangements be identified via testing, these corrective actions will be registered as a non-conformance and the EP/OPEP will be amended for these items via a Management of Change process.

5.1.3 Operational and Scientific Monitoring Program

This section satisfies regulations section 22(10). The Regia MSS Operational and Scientific Monitoring Program (OSMP) is available in Appendix G3. The OSMP has the following objectives:

- Identify high priority protection areas within the Environmental Planning Area.
- Specify monitoring methodologies.
- Detail the process CGG will follow to determine the monitoring studies that will be implemented to:
    - Provide situational awareness and assist in planning and execution of spill response to minimise environmental harm.
    - Provide for short-term and long-term environmental damage and recovery assessments.

5.2 Specific measures to continually identify and reduce impacts to ALARP

CGG is required by its corporate policies and the Regulations to continually improve its performance. This includes adopting specific measures to continually identify and reduce impacts to ALARP. The impact pathways identified by the environmental assessments include:

- Physical presence of vessels
- Elevated levels of sound
- Elevated levels of light

The following sections describe the processes that will be in place to ensure these impacts are continually monitored and reduced to ALARP.

5.2.1 Otway Adjustment Protocol

The Otway Adjustment Protocol (OAP) has the following features:

- As a minimum, claims processes for direct losses from:
  - Accidental damage or loss of deployed fishing equipment caused by the presence of the seismic vessel (either repair or replace).
  - Displacement for increased transit times, which result in increased fuel and crewing costs from moving fishing locations,
  - Reduced catch per unit effort if survey acquisition timing directly overlaps a previously fished area, within the fishing season, demonstrated by the reported data.
- The claims process will require a fisher to provide evidence (or authorisation to access evidence) for claimed losses that enables a calculation of how much compensation may be due.
- Details about the role, responsibilities, and instructions for nominated claims assessors who will be third parties to the titleholder.
- An assessment report on each claim will be provided by the claim assessor to the titleholder and the claimant.
- The assessment report will include the details and methodology used to conclude the claim and an Outcome Notification.
- There will be a dispute mechanism requiring additional assessment by a different assessor.
- Applies to fishing cooperatives who can provide evidence of commercial losses because of the survey.
- Adjustment can be claimed for up to 30 days after the completion of each activity.
- A claim can be lodged up to 180 days after the completion of the activity.
- Subject to a claim being lodged, a suitably experienced/qualified independent person/organisation will be engaged by the titleholder as the assessor of the claim, in consultation with the claimant.
- Appropriately documented claims will be assessed, in accordance with the processes outlined in the OAP, and completed within 30 days of receipt of the required data.
- Successful claims will receive compensation within 30 days of the Outcome Notification being executed.

The claim assessor(s) will be suitably experienced and qualified and is defined as a person or organisation with proven demonstrated experience in data analysis and data auditing processes and procedures within the fishing industry. Nominees for claims assessors can be made by titleholders and claimants and then agreed upon before the commencement of a claim.

There is a claims process specified in the OAP, which will be followed by the titleholder and the claims assessor. If a claimant disagrees with a claim assessment outcome, and an agreement cannot be reached between the titleholder and the claimant, the claimant may, within 30 days of receipt of the Outcome Notification, request that a suitably experienced/ qualified independent third-party is engaged to review and determine the outcome of the claim. The independent expert reviewer must provide a view as to whether the claim assessment process has been conducted in line with the requirements of the OAP. The independent expert reviewer may also consider any additional information deemed appropriate by them, including information provided by either the claimant or the titleholder. An independent expert review decision may differ from the initial assessment outcome. Protocol review and maintenance (Appendix G4, section 4) is detailed below in section 8.2.

5.2.2 Petroleum SIMOPS Plan

It is possible that the acquisition may come within proximity of gas production facilities in the region. A simultaneous operations plan will be developed if the seismic vessels or any equipment will enter within 5km of the 500 m Petroleum Safety Zone of the Thylacine-A platform.

5.2.3 Diving SIMOPS Plan

CGG will provide the opportunity for commercial divers (e.g. dive schools and commercial divers) to develop a simultaneous operations (SIMOPS) plan consistent with the DMAC guidelines. This means that divers and CGG will need to communicate when the survey vessel is acquiring within 40 km of known dive sites. To ensure that recreational divers are aware of the SIMOPS Plan adverts will be place in local newspapers and at local dive shops with an invitation to participate. This will be part of the ongoing consultation plan (Section 8).

5.2.4 SRW Coastal Monitoring Program Implementation Plan

Appendix G5 sets out how CGG will operationalise the SRW Coastal Monitoring Program. It explains the practices, processes, roles and decision-making pathways that govern a pre-survey monitoring effort is delivered safely, consistently, and with sufficient rigour to support real-time mitigation when the survey commences. This document translates the commitments made in Appendix F3 into clear, actionable processes for day-to-day implementation by monitoring teams, advisers, contractors and vessel crews. The purpose of this document is to establish a dedicated, operationally robust monitoring programme that detects the presence and movements of SRW along the south-west Victorian coastline before and during the Regia MSS. Its key objectives are to:

1. Provide real-time, reliable detection of SRWs within the broader Otway offshore region using coordinated coastal, aerial, and drone-based monitoring methods.
2. Support mitigation and shutdown decisions by supplying timely and verified whale presence information to the Survey Environment Adviser (SEA).
3. Integrate coastal monitoring with other detection platforms to add to the continuous, multi-lines-of-evidence management system.
4. Ensure compliance with regulatory requirements and with the SRW National Recovery Plan by maintaining effective detection capability throughout the SRW season (May–October).
5. Provide clear deployment, escalation, and response procedures tailored to different weather conditions so that monitoring coverage remains effective and safe across variable operational environments.

5.2.5 Active Source Area Reduction

Reduction of the Active Source Area (ASA) to reduce uncertainty associated with unnecessary operation of the sound source in areas proximate to sensitive nearshore (shallower) areas would further reduce impacts. The ASA has been progressively reduced throughout the preparation of this EP. It is likely that the survey areas will continue to reduce in nature and scale as operations draw closer. Therefore, to reduce impacts from underwater sound emissions CGG will ensure the minimum size of the ASA and limit sound accumulation outside of the primary geophysical target area. This will be adopted as a part of producing the sail line plan so that once the final sail lines are known the ASA is reduced to its smallest viable size.

5.3 Specific measures to ensure effectiveness of control measures

There are several processes that will be used to ensure that, for the duration of the activity, control measures detailed in Appendix G1 are effective in reducing the environmental impacts and risks of the activity to ALARP and an acceptable level. These include processes for:

- Management of change
- Environmental assessment
- Management of knowledge
- Management of communications
- Management of adverse weather
- Contractor and supplier management

5.3.1 Acquire seismic on paper workshop

The Acquire Seismic on Paper (ASOP) workshop is a practice designed to bring all stakeholders, technical staff, and decision makers together, from all companies working on the project to share knowledge, identify any project risks, and map out possible improvements before the operations phase.

There will be a term of reference agreed between CGG and the vessel contractors to govern the scope, content, and conduct of the ASOP. The ASOP will:

- Occur prior to the commencement of the survey.
- Rehearse predictable scenarios during seismic operations.
- Ensure all attendees are familiar with the planned operations of the survey and have access to relevant spatial data (e.g. survey boundaries, sensitive species BIA's).
- CGG will commission an ASOP report to record any adjustments to the EP or operational procedures and the attendees at the workshop.
- Involve all operational stakeholders including relevant environmental experts.
- Involve the marine fauna expert panel when discussing implementation of the Fauna Management Plan (FMP).

5.3.2 Management of Change Process

The primary purpose of managing change is to re-evaluate the predicted levels of environmental impacts and risks and perform an updated assessment of whether the decision-making criteria are still met. This is the assessment of whether a change can be managed such that the activity continues to manage environmental impacts and risks to as low as reasonably practicable and to an acceptable level.

The following activities will trigger a management of change (**MoC**) process:

- A new scope (e.g., timing, location, or changes to operational details such as vessel type, equipment, processes, or procedures), which has the potential to impact on the environment not assessed for environmental impact previously or authorised in existing management plans and procedures.
- Change to the existing activity, scope, equipment, process, or procedures, which have the potential to impact on the environment or interface with an environmental receptor (responsibility of the CGG Acquisition Operations Manager).
- Changes in the external environment managed and monitored by the CGG Acquisition Operations Manager.
- Provision of new information that differs to that included in this EP, such as:

  - Potential changes in scientific knowledge regarding impacts and risks from seismic activities
  - New environmental sensitivities within or adjacent to the Activity Planning Area.
  - Issue of new regulatory requirements (e.g., Australian Marine Parks (AMP) Management Plans).
  - Identification of Key Ecological Features (KEFs), threatened or migratory species or critical habitats or biologically important areas (BIAs) not identified in the EP.
- Identification of new stakeholder objections or claims that are assessed to have merit.
- Non-conformances (audits, inspections, etc.) which identify management and mitigation measures may no longer manage environmental impact/risk to ALARP or acceptable criteria. Non-conformances are monitored by the Environmental Officer.
- Incidents which identify new or increased impacts and risks arising from activities not previously identified in the accepted EP. Incidents are monitored by the Environmental Officer.

Any change relevant to the environmental management of the activity shall be directed to the CGG Acquisition Operations Manager and Environment Officer for initial assessment. The change shall be assessed for environmental impact/risk in accordance with the CGG Risk Management and MoC Process and any implications determined for the environment and associated regulatory document revisions.

Additional management and mitigation measures identified as part of the MoC that avoid, minimise, limit, or mitigate environmental impacts and risks will be captured in the relevant documents and the change to those documents recorded. Changes to any management and mitigation measure being relied on for the management of environmental impacts and risks will require a reassessment of whether the impact or risk being considered remains of an acceptable level and reduced to ALARP. The appropriateness of the environmental performance outcomes (**EPO**s) and environmental performance standards (**EPS**s) set for the activity will also be reassessed. For changes identified in the impact and risk assessment process, if relevant persons' interests, activities, or functions are affected by the change, they will be advised, and feedback invited on the proposed change.

Any new information, changes or updates considered via the MoC process will also be considered against Section 39 of the Regulations, to determine if resubmission of the EP to NOPSEMA is required. Consideration of the triggers for resubmission will occur after the MoC has been completed and will either result in a major revision (meaning a resubmission to NOPSEMA is required) or a minor revision.

Major revisions to the Environment Plan can arise from many circumstances including but not limited to:

- Before commencement of a new activity.
- Before the commencement of any significant modification or new stage of the activity that is not provided for in the accepted EP.
- Before or, as soon as practicable after the occurrence of any significant new or significant increase in environmental impact or risk, including a series of new or increased impacts or risks.
- If there is a change in titleholder that will result in a change in the way the environmental impacts and risks of an activity are managed.
- If the updated predictions of environmental impacts or risks exceed or may exceed the defined acceptable levels of impacts or risks in the in-force environment plan.
- If the assumptions made in the in-force environment plan about the predicted levels of environmental impacts or risks or defined acceptable levels are proven incorrect/inaccurate.
- In the event of legislative change driven by new case law.
- Requirements relevant to the activity or environmental feature being considered.

Minor revisions to the Environment Plan are likely to include:

- Administrative changes that are identified during operation of the Environment Plan (e.g. document references, contact details, etc.)
- A review of the activity/change and the environmental impacts and risks of the activity/change does not trigger a requirement for revision under the Regulations (Section 39 and Section 40).
- An improvement to a level of environmental performance.

Where amendments are made to the accepted EP/OPEP via the CGG MoC process, revisions made will be justified, tracked and a comprehensive record of the revision kept for each change. This includes all risk assessments associated with MoC activities. CGG will not use the MoC process to materially degrade or diminish the set levels of environmental performance.

5.3.3 Environmental Assessment

CGG's impact and risk management method is based on the principles, framework and processes defined by the International Standards Organization (**ISO**) 31000:2009 Risk Management – Principles and Guidelines. Each assessment process has the following components.

- Setting the context, scope, and criteria of the assessment.
- Identifying, analysing, and evaluating the impact or risk in an iterative assessment.
- Treating the impact or risk
- Communicating throughout the assessment.
- Monitoring and review throughout the assessment.

5.3.3.1 Impact Assessment Process

The impact assessment process in preparation of the EP identified the following environmental aspects and subsequent environmental impacts from planned events.

- Artificial Light
  - Change in ambient light
  - Change in fauna behaviour
- Underwater Sound
  - Change in ambient sound
  - Change in fauna behaviour
  - Change in hearing capacity
  - Change in physical condition
- Physical Presence
  - Change in functions, interests, or activities

CGG analysed each impact and assigned a level of effect and uncertainty, which in combination give a resultant predicted level of impact. The criteria used in this analysis and the impact assessment matrix can be found in Annex 1 – Impact Assessment Tables. These same criteria will be used by CGG if an impact required reassessment because of a management of change process.

5.3.3.2 Risk Assessment Process

The risk assessment process in preparation of the EP identified the following environmental aspects and subsequent environmental risks from unplanned events.

- Accidental Release of Fuel
  - Change in water quality
  - Change in sediment quality
  - Change in ecosystem dynamics
  - Change in physical condition
  - Change in fauna behaviour
  - Change to functions, interests, or activities

  - Change in aesthetic value
- Introduction Of Marine Pest Species
  - Change in ecosystem dynamics
  - Change to functions, interests, or activities
- Accidental Release of Materials or Waste Overboard
  - Change in physical condition
  - Change to functions, interests, or activities
  - Change in aesthetic value
- Collisions With Marine Fauna
  - Change in physical condition

CGG analysed each risk and assigned a level of likelihood and consequence, which in combination give a resultant predicted level of risk. The criteria used in this analysis and the impact assessment matrix can be found in Annex 2 – Risk Assessment Tables. These same criteria will be used by CGG if a risk required reassessment because of a management of change process.

5.3.3.3 Application of the Hierarchy of Controls

The "hierarchy of controls" (Regia definition "measures") is a philosophy used in occupational health and safety management to minimize or eliminate workplace hazards. It can be easily adapted to environmental management. Applying the hierarchy involves a systematic approach to controlling hazards by implementing a series of control measures, with each measure building on the previous one in terms of effectiveness. The five levels of the hierarchy of controls, in order of effectiveness, are:

1. **Elimination**: The most effective measure is to avoid or eliminate the aspect completely. This involves removing the aspect from the activity, so that receptors are no longer exposed. It is typically achieved by adopting an activity limitation.
2. **Substitution**: If avoidance is not feasible, the next best measure is substitution. This involves replacing the cause of one aspect with another, less hazardous one. This can most effectively be done by adopting activity limitations.
3. **Control measures**: If substitution is not feasible, the next best measure is a control measure. This involves adopting a system, procedure, or item of equipment to reduce exposure. It can also involve specifying a level of performance of a person.
4. **Administrative measures**: If control measures are not feasible, the next best measure is an administrative measure. This involves changing management system elements (practices, resources, processes, or responsibilities) to reduce exposure.
5. **Protective measures:** The least effective measure is protective measures. This involves implementing management plans to monitor and adapt to circumstances with protective measures, monitoring equipment, or devices to reduce exposure levels. Protective measures are the last line of defence and should only be used when other measures are not feasible.

In summary, the hierarchy of controls philosophy emphasizes the importance of using the most effective measures first, with less effective measures used only when more effective measures are not feasible. CGG will apply this hierarchy when considering how to reduce the levels of impact or risk in an assessment/reassessment.

5.3.4 Management of Knowledge Process

To support implementation of this EP, all staff and contractors engaged in the Regia MSS will be provided access to the accepted EP through the Regia MSS Consultation Hub. All contractors will also have access to the following documents in full:

Implementation Strategy Documents

1. Implementation Strategy (Appendix B3)
2. Fauna Management Plan (Appendix G2)
3. Oil Pollution Emergency Plan (OPEP) (Appendix G3)
4. Operational and Scientific Monitoring Plan (OSMP) (Appendix G3)
5. Petroleum SIMOPS Plan
6. Diving SIMOPS Plan
7. On Water Communications Plan
8. Consultation Plan
9. Sea Country Protection Plan
10. Sail Line Plan
11. Project HSE Plan
12. Emergency Response Plan
13. Garbage Management Plan(s)
14. Vessel Lighting Management Plan(s)
15. Shipboard Oil Pollution Emergency Plan(s) (SOPEP)

Registers

16. Environmental Compliance Register
17. Corrective Actions Register

Supporting Documents

18. Environmental Performance Outcomes and Standards (Appendix G1)
19. Description of Activity – Activity Limitations (Appendix A2)
20. Marine Assurance Audit Tools (e.g., OVID-style inspection checklist)
21. Acquire Seismic on Paper (ASOP) Report
22. Otway Adjustment Protocol (Appendix G4) (www.omicc.com.au)

These documents will be made available through vessel document management systems and project information platforms accessible to vessel crew, onshore support teams, and third-party contractors as appropriate. Personnel will also be briefed on the content and relevance of these documents during pre-commencement inductions and ongoing toolbox sessions.

This ensures all personnel responsible for implementing mitigation measures or monitoring environmental performance have direct access to the current versions of the documents that inform their responsibilities.

A check of the currency of the environmental knowledge that underpins the environmental assessments for the activity will be carried out one month prior to the survey commencing. This will include a review of any information received through ongoing consultation and a re-run of the Protected Matters Search Tool with comparison to previous results. Any changes will be subject to the management of change process.

CGG recognises that other parties (petroleum titleholders, commercial shipping, offshore wind proponents, research institutions, and government agencies) may have activities that offer insights and knowledge that may be useful for environmental management such as marine fauna detections or research. Table B3-1 identifies actions to be carried out to search for new information from third parties with activities in the area and try to improve the effectiveness of mitigation measures.

Table B3-1 - Third party knowledge sharing efforts

Third Party	Action	Reason	Mitigation Measure
Arthur Rylah Institute	Update on the planning for the activity and the Regia marine fauna detection activities. Request to share information before, during and after the activity with their citizen science program for SRW observations.	To assist data exchange, gathering, and mitigation actions.	Environment Advisor – Responsibility to establish relationships and attempt to facilitate data exchange.
DEECA	Seek information about SRW research priorities and actions and offer to exchange information on SRW detections.	To ensure that all available detection information is available to CGG to be able to detect the start/end of migration of SRW into the reproduction BIA.	
Amplitude Energy, ConocoPhillips Australia, Beach Energy, Woodside Energy	Seek to exchange information on whale detections, success of whale mitigation measures, and technology trials.	To learn from other activities fauna detections near the survey.	
Spinifex Offshore Wind Project	Seek to exchange information on whale detections from any PAM systems that the Spinifex Offshore Wind Project has deployed and detections from the survey.		

5.3.4.1 Pre-survey Knowledge Assessment

At least eight weeks prior to the survey commencement, the CGG Acquisition Project Manager and Environment Officer shall undertake pre-survey knowledge assessment that will review and consider the following as a minimum:

- Community and relevant person notification requirements.
- New issues or concerns raised by relevant persons.
- Changes to relevant legislation or regulatory guidelines.
- Existing information in relation to any component of the receiving environment (including BIAs, AMPs).
- Re-run the PMST searches to check for changes to listed/threatened species.
- Search the NOPSEMA website and consult with any new titleholders to determine the presence of other seismic operations overlapping the proposed activity.
- Changes to commercial fishery licence areas, fishery status, current fishing effort and licence holders overlapping the Regia MSS Environment Planning Area based on:
  - Status reports and available data sources such as FRDC, IMAS for fisheries and aquatic resources.
  - Information provided directly by fishers, VFA, and AFMA through the relevant person consultation process.

  - Fishing locations.
  - Spawning information relevant to key indicator species.
- Newly available scientific literature.
- New acoustic source technology and justification for or against its implementation.
- Confirmation of emergency (oil spill) contacts.

If new information regarding the receiving environment relevant to the activity is present, then a management of change assessment will be carried out.

5.3.4.2 Reporting

There will be a **Daily Operations Report** prepared during the survey to provide a comprehensive record of project activity, vessel performance, environmental monitoring, and health, safety, and environmental (HSE) measures. These reports are structured to support regulatory compliance, operational oversight, and environmental risk management, and their preparation will include the following content areas:

- Operational Summary: A detailed account of seismic acquisition progress, including the status of each survey line (e.g., completed, in progress, or aborted), acquisition parameters, production totals (in kilometres and square kilometres), and any operational interruptions such as equipment downtime or weather delays.

- Activity Timeline and Performance Metrics: A breakdown of 24-hour vessel operations, categorised into productive acquisition time, technical downtime, and standby time (particularly for marine mammal mitigation). Performance statistics track cumulative progress and provide insight into daily and project-wide acquisition efficiency.

- Marine Fauna Observations and Mitigation: Records of marine mammal detections (both visual and acoustic), associated mitigation actions (e.g., soft start delays or shutdowns), and species-specific sighting data. Reports also include commentary on the implementation of environmental management plan requirements.

- Health, Safety, and Environmental (HSE) Reporting: Documentation of crew exposure hours, safety meetings, drills, toolbox talks, and observation cards (including positive behaviours, hazards, or unsafe conditions). Summary statistics highlight safety performance across all support and survey vessels.

- Technical Commentary: Notes on streamer and source performance, positioning data quality, noise levels, and any operational issues encountered during acquisition. Data quality assessments from seismic processing teams may also be included.

- Support Vessel and Logistics Updates: Status of supporting vessels (e.g., crew changes, bunkering operations, transit), as well as updates on small boat activity for in-sea equipment maintenance or crew transfers.

- Environmental and Weather Conditions: Recorded weather states relevant to operational planning and visual observation capability, along with forecasts to inform short-term scheduling.

In preparing similar reports for future projects, teams should ensure coordination across operational, technical, HSE, and environmental personnel to provide timely, accurate, and integrated information that meets both internal management needs and external compliance requirements.

5.3.5 Management of Communications Process

This management process applies to internal communications. For external communications please see Section 8.

Any modification to the assumptions or basis of the EP that arise because of the implementation of the Environmental Management System will be communicated using the Chain of Command. This includes timely notification of any modifications to the EP because of managing change, knowledge, or adverse weather.

The seismic and vessel contractors will be responsible for keeping its workforce informed about environmental issues. The Party Chief acts as a focal point for personnel to raise environmental issues, and consults/involves all personnel in the following:

- Issues associated with the implementation of the EP.
- Any proposed changes to equipment, systems, or methods of operation of plant, where these may have environmental implications.
- Any proposals associated with continuous improvement of environmental protection, including the setting of environmental objectives and training schemes.
- Regular HSE meetings will be held on the seismic vessel. The issues discussed and actions taken will be recorded. The minutes of each meeting, including action items from the meetings, will be made available to all personnel.

Other forms of internal communication include toolbox meetings, which occur before every critical or unfamiliar job. This meeting includes all personnel involved in the task and will include aspects such as spill prevention requirements, etc.

The Report on Consultations (Appendix C1 and C2) documents all commitments made to relevant persons in relation to notifications about the activity and the progress of the survey.

5.3.6 Management of Adverse Weather Process

It is the duty of the Vessel Master to act as the focal point for all actions and communications with regards to any emergency, including response to adverse weather or sea state, to safeguard his vessel, all personnel on board and the environment.

During adverse weather the Survey and Support Vessel Masters are responsible for:

- Ensuring the safety of all personnel on board.
- Monitoring all available weather forecasts and predictions.
- Initiating the vessel safety management system, vessel HSE procedures and/or vessel ERP.
- Keeping the Party Chief and CGG Site Representative fully informed of the prevailing situation and intended action to be taken.
- Assessing and maintaining security, watertight integrity and stability of vessel.
- Proceeding to identified shelter location(s) as appropriate.
- Other appropriate responsibilities shall be taken into consideration as dictated by the situation.

In addition to in-vessel VHF Marine Radio Weather Services, daily weather forecasting from a designated weather forecast will be provided (if available) to monitor weather within the Operational Area over the duration of the survey.

Should poor/bad weather be imminent/encountered, the Vessel Master shall implement weather monitoring to assess conditions on site. The amount of monitoring and subsequent action would be

dependent on the severity of the bad weather front and resulting actions will comply with the seismic contractor's procedure for Severe Weather Monitoring.

The CGG Acquisition Operations Manager shall ensure adequate weather forecasting is available at an increased frequency as the severity escalates.

5.3.7 Contractor and Supplier Management Process

Seismic and vessel contractors considered for the Regia MSS will be assessed against, and meet the following criteria:

- Compliance with all statutory requirements.
- Have an acceptable HSEQ performance record in undertaking seismic activities.
- Have a Vessel Lighting Management Plan to minimise light emissions while meeting vessel navigational light requirements.
- Provide evidence of resources and competency in the services to be provided.
- Services, procedures, and vessel hardware comply with the requirements of this EP.
- Any equipment to be used in the provision of survey services meets regulatory requirements, is fit-for-purpose and has all equipment, testing and verification certificates.
- Specific requirements, which need to be assessed at tender evaluation stage include the acoustic source is confirmed to be 2,820 in^3 or less.
- Specific requirements, which need to be assessed at tender evaluation stage include a preference to select vessels:
  - Whereby refuelling at sea is not required.
  - That are double bottomed.
  - That have double walled fuel tanks.
- Specific requirements that need to be assessed prior to vessel mobilisation include all vessels transiting to the Otway must be assessed for biofouling risk and have the relevant biosecurity clearance.

All contracted vessels will undergo a PAM-readiness assessment during mobilisation planning to determine whether they can safely and effectively support PAM systems. PAM-ready vessels will be preferentially selected and mobilised where commercially and operationally feasible. Where PAM integration is not practicable due to vessel configuration, safety constraints, or technical limitations, the basis for infeasibility will be documented, and alternative monitoring arrangements will be implemented to maintain the required whale-detection capability in accordance with the EPOs.

Prior to the survey, CGG will undertake an audit/inspection of each vessel as detailed in Section5.6.3.

5.4 Specific measures to ensure environmental performance is being met

The following resources, processes or practices are used to ensure that environmental performance outcomes and environmental performance standards are being met for the duration of the activity.

There are several resources that support the implementation, monitoring and review of the EP. These are listed below and those without explanation in other parts of the EP are described in the subsequent sections:

- Fauna Management Plan (Appendix G2).
- Oil Pollution Emergency Plan (OPEP) (Appendix G3)
- Operational and Scientific Monitoring Plan (OSMP) (Appendix G3).
- Petroleum SIMOPS Plan (Section 5.2.2).

- Diving SIMOPS Plan (Section 5.2.3).
- On Water Communications Plan (Section 5.4.1).
- Consultation Plan (Section 5.4.2).
- Project HSE Plan.
- Emergency Response Plan.
- Garbage Management Plan(s) and Garbage Record Book(s).
- Vessel Lighting Management Plan(s).
- SOPEP(s).
- Sail Line Plan (Section 5.4.4).
- Sea Country Protection Plan (5.4.5).

5.4.1 On water Communications Plan

This plan covers all on-water external communications with other marine users. All project vessels will have means of communication with each other and other marine users. Project vessels are equipped with suitable and fully functioning navigation aids, including automatic identification systems (AIS). Competent crew members ensure 24-hour visual, radio, and electronic surveillance to enhance navigational safety. This plan documents all the methods of communication on the water (primary and alternatives) and when these are required to occur.

5.4.2 Consultation Plan

The Consultation Plan is designed to establish an organized and efficient process for consulting with, and gathering feedback from, relevant persons throughout the lifecycle of the activity. It includes practices that will identify, engage, and respond to relevant persons, ensuring that their concerns and perspectives are considered and addressed.

The **Consultation Plan** comprises a variety of techniques to ensure that external parties (relevant State and Commonwealth authorities and other relevant interested persons) are appropriately kept informed about the activity. The consultation plan ensures that relevant persons and local communities are informed about the progress of the activity at the frequency requested during preparation of the EP. There are various people involved in ensuring that the communications plan is followed with the overall responsibility for ensuring the performance residing with the Environment Advisor. Relevant details of the **Consultation Plan** are provided in Section 8.

5.4.3 Fauna Management Plan

The Fauna Management Plan (**FMP**) (Appendix G2) governs the protection of marine fauna interactions during the survey. It sets up a moving 40 km horizontal field-of-view as a detection area for marine fauna around the sound source. The FMP has clear guidance for pre-survey and on-water actions to protect marine fauna, along with shoreside support, decision, and review mechanisms to improve the fauna management system over time. The FMP has:

- Roles and responsibilities for staff involved in the protection of marine fauna and functions as the primary document that ensures the EPO's related to protection of marine fauna will be met.
- Has specific procedures for various stages of the activity.
- Includes the requirement for soft starts.

5.4.4 Sail Line Plan

The sail line plan is a resource primarily in place to ensure that activity is carried out by the contractor to the specifications of CGG. It includes spatial and technical data consistent with the description of activity including the limits and boundaries of the operational area and acquisition area for operation of the seismic source and excised zones. The MSS acquisition lines will be acquired working from:

- Deep lines to shallow lines if the survey period is between September to December

The sail line plan includes all the specifications of the acoustic source and streamer configuration, and all activity limitations as specified in Appendix A2.

The sail line plan will be provided to the seismic contractor for agreement before the survey begins, and all variations to the plan will be agreed upon and documented in writing between CGG and the seismic contractor.

The sail line plan will:

- List the activity limitations in Appendix A2, Section 4 of the accepted EP.
- Include maps for the operational area, acquisition area, depth contours, and distances related to environmental management control measures.
- Include sail line pre-plots for acquisition.
- Include instructions on how to optimise sail lines and the communication associated with adapting the survey due to operational and environmental constraints.
- Be communicated during the ASOP workshop.
- Be signed off and accepted by the party chief of the vessel contractor.

Prior to the sail line plan being signed off, the Environmental Advisor will ensure that the Active Source Area will be reduced to its smallest viable size.

5.4.5 Sea Country Protection Plan

Considering the regulatory environment governing offshore petroleum activities and the increasing emphasis on cultural heritage protection, CGG implemented a Sea Country Protection Program (**SCPP**). The Regia MSS EP identified that offshore petroleum activities can affect tangible and intangible cultural interests, values and sensitivities, on or related to Sea Country, as described in Appendix F3, section 3.16, particularly those associated with marine fauna, and they should be protected when appropriate.

The SCPP is a mechanism that facilitates the identification and management of new information, relevant to the activity, through collaboration of First Nations people who decide to be part of the program.

Activities able to be undertaken through the SCPP include:

- Facilitation of First Nations knowledge holder participation on expert whale panel (Event ID EVT352)
- Potential funding for spiritual permission or healing with consent from Traditional Owners.
- Opportunities for other parties to contribute to further the growth and scope of the program if it continues to be effective.
- Provision of fauna monitoring data

5.4.6 Chain of Command

A clear chain of command for the shore-based and vessel-based roles relating to the Regia MSS is provided in Figure B3-1. Upon contract award, and during evaluation of the contractor's management system, specific on-board positions will be identified who are responsible for specific management and mitigation measure implementation.

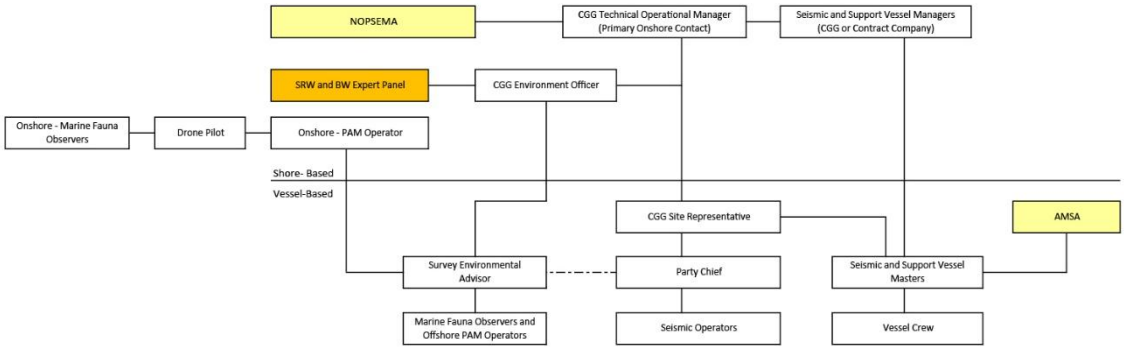

Figure B3-1 - Regia MSS Organisation Structure.

5.4.7 Roles and Responsibilities – Implementation, Management & Review

The roles and responsibilities for personnel involved in this activity in relation to implementation, management, and review of this EP, are described in Table B3-2.

Table B3-2 - Roles and Responsibilities - Implementation, Management & Review

Role	**Responsibilities in relation to the implementation, management, and review of the EP**
CGG Acquisition Operations Manager	Ensure the activity is undertaken as per the environmental performance outcomes of the EP.
	Provide sufficient resources to implement management and mitigation measures to achieve the performance outcomes of the EP.
	At least four weeks prior to the survey commencement undertake the ASOP (Section 5.3.1)
	Monitor and ensure the close out of corrective actions raised from environmental inspections/audits or incidents.
	Initiate the end of activity review with the seismic contractor and document lessons learnt.
	Ensure incidents are fully investigated and corrective actions monitored to close-out and ensure that all incidents are properly reported. (Section 5.6.5)
	Commission audit and inspections. (Section 5.6.3)
Environment Officer	Ensure that the activity specific induction is completed by all project personnel. (Section 5.5.1)
	Review results of conformance audits conducted during the program and make recommendations where required.
	Develop and maintain the **Environmental Compliance Register** for the activity, detailing the environmental commitments, performance outcomes and standards and measurement criteria in the EP.
	Oversee the implementation of the management of change process. (Section 5.3.2)
	Develop and maintain a **Corrective Actions Register** and communicate the status of actions to the CGG Acquisition Operations Manager.
	Ensure data and records are collected for the **Post-survey Environmental Performance Report** (PEPR) and prepare the report.
	Convene and coordinate the Expert Panel as part of the **Fauna Management Plan**.
	Prepare the **Monthly Environment Report** (MER) and submit to NOPSEMA.
	Sightings and survey information are to be recorded within the 'Cetacean Sightings Application' (CSA) software.
	Maintain regular contact with third parties offer to share marine fauna detections in return for the same information. Increase efforts for the real-time exchange of information during the 90 days of the survey.
	Upon completion of the survey, export the information reported to the CSA as a text file.
Seismic and Support Vessel Managers (CGG or Contractor Company)	If contractor's HSE documentation is not compliant with the relevant requirements described in this EP develop a bridging document to ensure all management and mitigation measures are in place.
	Ensure that the documents specified in the management of knowledge are available aboard.
	Provide access to the vessels for audits and inspections.

Role	**Responsibilities in relation to the implementation, management, and review of the EP**
	Ensure vessels are compliant with maritime standards that will be audited as part of CGG's Marine Assurance System.
CGG Site Representative (Primary Vessel-based Contact)	Facilitate clear communications between the persons identified in this EP.
	Monitor and report on the conformance of all EP commitments through observations and assessments of performance against the measurement criteria.
	Review the seismic and vessel contractor's HSE documentation for compliance with the relevant requirements described in this EP prior to the commencement of the activity.
	Assist with review, investigation and reporting of all environmental incidents and ensure they are reported to the CGG Acquisition Operations Manager.
	Ensure day-to-day activities are monitored for conformance against this EP and the outcomes are reported to the CGG Acquisition Operations Manager.
	Perform MMO duties when the dedicated MMO is unable to, such as during short break periods.
Party Chief	Ensure safe execution of all operations carried out by the seismic crew aboard the survey vessel, in accordance with the EP.
	Ensure the control measures adopted within this EP relating to operation of the seismic source are implemented to minimise potential environmental impacts resulting from seismic acquisition (e.g., pre-watch, soft-start procedures, stop-work procedures)
	Ensure equipment used on site is inspected before use and as required during survey.
	With assistance from others, inspect and maintain equipment, including environmental equipment, and maintain all statutory test and inspection documentation for the marine equipment.
	Provide a daily log of activities and environmental incidents to the CGG Site Representative.
Survey Environmental Advisor (SEA)	Coordinate the implementation of the **Fauna Management Plan** offshore and provide advice to the Party Chief on actions to be taken.
	Undertake audits and inspection under direction. (Section 5.6.3)
	Assist in preparation of external regulatory reports required for the survey.
	Collate data for the **Monthly Environment Reports** (MER) and the PEPR and prepare the offshore parts of the MER.
	Monitor the implementation of the environmental performance standards on the survey and support vessels.
Seismic and Support Vessel Masters	Responsible for the overall HSE performance of the vessel against the legislative requirements and any applicable measures in the EP.
	Ensure the safe execution of all operations of the vessel.
	Communicate with other marine users and follow the On-Water Communications Plan.
	Support the CGG Site Representative in ensuring that all relevant HSE documents are understood and adhered to.
Seismic Operators Vessel Crew	Conduct activities in a professional and safe manner with attention to good housekeeping procedures and work practices.
	Undertake Regia MSS induction.
	Immediately report any incidents to the Survey Vessel Master or Party Chief.
	Encourage improvement in environmental performance wherever possible.
	Report any marine fauna sightings to the SEA.

There are further responsibilities for the personnel involved in marine fauna management located in the **Fauna Management Plan**. There are also responsibilities for measuring the environmental performance of control measures in meeting the environmental performance outcomes, which can be found in the performance tables in Appendix G2.

5.4.8 Roles and Responsibilities – Emergency Conditions

The roles and responsibilities for personnel involved in this activity in relation to emergencies or potential emergencies are described in Table B3-3. Emergencies or potential emergencies are defined in this section to be any breach, or potential breach, of a requirement of the EP as well as the responsibilities in emergency response. Additional roles and responsibilities as they relate specifically to oil spill response are detailed in the Oil Pollution Emergency Plan (**OPEP**) which is available in Appendix G3.

Table B3-3 - Regia MSS Roles and Responsibilities – Emergency Conditions.

Role	Responsibilities during emergencies or potential emergencies
CGG Acquisition Operations Manager (Primary Shore-based Contact)	Commit resources to facilitate an emergency response strategy in the event of an incident.
	Complete the notifications detail within the OPEP.
	Review and send incident reports to regulators and others as defined in the OPEP.
	Manage the CGG emergency response strategy in the event of an incident.
CGG Environment Officer	Manage any oil spill monitoring requirements as per the OSMP.
	Confirm the high priority protection areas.
Seismic and Support Vessel Managers (CGG or Contractor Company)	Timely communication of emergencies or potential emergencies within the Chain of Command.
CGG Site Representative (Primary Vessel-based Contact)	Immediately alert the CGG Acquisition Operations Manager of any changes in operations, which could impact negatively on environmental performance or for changes in operation, which alter the environmental risk profile of the activity.
Party Chief	Immediately notify the CGG Site Representative of any incidents/activities arising from seismic operations that are likely to have a negative impact on the performance outcomes detailed in this EP.
Survey Environmental Advisor (SEA)	Notify NOPSEMA in the event of a fauna collision.
Seismic and Support Masters	Notify AMSA, CGG Site Representative and Vessel Manager in the event of a notifiable oil spill or the accidental release of waste overboard.
	Implement the vessel's SOPEP and OPEP procedures in the event of an oil spill, including first response to an incident using the resources immediately available to the vessel.
	Immediately notify the CGG Site Representative of any incidents/activities arising from vessel operations that are likely to have a negative impact on the performance outcomes detailed in this EP.

5.4.9 Emergency Response

CGG's emergency preparedness and response arrangements will be included within the Project HSE Plan. In addition, the seismic and support vessels will be expected to have a vessel-specific Emergency Response Plan (**ERP**) and SOPEP. These documents will be reviewed by CGG to ensure they meet the requirements for emergency and oil spill response specified within this EP. As the Regia MSS is vessel-based, it is considered appropriate that operational response to an emergency would be handled by CGG using their existing emergency response procedures and the vessel-specific ERP and SOPEP. The ERP, SOPEP and OPEP will be tested prior to the commencement of the survey as detailed in Section 5.1.2.

CGG reviews specific activities, equipment, and workplaces to identify possible emergency situations that may arise. CGG would ensure that any subcontracted vessel operator has established systems to ensure emergency plans are developed, implemented, and maintained and that these plans address those incidents that are reasonably foreseeable. Information that is considered when identifying potential emergency situations include the following:

- Results of hazard identification and impact/risk assessments.
- Legal requirements.
- Previous incident (including accident) and emergency experience.
- Emergency situations known to have occurred in similar organisations.
- Information related to accident and/or incident investigations posted on the websites of regulators or emergency response agencies.
- The Project HSE Plan contains instructions for vessel emergency, medical emergency, search and rescue, reportable incidents, incident notification and contact information to ensure that:
  - All potential emergencies are identified.
  - Emergency response plans are documented, accessible and clearly communicated.
  - Roles and responsibilities are clearly defined.
  - Adequate equipment, facilities and trained personnel are available to respond to emergency situations to mitigate adverse consequences.
  - Inspection and testing of critical emergency equipment is performed.
  - Emergency drills and exercises are conducted to assess emergency response capacity and capabilities.
  - Lessons learned are communicated to the appropriate people.

5.5 Awareness of EP Responsibilities

This section addresses regulation section 22(4).

5.5.1 Activity Specific Inductions

All personnel involved with the Regia MSS will be given an activity-specific environmental induction prior to commencing work. This induction will cover environmental responsibilities relevant to the duties and responsibilities of the roles including:

- Environmental sensitivities and conservation values in the EP.
- Environmental impacts and risks associated with the activity.

- Waste management and chemical management procedures (including the vessel **Garbage Management Plan**).
- Minimising light emissions at night by turn-off unnecessary lighting and using the black out curtains provided.
- Emergency response and spill management procedures outlined in the OPEP and vessel SOPEP.
- Procedures for marine fauna interactions as per the **Fauna Management Plan**.
- Roles and environmental responsibilities of key personnel on board the survey and support vessels.
- The importance of following procedures and using company processes to identify environmental risks and mitigation measures.
- Environmental performance outcomes, standards, and measurement criteria to be complied with under the EP.
- Procedures for reporting environmental hazards, incidents, near misses and opportunities for improvement.
- Opportunities for employee communication and participation.
- Relevant plans and procedures (CGG, seismic and support vessel contractor owned), including where they can be obtained on board the vessels.

A record of the induction will be retained by CGG's Acquisition Operations Manager with the endorsement of personnel who attended. All personnel are required to sign an attendance sheet to confirm their participation in and understanding of, the induction. If a contractor is used, they will conduct their own company and vessel-specific inductions independently and in addition to the activity-specific HSE induction.

5.5.2 Competency and Ongoing Awareness

It is ultimately CGG's responsibility to ensure all employees and contractors comply with the requirements of the CGG corporate HSE Policy and that the personnel are suitably trained and competent in their respective roles.

CGG will ensure the marine crew are trained and competent to undertake their respective activities on board the vessel. All marine personnel will be qualified in accordance with the International Convention on Standards of Training Certification and Watch Keeping for Seafarers (STCW95).

CGG will ensure marine fauna observers (**MFO**s) and passive acoustic monitoring (**PAM**) operators are trained and competent, and will have the following experience:

- 1x Lead Marine Fauna Observer: Minimum of 2 years' experience and a minimum of 12 months experience working in Australia.
- 4x (1 of which will be relief) Marine Fauna Observers: Minimum of 12 weeks experience.
- 1x Lead PAM Operator: Minimum of 2 years' experience and a minimum of 12 months experience working in Australia.
- 1x PAM Operator: Minimum of 12 weeks experience.

The Whale Expert Panel will consist of a minimum of four experts and will have the following experience:

- 1x SRW expert with experience with SRW in southern Australia: Will have a PhD in Southern Right Whales in Australia and have experience in Southern Right Whale detections and observations.

- 1x BW expert with experience with BW in southern Australia: Will have a PhD Blue Whales in Australia and have experience in Blue Whale detections and observations.
- 1x Marine mammal expert with experience with whale observations/detections in southern Australia: Will have formal qualifications in marine science with a focus on marine mammals and have experience in observations and detections of marine mammals in Australia.
- 1x CGG representative will have experience and understanding of seismic surveys, and the EP requirements.

The following activities will serve to reinforce and maintain ongoing environmental awareness of vessel personnel for the Regia MSS. Records will be produced for each of these meetings:

- Project kick-off meeting: Held at the start of the activity and reviews the contractual and HSE specifications for the activity, the scope of work, vessel specific HSE plans, environmental outcomes, performance standards and measurement criteria within this EP.
- Daily progress meetings (on board): Review all survey operations and incidents of the previous day, actions are recorded within the daily progress report.
- Toolbox meetings: Attended by all personnel involved in a specific operation (i.e. operations involving major hazards and/or involving more than one person). This meeting reviews the activity and reinforces the adoption of control measures within this EP to prevent adverse environmental and safety impacts. Recorded within the daily progress report.

All personnel will be encouraged to communicate any concerns, suggest improvements to the control measures implemented for any task or operation during the activity and comment on any proposed changes to equipment, systems, or methods of operation of equipment, where these may have HSE implications. Opportunities for personnel (including management, relevant contractors and MMOs) to participate in improving the management of environmental risks during the activity include:

- At the time of the induction.
- During daily toolbox and pre-start meetings at the commencement of each shift and prior to commencing a new task (e.g. recovery of streamer).
- Identification of hazards based on incident and near miss reporting.
- Providing suggestions for improvements to the CGG Site Representative at any time.

CGG crew and contractors (including all vessel personnel) will be provided information on employee communication and participation during the environmental induction prior to commencing the activity.

5.6 Managing Environmental Performance

The following sections address regulation section 22(5).

5.6.1 Monitoring of Environmental Performance

CGG will monitor the performance of the management and mitigation controls during the activity in line with the **Project HSE Plan**. Environmental performance during the survey will be reviewed to ensure that:

- EPOs and EPSs are being met, reviewed and where necessary amended (to continue to reduce the environmental impacts and risks of the activity to ALARP).
- Potential non-conformances and opportunities for continuous improvement are identified and corrective actions implemented.
- All environmental monitoring requirements have been met before completing the activity.

5.6.2 Recording of Environmental Performance

CGG will develop and maintain an electronic **Environmental Compliance Register** for the activity, which includes all commitments made in the EP, including the:

- Environmental performance outcomes, standards and measurement criteria
- Description of Activity (Appendix A2)
- Activity limitations
- Implementation Strategy (this document)
- Any other commitments made in the EP

The Environmental Compliance Register is an audit tool to be used during the activity to demonstrate conformance of the activity with the EP.

A summary of the environmental management and mitigation controls, performance outcomes and standards and measurement criteria in the EP will be distributed aboard the survey and support vessels, and implementation of the environmental performance standards will be monitored by the Survey Environmental Advisor.

5.6.3 Audits and Inspections

Post acceptance of the EP, conformance will be monitored on an at least quarterly basis by the CGG Site Representative, or delegate, via audits and inspections, as well as through the commitments under the Management of Risk, Management of Change, and Management of Knowledge parts of this Implementation Strategy. There will also be the following audits and inspections:

Compliance Check	Compliance Activity	Scope and Purpose	Occurrence
Audit	Vessel contractors' pre-qualification assessment	All vessels: To ensure vessel biofouling controls meet these EP requirements. This functions as an audit of vessel contractors prior to contractual terms are signed.	Once prior to contract signing.
		Vessels over 400GT: Vessels with double-walled fuel tanks or internal fuel tanks will be preferred in contractor selection.	

Compliance Check	Compliance Activity	Scope and Purpose	Occurrence
		All vessels: To receive the light management plan for the vessel.	
Inspection	OVID-Style Inspection	All vessels: To verify the validity and compliance of certificates required by COLREGS, the Navigation Act, SOLAS and various Marine Orders, and the presence of a vessel bunkering procedure and a Shipboard Oil Pollution Emergency Plan (SOPEP), tailored to the vessel's class and operational requirements.	Once prior to survey start.
		All vessels: To gather evidence that: • Shows the sound source and towed streamers have been inspected and cleaned (where required) prior to deployment. • Each vessel has conducted pre-port entry checks using the National Introduced Marine Pest Information System database and assess changes in known invasive species. • Ballast water exchange activities have been conducted exclusively in open waters, avoiding areas designated as Marine Protected Areas (AMPs), to prevent environmental contamination.	
		All vessels: To confirm the presence, awareness, and utilisation of a vessel specific light management plan, shielded lighting, dimming technologies, and blackout curtains.	
		All vessels: To confirm the on-board spill response capability against the vessels SOPEP or equivalent and relevant management and mitigation controls in this EP, to verify spill preparedness.	
Audit	Commencement audit	Confirm that the vessel management systems are consistent with the management and mitigation controls detailed in the in-force EP.	Once within the first 7 days of the survey starting.
		Ensure all vessels and contractors have access to the following appendices: A2, B3, G1 and G2.	
		Conformance with regulatory requirements detailed in the **Environmental Compliance Register.**	
		Emissions and discharges are being monitored, measured, and documented.	

Compliance Check	Compliance Activity	Scope and Purpose	Occurrence
Audit	Daily report review	The purpose of auditing daily seismic and HSE reports is to verify that they accurately document survey activities, environmental monitoring, and safety performance, and that they meet regulatory, contractual, and internal reporting obligations. These audits help ensure the reports are suitable for compliance tracking, stakeholder communication, and operational oversight. The scope of the audit includes reviewing a sample of reports to confirm they consistently cover: • Operational data: acquisition activity, production figures, vessel and equipment status. • Environmental monitoring: marine fauna detections, mitigation actions, weather and visual effort. • HSE performance: crew exposure hours, incidents, toolbox talks, drills, and observations. • Technical quality: seismic data integrity, equipment performance, and navigation accuracy. • Structure and presentation: clarity, completeness, and readiness for integration into broader reporting. Audits use a structured checklist to assess completeness and traceability, with outcomes supporting continuous improvement and assurance that the reports meet their intended purpose.	At least weekly or on request.

5.6.4 Review of Environmental Performance

The following arrangements will be established to review the environmental performance of the activity:

- Inspections of the vessels will be carried out before and during the survey to ensure that procedures and equipment for managing routine discharges and emissions are in place to enable conformance with the EP.
- The performance of items of equipment as described in this EP will be checked to ensure ongoing reduction of risks and impacts to ALARP, and any potential issues (i.e. observations of poor operating condition/performance or non-conformances) are continually monitored and raised as soon as practicable.
- Records of inspections against EP requirements are documented in the **Environmental Compliance Register**.

An end of activity review will be jointly conducted by CGG and the seismic contractor during a post-survey meeting. The purpose of this meeting is to enable the review of management and mitigation strategies implemented during the activity. It includes reviews of performance, incident investigations, audits and field activity to identify actions for future seismic surveys, which can be implemented on a continuous improvement basis. The end of survey HSE Review will include a

'Lessons Learnt' section to facilitate incorporation of any recommended improvement actions in future seismic activities.

5.6.5 Management of Non-Conformance

Non-conformances and opportunities for improvement will be identified and corrective actions will be tracked to completion utilising the Environment Compliance Register. Corrective actions will specify the remedial action required to fix the breach and prevent its reoccurrence and is delegated to the person deemed most appropriate to fulfil the action. CGG will carry forward any areas of non-conformance identified during its previous activities for consideration in future seismic activities to assist with continuous improvement in environmental management. Non-conformances may necessitate a management of change and/or a management of knowledge process to be implemented.

6 Monitoring of Emissions and Discharges

6.1 Monitoring Emissions and Discharges

In accordance with regulations section 22(6) the titleholder shall record emissions and discharges for the duration of the activity. Discharges associated with a survey will be limited to those allowed for under maritime law. Therefore, all discharges will be recorded and controlled in accordance with maritime monitoring and recording requirements. Any non-compliance with discharge requirements will be included in the monthly recordable incident report to NOPSEMA.

7 Environmental Performance Reporting

This section addresses regulation section 22(7).

7.1 Regulatory Reporting

CGG will submit an environmental performance report to NOPSEMA within three months of survey completion. CGG will publish the same environmental performance report at the same time as submission to NOPSEMA on the Regia MSS Consultation Hub.

7.2 Notifications and Reporting

Under Sections 24(c) and 47 of the Regulations, CGG is required to notify NOPSEMA of any recordable (an incident arising from the activity that breaches an EPO or EPS in the EP that applies to the activity that is not a reportable incident) and reportable (an incident arising from the activity that has caused, or has the potential to cause, moderate to significant environmental damage) incident within a specified timeframe. Environmental incidents will be reported to the relevant government agency by the CGG Site Representative. The requirements for reporting and recording incidents are outlined in Table B3-4.

Following any recordable or reportable incident, CGG will undertake an incident investigation, and this information will be communicated to all relevant personnel. All recordable and reportable incidents will be documented by the CGG Acquisition Operations Manager and will include details of the event, immediate action taken to control the situation, and corrective actions to prevent re-occurrence. The CGG Acquisition Operations Manager and CGG Site Representative will follow up actions taken to ensure that the corrective actions have been taken to close it out. When planning future activities, CGG will review the reportable and recordable incidents that have occurred previously to incorporate any lessons learned as part of CGG's continual improvement process.

Table B3-4 - Notification Requirements.

Requirement	Timing	Contact
Recordable Incidents		
As a minimum, the written monthly recordable incident report must include a description of: All recordable incidents, which occurred during the calendar month. All material facts and circumstances concerning the incidents that the operator knows or can reasonably find out. Any actions taken to avoid or mitigate any adverse environmental impacts of the incident. Corrective actions that have been taken, or may be taken, to prevent a repeat of similar incidents occurring.	As soon as possible but before the fifteenth day of the following calendar month.	NOPSEMA - submissions@nopsema.gov.au
Verbal Notifications		
Vessel-sourced spill in Commonwealth waters.	Within one hour	JRCC Australia: Phone: +61 2 6230 6811 or 1800 641 792 Facsimile: +61 02 6230 6868

Requirement	Timing	Contact
Reportable incidents include, but are not limited to, those that have been identified through the risk assessment process as having an inherent impact consequence of 'significant', 'major' or 'critical', or at a minimum, the following incidents: • A level 2 spill incident • Vessel strike / entrapment or entanglement with listed marine fauna. • IMS Introduction. The notification must contain: • All material facts and circumstances concerning the incident. • Any action taken to avoid or mitigate the adverse environmental impact of the incident. • The corrective action that has been taken or is proposed to be taken to stop, control or remedy the reportable incident. This must be followed by a written record of notification ASAP after notification. This written notification must also be supplied to the NOPTA and DEECA (Vic) for Commonwealth water incidents.	Within two hours	Verbal: NOPSEMA – Phone 1300 674 472 DEECA (Vic) – 0419 597 010 Written notifications: NOPSEMA – submissions@nopsema.gov.au DEECA – marine.pollution@ecodev.vic.gov.au NOPTA – reporting@nopta.gov.au
If an oil pollution incident occurs within or approaches an AMP, or where an oil spill response action must be taken within an AMP, the Director of National Parks (DNP) must be contacted immediately. Information, which must be provided within that notification includes: • Titleholder details • Time and location of the incident (including AMP likely to be affected) • Proposed response arrangements as per OPEP • Confirmation of providing access to the relevant monitoring and evaluation reports when available • Contact details of the emergency coordinator.	As soon as possible and prior to response action being taken, as far as reasonably practicable	Verbal: Director of Marine Parks – 0419 293 465 (24hr Marine Compliance Officer) Written Notification: marine.compliance@environment.gov.au
Notify DCCEEW of any death or injury of a listed threatened species; all cetacean species; listed migratory species or listed marine species.	Within seven days	Phone: +61 2 6274 111 Phone: 1800 803 772 Email: EPBC.Permits@environment.gov.au
Written Incident Reports		

Requirement	Timing	Contact
Verbal notification of a reportable incident to NOPSEMA (Commonwealth waters) must be followed by a written report. As a minimum, the written incident report will include: The incident and all material facts and circumstances concerning the incident. Actions taken to avoid or mitigate any adverse environmental impacts. The corrective actions that have been taken, or may be taken, to prevent a recurrence of the incident. The action that has been taken or is proposed to be taken to prevent a similar incident occurring in the future.	Within three days of notification of incident (NOPSEMA) Within seven days after submission to NOPSEMA (NOPTA).	NOPSEMA - submissions@nopsema.gov.au NOPTA – reporting@nopta.gov.au
Vessel strike with cetacean is reported to the DCCEEW.	Within 72 hours of incident	Upload information to: https://data.marinemammals.gov.au/report/shipstrike
Heritage Notifications		
Heritage Victoria must be notified in accordance with s80 of the Heritage Act 2017 (Vic) or under Underwater Cultural Heritage Act 2018 (Cth). A further notification must be given to the Minister as per s40 of the Underwater Cultural Heritage Act 2018 (Cth).	As soon as practicable.	Email: heritage.victoria@delwp.vic.gov.au Phone 03 7022 6390

7.3 External Routine Notification and Reporting Requirements

Review of statutory and stakeholder requirements with respect to routine external notification and reporting is provided in Table B3-5. These actions are the responsibility of the CGG Acquisition Operations Manager (or delegate).

Table B3-5 - External Routine Notification and Reporting Requirements.

Requirement	Timing	Contact
Routine Performance Reporting		
The Regulations - Section 51: Submit an EP Performance/Compliance Report to NOPSEMA. This reports compliance against each of the EPOs and EPSs as outlined in this EP.	Within three months of survey completion.	NOPSEMA - submissions@nopsema.gov.au
Report on the conduct of the survey with whale sightings.	Within two months of activity completion.	Upload information to: https://data.marinemammals.gov.au/csa Text file sent to: sightingsdata@aad.gov.au
EP Accepted and Activity Update		
Notification to all relevant stakeholders advising of EP acceptance and provide an update on survey commencement.	Within 10 days of the date the EP has been accepted.	All relevant stakeholders listed in the Consultation Log.
Notification of the establishment of the claims process, the survey timing, and the Adjustment Area	No less than 28 days before activity commencement.	Relevant commercial fishing licence holders and respective peak commercial fishing industry bodies.
Provision of OPEP to DTP and AMSA following EP acceptance and prior to survey commencement.	Prior to survey commencement.	Contact details listed in Consultation Log.
Survey Commencement		
Notify AHO for Notice to Mariners.	At least 4 weeks prior to commencement.	AHO - datacentre@hydro.gov.au
Notify NOPSEMA of survey commencement.	At least 10 days prior to commencement.	NOPSEMA - submissions@nopsema.gov.au
Notify AMSA for Auscoast Warnings This notification will include when operations start and end, name, callsign and maritime mobile service identity (MMSI), satellite communications details (including inmarsat-c and satellite telephone numbers), area of operation, requested clearance from other vessels and any other information that may contribute to safety at sea.	At least 24-48 hours prior to survey commencement.	JRCC - rccaus@amsa.gov.au Ph: 1800 641 792 or +61 2 6230 6811
Survey Cessation		
Notify AMSA to cease Auscoast Warnings	Upon vessel demobilisation.	JRCC - rccaus@amsa.gov.au Ph: 1800 641 792 or +61 2 6230 6811
Notify NOPSEMA with survey completion date	Within ten days of survey completion.	NOPSEMA - submissions@nopsema.gov.au
End of EP		
Notification of EP completion to NOPSEMA.	End of EP operation.	NOPSEMA - submissions@nopsema.gov.au

8 Ongoing Consultation

This section addresses regulatory section 22(15). Community engagement and relevant persons consultation will be ongoing post-acceptance, as well as during the planning and conduct of the activity.

Ongoing consultation remains a requirement in the presence of increased or changing environmental impacts and risks that arise before, during or after the activity.

CGG will maintain an up-to-date list of relevant persons in the consultation management system. The system is used to record when relevant persons are communicated with so that we can show when each relevant persons was provided with new information relevant to the management of the activity, and any other updates or changes that may affect their functions, interests and activities. Each relevant person has their previously established preferred method of communication which will be used in this process.

8.1 Specific Notifications

The following notifications will be made as part of the consultation plan:

- All relevant persons will receive:
  - a notification of the activity's commencement upon acceptance of the Environmental Plan (EP) or a minimum of two weeks before the survey, unless they have requested otherwise.
- Information about the survey, including .kmz files, 5-minute updates, and a 48-hour look-ahead, will be provided to relevant persons who have identified a need for this information.
- Relevant persons requesting 24, 48, or 72-hour look-ahead for acquisition will receive daily notifications throughout the survey duration.
- Australian Maritime Safety Authority's Joint Rescue Coordination Centre (AMSA JRCC) will be provided notice of the intention to commence the activity 48 hours prior to the activity's commencement.
- CGG will request a 'Notice to Mariners' to be issued via RAN Australian Hydrographic Service (AHS) before the survey begins.
- A webpage for commercial fishers will provide lookahead information and contact details for activity vessels
- CGG will place adverts in local papers and at local dive shops a minimum of two weeks before the survey with details of the measures in place to protect divers and information about how to gain an understanding of the SIMOPS plan.
- CGG will consult with Beach Energy if the survey design results in the presence of the vessel within 2km of the 500m petroleum safety zone around the Thylacine platform.
- CGG must give 28 days' notice to OMICC registered commercial fishers of the commencement of an activity. The notification will include information to support avoidance of the activity and information about how to make a claim.

8.2 Consultations

CGG will continue to promote relevant persons' self-identification throughout the life cycle of the activity. On request, CGG will meet with relevant persons on a one-on-one basis to communicate NOPSEMA assessment outcomes, gather additional feedback, and liaise with local government bodies. As per the management of knowledge process, CGG will also continue consultation with third parties to improve the environmental management.

The Otway Adjustment Protocol will be subject to review and update by Klarite Sustainable Ventures (KSV) and the members at least once in each 12-month period. Changes will be considered in

consultation with relevant fishing associations (and other stakeholders as appropriate) and subject to agreement by the titleholder members.

8.3 Activity Website

CGG will maintain the Regia MSS Consultation Hub website and interactive map and respond to comments within 48 hours of a comment being made.

8.4 Webinars

Post-acceptance of the EP, CGG will continue its practice of hosting an online webinar every two months the Environment Plan is in-force. Registration for the webinars will remain open while the Environment Plan is in-force. Members of the public may also register for the webinar series. All previous webinars will be accessible on the Regia MSS Consultation Hub and on YouTube. Similarly, there will be a monthly newsletter every month the EP is in-force.

8.5 Project Updates

CGG will communicate to each relevant person by sending notifications at the following key milestones or events:

- At each NOPSEMA decision.
- If the EP is accepted.
- 8 weeks prior to survey commencement.
- Immediately upon completion of the activity.
- In the event of a significant incident (e.g. level 2 fuel spill).
- If the seismic vessel is required to depart the Operational Area to avoid adverse weather (notification will be communicated by the AMSA Joint Rescue Coordination Centre as a navigational safety warning).
- If there is a change to the MSS activity scope that may affect the relevant persons interests, activities or functions.
- If a new or significant increase in potential impact or risk is identified that (after identification of additional control measures to manage those impacts or risks) may affect the relevant persons functions, interests, and activities.

All notifications will include the relevant details of the activity including the activity title, location and contact details.

8.6 Continual Identification of Relevant Persons

CGG will perform searches for relevant persons at least once per 12-month period and once, eight weeks prior to the commencement of the survey. There will be no searches for relevant persons after the end of the activity notification is provided to NOPSEMA.

As a result of providing activity status updates publicly, or because of a change in a person's functions, interests, and activities, CGG acknowledges that new relevant persons may reveal themselves at any time while the EP is in-force. If a new person reveals themselves the following steps will be followed:

- Establish a preferred and an alternative means of contact.
- Establish the persons functions, interests, and activities (by research or enquiry).
- If the person may be affected by the activity:
    - Provide the NOPSEMA consultation brochure.

  - Inform the person of their rights and obligations under the regulations.
  - Notify the person that they may request any information they provide to CGG can be treated as confidential and will not be published.
  - Notify the person that all records of correspondence will be maintained and may be provided to NOPSEMA as part of a proposed revision or an inspection.
- Provide the following initial information about the proposed activity.
  - Latest map of the activity.
  - The PEIRA and a link to the Consultation Hub.
  - A proposed consultation process for them.
- Enquire if any further information is required to make an informed assessment of the potential consequences of the activity on their functions, interests, or activities.
- Allow a period of 30 days for the relevant person to respond with any objections or claims about the adverse effects of the activity.
- Respond to any objections or claims about the adverse effects of the activity.
- If the person is unresponsive, make two further attempts to contact the person by the preferred and alternative means of contact. If the person remains unresponsive after these efforts, inform the person that they will be removed from the relevant persons consultation process unless they reply.

Similarly, a relevant person may be the source of new information that has resulted in a change to their functions, interests, and activities. This may in turn result in a modified or new objection or claim relevant to the activity. CGG shall assess the merits of any modified or new objections or claims in the same way as completed in the EP. If the claim has merit, where appropriate, CGG may modify the management of the activity as soon as possible. A management of change process would assess the modification to the management of the activity.

CGG will endeavour to respond to the modified or new objection or claim received while the Environment Plan is in-force within one week of receipt of the new information and the modified or new objection or claim.

CGG will undertake any resulting management of change actions as soon as practicable, but preferably within the same time. For objections and claims that do not necessitate a change to the management of the activity nor the Environment Plan, CGG will respond to the relevant person providing reasoning and supporting information (as relevant) to support CGG's conclusions within a month of receiving the new information.

9 Compliance with the Act, the regulations, and all other environmental legislation

9.1 Record Management

In accordance with Section 52, CGG will store and maintain documents or records relevant to the EP implementation for a period of five years in a way that makes retrieval reasonably practicable.

10 Document Control

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	10 March 2023	MS	Initial version
0.1	19 March 2023	SJ	Peer review
0.2	23 March 2023	LT/PR	Review by CGG
0.3	2 April 2023	MS	Updated following reviews
1.0	6 April 2023	MS	Published on Regia MSS Consultation Hub website
1.1	20 December 2023	HS	Updated for 2023 regulations and reviewed for consistency with environmental assessments.
1.2	29 December 2023	MS/SJ	Reviewed and finalised for submission.
2	3 January 2024	MS	Published on the consultation hub and ready for submission for public comment.
3	11 May 2024	MS	Review post public comment, minor changes only.
4	28 October 2024	MS/CT	Updated following NOPSEMA assessment
5	16 April 2025	MS/PR/IB/PS	Updated following NOPSEMA OMR Letter
6	6 December	MS	Updated following NOPSEMA OMR 2 Letter

Annex 1 – Impact Assessment Tables

Table B3-6 – Environmental impact assessment effect levels.

Effect Level	Definition
Negligible (1)	The impact is expected to have little or no effect on the environment or the affected species, populations, or ecosystems. The impact may be within the natural variation or background levels, or the system may have the capacity to absorb or recover from the impact without significant harm.
Minor (2)	The impact is expected to have some effect on the environment or the affected species, populations, or ecosystems, but the effect is not considered significant or long-lasting. The impact may be localized or temporary, and the system may have the capacity to recover from the impact over time.
Moderate (3)	The impact is expected to have a noticeable and potentially significant effect on the environment or the affected species, populations, or ecosystems. The impact may be more widespread or persistent than a minor effect, and the system may require longer periods of time or additional management measures to recover from the impact.
Major (4)	The impact is expected to have a significant and potentially irreversible effect on the environment or the affected species, populations, or ecosystems. The impact may result in the loss or degradation of critical habitats, the decline or loss of species or populations, or the disruption of ecosystem functions or services. The system may require extensive management measures to recover from the impact, and the recovery may be incomplete or may take many years.
Catastrophic (5)	The impact is expected to have a severe and potentially irreversible effect on the environment or the affected species, populations, or ecosystems. The impact may result in the loss of entire ecosystems or the collapse of ecological processes, with significant consequences for human health, safety, or well-being. The system may require extensive and long-term management measures to recover from the impact, and the recovery may be uncertain or impossible to achieve.

Table B3-7 - Environmental impact assessment uncertainty levels.

Uncertainty Level	Definition
Very low (1)	This level of uncertainty indicates that there is an extremely high degree of knowledge, understanding, or confidence in the data, models, or assumptions used in the analysis. This level of uncertainty is typically associated with very well-established scientific principles or data that have been extensively tested, validated, and replicated.
Low (2)	There is a high degree of knowledge, understanding, or confidence in the data, models, or assumptions used in the analysis. This level of uncertainty is typically associated with well-established scientific principles or data that have been extensively tested and validated.
Medium (3)	Some knowledge, understanding, or confidence in the data, models, or assumptions used in the analysis, but there are still gaps or uncertainties that need to be addressed. This level of uncertainty may require further research or data collection to reduce uncertainty.
High (4)	Limited knowledge, understanding, or confidence in the data, models, or assumptions used in the analysis. This level of uncertainty may indicate a lack of data, or a poor understanding of the system being studied. At this level there is scientific uncertainty, and the precautionary principle must be applied.
Unknown (5)	Insufficient knowledge, understanding, or data available to decide the level of uncertainty. This level of uncertainty may be associated with new or emerging scientific principles, or areas where data are scarce or difficult to obtain. The unknown uncertainty level may also be used when there are conflicting scientific opinions or when the scientific community is divided on a particular issue. At this level there is scientific uncertainty, and the precautionary principle must be applied.

Table B3-8 - Environmental impact evaluation matrix.

	Effect				
Uncertainty	Negligible	Minor	Moderate	Major	Catastrophic
Very low					
Low					
Medium					
High					
Unknown					

Term	**Definition**
Low	Acceptable. The predicted levels of impact are beneath levels of perception and/or within normal bounds of variation. Good industry practice (including legislation and standards) has been applied and therefore these impacts are of an acceptable level without further reduction measures being required.
Medium	Acceptable. The predicted levels of impact are clearly below the pre-defined acceptable levels of impact and the mitigation and management measures in place provide sufficient confidence in the predicted effect levels.
High	Objectionable. The predicted levels of impact are close or like the pre-defined acceptable levels and/or there is enough uncertainty to apply the precautionary principle.
Very High	Unacceptable. The activity requires re-design and/or postponement or cancellation. Further studies may be required to lessen the uncertainty or reclassify the effect level. There are no additional mitigation and management measures that lower the effect.

Annex 2 – Risk Assessment Tables

Table B3-9 - Environmental risk assessment levels of consequence.

Consequence	Definition
Negligible (1)	Potential harm is minor, and it may be limited to minor injuries or damage to property that can be easily repaired or replaced. The impact may be temporary or localized, and the consequences may be reversible or easily mitigated.
Minor (2)	Potential harm is moderate, and it may result in injuries or damage to property that require some level of repair or replacement. The consequences may be more widespread or longer lasting than a negligible consequence, and the consequences may require some level of mitigation or remediation.
Moderate (3)	This level of consequence indicates that the potential harm is significant, and it may result in injuries or damage to property that require extensive repairs or replacement. The consequence may be more widespread or longer lasting than a minor consequence, and the consequences may require significant mitigation or remediation efforts.
Major (4)	Potential harm is severe, and it may result in injuries or damage to property that are catastrophic or irreparable. The consequences may result in significant environmental, social, or economic harm, and the consequences may require extensive and long-term mitigation or remediation efforts.
Catastrophic (5)	Potential harm is extremely severe, and it may result in loss of life, extensive environmental damage, or long-term social or economic harm. The consequence may be irreversible or impossible to mitigate, and the consequences may have significant consequences on human health, safety, and well-being.

Table B3-10 - Environmental risk assessment likelihood levels.

Likelihood	Definition
Rare (1)	The event is expected to occur only in exceptional circumstances, or it may have never occurred before in similar circumstances. This level of likelihood implies that the event is highly unlikely to occur, with a probability of less than 1%.
Unlikely (2)	The event is possible but not expected to occur under normal circumstances. This level of likelihood implies that the event is not likely to occur, with a probability of between 1% and 10%.
Possible (3)	The event could occur under certain conditions, or it may have occurred before in similar circumstances. This level of likelihood implies that the event is moderately likely to occur, with a probability of between 10% and 50%.
Likely (4)	The event is expected to occur under normal circumstances, or it may have a high likelihood of occurring based on experience or data. This level of likelihood implies that the event is highly likely to occur, with a probability of between 50% and 90%.
Almost Certain (5)	The event is expected to occur in most circumstances, or it may be virtually certain to occur based on experience or data. This level of likelihood implies that the event is almost certain to occur, with a probability of greater than 90%.

Table B3-11 - Environmental risk evaluation matrix.

	Consequence				
Likelihood	Negligible	Minor	Moderate	Major	Catastrophic
Rare					
Unlikely					
Possible					
Likely					
Almost Certain					

Term	**Definition**
Low	Tolerable. The predicted levels of risk are beneath levels of perception. Good industry practice (including legislation and standards) has been applied and therefore these risks are of an acceptable level without further reduction measures being required.
Medium	Tolerable. The predicted levels of risk are clearly below the pre-defined acceptable levels of risk and the mitigation and management measures in place provide reliable prevention to have confidence in the predicted likelihood levels.
High	Objectionable. The predicted levels of risk are close to or like the pre-defined acceptable levels of risk and/or the mitigation and management measures in place to prevent and respond to the event have lower levels of effectiveness such that others may disagree to the acceptability of the risk.
Very High	Unacceptable. The activity requires re-design and/or postponement or cancellation. Further studies may be required to lessen the uncertainty or reclassify the effect level. There are no additional mitigation and management measures that lower the effect.

Annex 3 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4222	The BCR and surrounding waters has significant economic, environmental and cultural values, and supports a significant tourism industry as well as commercial and recreational fishing, as a key biodiversity area, it is of incalculable value to coastal communities and the state.	The titleholder is aware of the areas unique features and values having undertaken a comprehensive engagement process. The titleholder has ensured appropriate measures have been put in place so there are no long term affects from the activity. (Event ID 4092).	4091
4499	GMTOAC notes that the April 2025 EP allows CGG a 90-day continuous window to complete the survey, with a maximum of 60 days of active seismic acquisition. GMTOAC claims that this limited timeframe will not allow CGG to meaningfully implement ongoing review and improvement measures intended to reduce harm to Karntubul.	Appendix G1 outlines that the Environment Officer is responsible for recording, assessing, and addressing environmental incidents within required timeframes, implementing corrective actions, and ensuring continuous compliance through daily reports, weekly audits, and incident reviews. Non-compliance triggers immediate inspection and corrective action, and objections or claims are assessed within 48 hours, with any necessary protections implemented promptly. This framework also illustrates how the proposed CVA project (Event ID EVT337), including the Sea Country Protection Plan, could involve Gunditjmara and supports CGG's position that the CVA should extend before, during, and after the activity.	EVT352
4501	GMTOAC objects that the EP sets out CGG's own "Defined Acceptable Levels" for cultural impacts arising from underwater sound on marine mammals, concluding that any such impacts would be short-term, temporary, and recoverable. GMTOAC and Gunditjmara reject this assessment, emphasising that CGG did not properly consult them on what levels of harm to cultural values, including impacts to culturally significant species such as Karntubul, would be acceptable. As these standards were developed unilaterally, GMTOAC and Gunditjmara do not accept CGG's conclusions regarding cultural impacts.	PROPOSED RESPONSE SUMMARY - CGG applied a comprehensive, transparent, ISO 31000:2009-aligned risk-assessment methodology, drawing on peer-reviewed literature and approaches accepted in numerous Environment Plans, to determine acceptable levels of environmental impacts and risks on both tangible and intangible values. Environmental aspects were systematically identified, impact severity and duration were assessed, and mitigation measures were evaluated using evidence and consultation. Acceptable impact levels (Appendix B1) and the assessment method (Appendix B9) were publicly released in May 2023. CGG concluded that impacts and risks are acceptable because risks were fully identified, lower-level risks were eliminated or	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		controlled, major risks were examined in detail, activity limitations constrain operations, predictions were assessed against defined acceptable levels, uncertainty was considered, and the activity complies with the EPBC Act and ecologically sustainable development principles. CGG also relied on relevant sources, including peer-reviewed studies and UNESCO guidance describing the deep interdependence of tangible and intangible values, to inform acceptable levels where Traditional Owner input has not yet been provided. GMTOAC and Gunditjmara have been invited to contribute to cultural-value management, and the EP includes an Implementation Strategy embedding a Sea Country Protection Plan to support ongoing engagement and adaptive management. The Regulations (Regs 17–18) further ensure that any significant new cultural or environmental information must trigger revision of the EP. CGG remains ready to continue collaboration with GMTOAC and Gunditjmara throughout the activity.	

Regia MSS: Preliminary Environmental Impact and Risk Assessment

March 2023

Klarite

Contents

Regia MSS: Preliminary Environmental Impact and Risk Assessment 1
Introduction 4
Purpose 4
Environmental Planning Area Description 4
Scope of Assessment 5
Environmental Regulations and Guidelines 6
Methodology 6
Project Description 6
Data Collection 6
Impact Assessment Techniques 7
Risk Assessment Techniques 7
Assessment of Potential Significance 7
Treatment of Environmental Impacts and Risks 8
Environmental Aspects 8
Cause Effect Pathways 8
Identification 8
Extent and Duration 9
Screening 12
Baseline Environmental Conditions 13
Summary 13
Physical Environment 13
Ecological Environment 14
Human Environment 14
Environmental Impacts 16
Environmental Impact Evaluation 16
Impacts Not Further Assessed 16
Artificial Light 16
Atmospheric Emissions 17
Planned Discharges 20
Underwater Sound 20
Risk Assessment 23
Environmental Risk Evaluation 23
Risks Not Further Assessed 23
Accidental Release of Materials or Waste Overboard 23
Mitigation and Management 27

Mitigation Measures 27
Management Plans 27
Conclusion and Recommendations 28
References 29

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Introduction

This preliminary environmental impact and risk assessment (PEIRA) has been prepared by Klarite to support CGG Services (Australia) Pty Ltd (CGG) in its environmental management of the Regia Marine Seismic Survey (Regia MSS).

Klarite is an independent professional services firm specialising in environmental management of offshore energy developments. Established in 2017, Klarite has performed environmental impact and risk assessment throughout the offshore marine area in Australia and has years of experience in the offshore regulatory framework.

The PEIRA follows a standardised methodology for identifying environmental impacts and risks from offshore petroleum activities and determining their relative significance.

Purpose

The purpose of this PEIRA is to:

- Identify key environmental values and sensitivities (which include social, economic, and cultural features).
- Perform an initial evaluation of the environmental impacts and risks associated with the Regia MSS to support consultation efforts.

The findings of this assessment will be used to inform project design and decision making, and to identify any necessary mitigation measures and management strategies. The PEIRA will also provide a basis for further study, including the potential for baseline characterisation studies, and investigation as required. This document serves as a starting point for a full environmental assessment, which will be required before the activity can progress through the approvals process.

Environmental Planning Area Description

To commence the PEIRA an Environmental Planning Area was established to frame the initial studies and community consultation effort. Within that area an Activity Planning Area was established to frame the maximum geographical limits of the activity. The Environmental Planning Area and Activity Planning Area are shown in Figure B4-1.

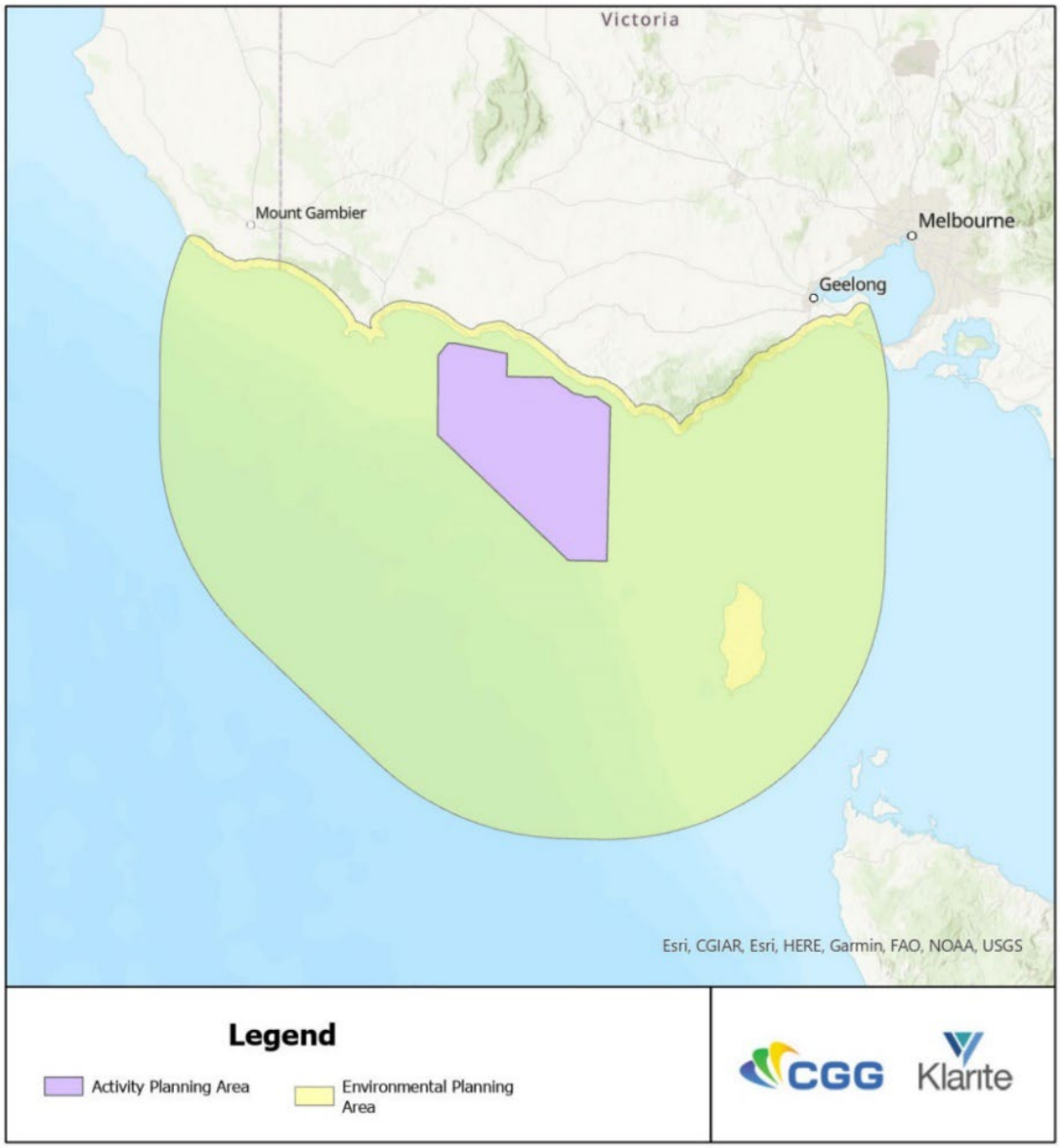


Figure B4-1 - Regia MSS Environmental Planning Area and Activity Planning Area.

The Environmental Planning Area has been set at 155 km around the Activity Planning Area. This distance has been selected using professional judgement and a review of previous impact and risk assessments for similar activities in the region. Further justifying the distance, the NERA Reference Case: Consequences analysis of an accidental release of diesel (NERA 2018) found that diesel spills under 700m^3 were reliably predicted to disperse within this distance. The Environmental Planning Area will be validated or modified based on recommended within this PEIRA.

Scope of Assessment

This scope of this PEIRA covers the Environmental Planning Area, which includes the Activity Planning Area and the surrounding area that may be affected by the activity. The PEIRA aims to identify and evaluate the impacts and risks of the activity on the:

- physical and biological environment, including air quality, water quality, sediment quality, climate, marine life, and marine habitats; and
- human environment, including marine industries, cultural and indigenous values, recreational activities, tourism, coastal developments, and marine protected areas.

Environmental Regulations and Guidelines

The primary legislation governing the Regia MSS is the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (the Act) and the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (the Regulations).

There are numerous additional laws, regulations, and guidelines that apply requirements to the Regia MSS activity. These are the subject of a separate study being completed by CGG and are only discussed here if they are relevant to the management of environmental impacts and risks.

The following terms are used in this PEIRA and are defined in the Regulations:

A petroleum activity or activity means operation or works in an offshore area undertaken for the purpose of: (a) exercising a right conferred on a petroleum titleholder under the Act by a petroleum title; or (b) discharging an obligation imposed on a petroleum titleholder under the Act or a legislative instrument under the Act.

An environmental impact is a change, whether adverse or beneficial, that wholly or partially results from an activity.

The following terms are used in this PEIRA and are defined in various relevant environmental management standards and guidelines:

An environmental aspect is an element of an activity that can interact with the environment.

An environmental risk is the probability and consequence of an unwanted accident.

Methodology

The environmental assessment methodology used in the PEIRA has been developed based on widely adopted best practice and industry standards, primarily AS/NZS ISO 31000:2018: Risk Management – Principles and Guidelines. There are two parts of the methodology, one for environmental impacts and one for environmental risks. Both parts of the assessment are underpinned by a clear description of the activity, data collected in preparation of this document, and the identification of environmental aspects arising from the Regia MSS.

Project Description

Klarite was provided a description of the activity which is available on the Regia MSS Consultation Hub (www.regiamss.com.au).

Data Collection

A review of relevant literature and data sources was undertaken to gather information on the Environmental Planning Area and the baseline environmental conditions. No field surveys were undertaken to collect data given that the marine environment in the Otway region is relatively well understood and the preliminary nature of this PEIRA.

Community consultation for the project has commenced and will provide a valuable source of information on environmental values and sensitivities, as well as the concerns and perspectives of interested parties, including local communities and regulatory agencies. This

PEIRA will be published to help inform the community of the environmental aspects of the activity so that their views can be properly reflected in the full environmental assessment.

Information sources accessed to inform this PEIRA are detailed in Table B4-1.

Table B4-1: Information Sources Accessed to Inform PEIRA

Information Source	Managed by	Date Accessed
Protected Matters Search Tool https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool	Department of Climate Change, Energy, the Environment and Water	11 Feb 2023
Species Profile and Threats Database	Department of Climate Change, Energy, the Environment and Water	Feb/Mar 2023
Submarine Cable Map https://www.submarinecablemap.com/	TeleGeography	11 Feb 2023
Victorian Desalination Project https://www.dtf.vic.gov.au/partnerships-victoria-ppp-projects/victorian-desalination-project	Victorian State Government	11 Feb 2023

Impact Assessment Techniques

The impact assessment for the PEIRA consists of a desktop study conducted to evaluate the environmental impacts of the activity on the Environmental Planning Area, based on the data collected during the data collection phase. Professional judgement and good practice have been relied on to complete the PEIRA and recommendations for further studies including modelling, have been made where necessary to support the full environment assessment.

Risk Assessment Techniques

The risk assessment for the PEIRA consists of a desktop study conducted to identify the hazards associated with the activity and analyse the probability and consequence of each hazard to determine the risks associated with the activity. The results of the probability and consequence analysis will be used to characterise the overall risk associated with the activity, and to prioritise mitigation measures and management strategies. Professional judgement and good practice have been relied on to complete the PEIRA and recommendations for further studies, including modelling, have been made where necessary to support the full environmental assessment.

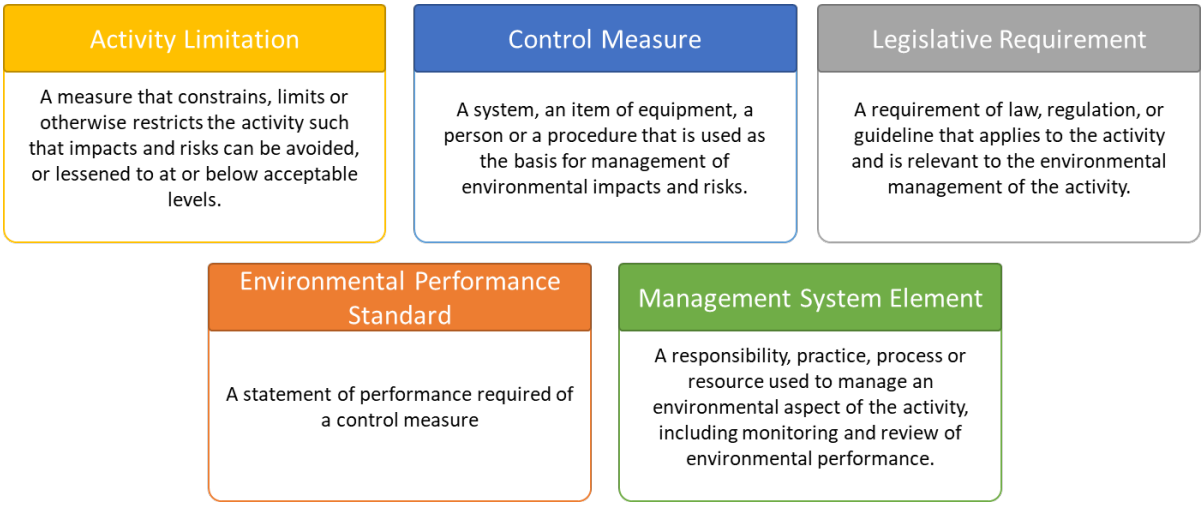
Assessment of Potential Significance

Assessment of potential significance is a key outcome of the PEIRA. It provides context for any additional baseline studies and guides the full environmental impact and risk assessment. Under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), an action (*activity*) will require approval from the Environment Minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance. A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely

to have a significant impact depends upon the sensitivity, value, and quality of the environment, which is impacted, and upon the intensity, duration, magnitude, and geographic extent of the impacts (DAWE 2013).

Treatment of Environmental Impacts and Risks

Throughout the PEIRA (and the subsequent full assessment) there will be mitigation and management measures that will be implemented preparing for, and during, the activity. There are five types of mitigation and management measures as shown below. Where a mitigation or management measure is identified for the Regia MSS from this PEIRA they will be shown within the text to emphasise their importance for environmental management.



Environmental Aspects

Cause Effect Pathways

A cause-effect pathway refers to the chain of events that connects a specific cause to an effect. In the context of environmental impacts and risk assessments, cause-effect pathways describe the relationships between environmental aspects and the impacts or consequences they could have on the environment.

A cause-effect pathway typically starts with the identification of a potential hazard, such as the physical presence of a seismic survey vessel, and then examines the potential pathways by which that hazard could result in an impact, such as the release of pollutants into the water affecting water quality or the generation of underwater sound at levels that can cause harm to marine life.

The identification of cause-effect pathways is an important step in the assessment process, as it allows for a systematic evaluation of the environmental impacts and risks of a proposed activity. It also provides a basis for developing mitigation and management strategies.

Identification

To understand the magnitude, extent and duration of an environmental impact or risk the pathway of each environmental aspect needs to be identified. The following list describes the environmental aspects identified from the Regia MSS activities to date that can lead to environmental impacts.

- Artificial light – the presence of vessels undertaking night-time operations will result in artificial light discharge into the marine environment.
- Physical presence – the presence of components of the activity, such as the physical presence of vessels operating in marine waters may interfere with other marine users.
- Underwater sound – components of the activity will generate impulsive sound and other components will generate continuous sound. Both could affect ecological, economic, or social receptors.
- Atmospheric emissions – vessels used on the activity will generate atmospheric emissions, which could affect ambient physical conditions and ecological receptors.
- Planned discharges – the activity will likely result in planned liquid discharge pathways, such as those typically generated by vessels.

The following list describes the environmental aspects identified in the Regia MSS to date that may lead to environmental risks.

- Accidental release of fuel – whilst undertaking the activity, unplanned events may occur which result in a discharge of marine diesel.
- Accidental release of materials or waste overboard – whilst undertaking the activity, unplanned release of waste, or equipment may occur.
- Introduction of marine pest species – vessels that transit between ports may temporarily harbour invasive marine species that have could be introduced or even establish in foreign places.
- Collisions with marine fauna – vessels have limited manoeuvrability at stages during the activity and may be unable to avoid collisions with marine fauna.

Typical environmental aspects from offshore petroleum activities that were considered and determined to not be relevant to this assessment are listed below.

- Benthic disturbance – there is no pathway for the activity to result in changes to physical receptors, for example disturbance to the seabed, as there will be no anchoring as part of the activity.

Activity Limitation
No anchoring permitted within the activity planning area.

Extent and Duration

Each environmental aspect has a related spatial extent within the Environmental Planning Area. The Regulations require that the Environment Plan must describe the existing environment that may be affected by the activity. Therefore, this PEIRA seeks to identify the appropriate extent and duration of each environmental aspect so that the search for environmental values and sensitivities can be specific to the environmental aspect. Table B4-2 identifies and justifies the extent and duration of each environmental aspect for the Regia MSS.

Table B4-2 - Extent and Duration of Regia MSS Environmental Aspects

Environmental Aspect	Extent	Duration	Justification
Artificial light	Activity Planning Area +20 km	90 days	The National Light Pollution Guidelines (CoA 2020) detail that where there is important habitat for listed species that are known to be affected by artificial light within 20 km of a project, species specific

Environmental Aspect	Extent	Duration	Justification
			impacts should be considered through an Environmental Impact Assessment process. The measurable change in light from ambient conditions is likely to occur at <20 km from the source; but due to difficulties with calculating light intensity in biologically relevant measurements, the distance in CoA (2020) has been used. Once the vessels leave the Activity Planning Area this aspect ceases.
Physical presence	Activity Planning Area	90 days	There will be no activities beyond the Activity Planning Area which will be narrowed to the Operational Area later in the assessment process. The larger area has been used for this PEIRA.
Underwater sound	Underwater sound area	90 days	This is an additional area that varies depending on how sound is received by the receptor. This area will be predicted through qualitative underwater sound modelling.
Atmospheric emissions	Activity Planning Area	90 days	There will be no activities beyond the Activity Planning Area which will be narrowed to the Operational Area later in the assessment process. The larger area has been used for this PEIRA.
Planned discharges	Activity Planning Area	90 days survey duration +1 day	When the survey ends the planned discharges associated with the activity end. Planned discharges are such that after a 24-hour period any impacts would be indistinguishable from other marine activities in the area.
Accidental release of fuel	Environment Planning Area	90 days survey duration +7 days	When the survey ends this aspect ends. If there were an accidental release of fuel the consequences of the release would not be detectable a further 7 days post-incident due to the rapid evaporation and dispersion of the fuel.
Accidental release of materials or waste overboard	Environment Planning Area	90 days	Any buoyant waste released overboard is likely to wash up on shorelines hence why the larger Environment Planning Area has been used. Once the activity ends this aspect is no longer relevant.
Introduction of marine pest species	Activity Planning Area	90 days	The vessel will not be conducting petroleum activities beyond the Activity Planning Area, which will be

Environmental Aspect	Extent	Duration	Justification
			narrowed to the Operational Area later. Once the activity ends this aspect is no longer relevant.
Collision with marine fauna	Activity Planning Area	90 days survey duration	The vessel will not be conducting petroleum activities beyond the Activity Planning Area, which will be narrowed to the Operational Area later. Once the activity ends this aspect is no longer relevant.

Screening

Not all environmental aspects interact with the identified component parts of the environment. For example, water quality will not be affected by artificial light. Table B4-3 shows the interactions between each environmental aspects and identified components of the environment. Additional component parts of the environmental may be identified through the consultation process. These will be considered in the full assessment.

Table B4-3 - Screening of Environmental Aspects against the Components of the Environment.

		Environmental Aspects								
		Artificial Light	Physical Presence	Underwater Sound	Atmospheric Emissions	Planned Discharges	Accidental Release of Fuel	Accidental Release of Materials or Waste Overboard	Introduction of marine pest species	Collisions with marine fauna
Environment Component										
Physical Environment	Air Quality				✓					
	Ambient Light	✓								
	Ambient Sound			✓						
	Climate				✓					
	Sediment Quality						✓			
	Water Quality					✓	✓	✓		
Ecological Environment	Benthic Assemblages			✓			✓	✓	✓	
	Coastal Habitats and Communities				✓		✓			
	Plankton	✓		✓	✓	✓	✓			
	Invertebrates	✓		✓	✓	✓	✓		✓	
	Fish	✓	✓	✓	✓	✓	✓	✓		✓
	Birds	✓	✓	✓	✓	✓	✓	✓		
	Marine Reptiles	✓	✓	✓	✓	✓	✓	✓		✓
	Marine Mammals	✓	✓	✓	✓	✓	✓	✓		✓
Human Environment	Coastal Development	✓					✓			
	Commercial Fishing and Aquaculture		✓				✓	✓	✓	
	Diving		✓	✓			✓		✓	
	Indigenous Culture		✓				✓	✓		
	Marine Industries		✓				✓			
	Marine Protected Areas		✓				✓	✓		
	Marine Tourism		✓				✓			
	Recreational Fishing		✓				✓		✓	

Baseline Environmental Conditions

The baseline environmental conditions identified below are used as a reference point to evaluate the impacts and risks of the Regia MSS. The baseline conditions are also used to determine the significance of the impacts and risks identified in the PEIRA and to identify any necessary mitigation measures and management strategies.

Summary

The marine environment of the offshore Otway Basin, Victoria, Australia, is a diverse and dynamic ecosystem that supports a range of important physical, ecological, and human activities. The Environmental Planning Area encompasses a wide range of habitats, including open ocean, coastal waters, rocky shores, sandy beaches, seagrass beds, and kelp forests. These habitats support a variety of marine species, including fish, crustaceans, molluscs, birds, marine reptiles, marine mammals, and seaweeds. The marine environment also supports a range of human activities, including but not limited to fishing, diving, shipping, and recreation.

Water quality in the Environmental Planning Area is generally good, with relatively low levels of pollutants and relatively high levels of dissolved oxygen. The area is also relatively protected from human impacts, with few major industries or coastal developments in the immediate vicinity. However, the Environmental Planning Area is subject to some environmental stressors, including nutrient runoff, sedimentation, and marine debris.

Physical Environment

The physical environment refers to the non-living natural elements of an ecosystem, including air, water, soil, minerals, and energy from the sun. These elements interact with each other and with living organisms to form a complex system that supports and sustains life.

The physical environment plays a crucial role in shaping the biotic components of an ecosystem, influencing the distribution and diversity of plants, animals, and microorganisms. For example, the availability of water, light, and nutrients determines the types of vegetation that can grow in a particular area, while topography and geology shape the physical structure of the landscape, providing habitats and resources for various species.

Understanding the physical environment is essential for comprehending the functioning of an ecosystem and for developing sustainable management practices that preserve and enhance the ecological, economic, and social values of the environment. The following components of the physical environment are considered in this PEIRA and will be carried through to the full assessments.

- Air Quality
- Ambient Light
- Ambient Sound
- Climate
- Sediment Quality
- Water Quality

Ecological Environment

The ecological environment refers to the living components of an ecosystem, including plants, animals, and microorganisms, as well as their interactions with each other and with the non-living elements of the environment. These interactions form the food webs and nutrient cycles that sustain life and maintain the stability and resilience of the ecosystem.

The ecological environment is shaped by the physical environment, as well as by historical events, such as natural disasters, evolution, and human activities. Biodiversity, or the variety of species and their interactions, is a key feature of the ecological environment, providing the essential functions and services that support human well-being, such as food, medicine, and recreation.

Understanding the ecological environment is important for conserving and restoring biodiversity, preserving the integrity and functioning of ecosystems, and supporting the livelihoods and well-being of people and communities. It involves monitoring and assessing changes in species composition, populations, and interactions, as well as evaluating the impacts of human activities, such as habitat destruction, pollution, and introduction of non-native species, on the ecological environment. The following components of the ecological environment are considered in this PEIRA and will be carried through to the full assessments.

- Benthic Assemblages
- Coast Habitats and Communities
- Plankton
- Invertebrates
- Fish
- Birds
- Marine Reptiles
- Marine Mammals

These components of the ecological environment may include the following matters that must be considered in the full assessments:

- the presence of a listed threatened species or listed threatened ecological community.
- the presence of a listed migratory species.
- any values and sensitivities that exist in, or in relation to, part or all of:
    - a Commonwealth marine area; or
    - Commonwealth land.

Human Environment

The human environment refers to the relationships between people and the environment, including the physical, psychological, social, economic and cultural elements that shape human well-being. It encompasses the communities, economies, and cultures that depend on the environment for their livelihoods, health, and well-being.

In the context of marine areas, the human environment includes coastal developments, fishing and aquaculture industries, tourism and traditional owners who have a close connection to the sea and its resources. The relationship between traditional owners and the sea often involves a deep cultural, spiritual, and economic connection, and they have a unique knowledge and understanding of the marine environment that has been passed down through generations.

Understanding the human environment is critical for developing effective and equitable environmental management strategies that balance the needs of people with the conservation of the environment. It involves considering the social, economic, and cultural values and impacts of environmental change, and engaging with the various stakeholders, including traditional owners, to ensure that their perspectives and needs are incorporated into decision-making processes. The following components of the human environment are considered in this PEIRA and will be carried through to the full assessments.

- Coastal Development
- Commercial Fishing and Aquaculture
- Diving
- Indigenous Culture
- Marine Industries
- Marine Protected Areas
- Marine Tourism
- Recreational Activities

In this list Marine Protected Areas may include the following matters that must be considered in the full assessments:

- the National Heritage values of a National Heritage place.
- the ecological character of a declared Ramsar wetland.

Noting that there is no proposed activity, or part of the activity, being undertaken in any part of a declared World Heritage property.

Environmental Impacts

Environmental impacts are identified and evaluated based on the cause effect pathways that arise from the activity. This PEIRA provides a first pass at evaluating the significance of the environmental impacts to:

- Support community consultation.
- Direct further assessment towards areas of higher impact.
- Inform decision making during the activity design.
- Justify if no further assessment is required for negligible effects.

The evaluation step at this preliminary stage involves using professional judgement to compare the estimated environmental impacts to internal assessment criteria, determining the overall significance of the impacts, and deciding on actions for further assessment.

This impact assessment is designed to facilitate consultation with the community, including government agencies, community groups, and other relevant organisations about the nature and scale of environmental impacts from the activity. This PEIRA will be published, with a summary, on the Regia MSS Consultation Hub (www.regiamss.com.au) and used in consultation with the community.

Environmental Impact Evaluation

At the preliminary stage, environmental impacts are a combination of a subjectively estimated level of effect combined with a subjectively estimated level of uncertainty. The impact assessment methodology is explained in the Environmental Assessment Framework document available on the Regia MSS Consultation Hub. The outcomes of the evaluation are presented in Table B4-4.

Impacts Not Further Assessed

The PEIRA identified four environmental aspects where the environmental impact to some environment components were ranked as having a negligible level of effect. Each identified environmental aspect will be carried through to the full assessment, however, the environment component where the impact was ranked as negligible will not be carried through to the full impact assessment for that environmental aspect. Justification for this decision is provided in the sections below.

Artificial Light

Marine Mammals: Change in fauna behaviour

Artificial light has not been reported to cause a significant behavioural disturbance to marine mammals, despite their often-higher activity levels at night. Results from a previous independent review and assessment of the sensitivity of marine mammals to mining and exploration activities in the Great Australian Bight Marine Park indicate that the consequence of light pollution impacts to marine mammals were insignificant (defined as occasional short-term attraction and/or disruption to marine mammals) (Pidcock, Burton and Lunney, 2003). Therefore, impacts to marine mammals from light emissions are not predicted and have not been evaluated further.

Coastal Development: Change to functions, interests, and activities

The coastline is sparsely populated with no cities (i.e. >100,000 people congregated around an urban centre) located on the coastline. The largest town that may be able to see the mandatory minimum navigational light is Warrnambool at the northwest of the Activity Planning Area. There is a shipping channel through the Activity Planning Area and artificial

light produced by the survey at night-time will be no different to artificial light from other marine users navigating at night. Therefore, impacts to coastal developments from light emissions are not predicted and have not been evaluated further.

Atmospheric Emissions

Ecological environment: Change to local air quality, change in climate, change in ecosystem dynamics

Atmospheric emissions have the potential to result in a change in air quality. As a result of a change in ambient air quality, a change in physical condition may occur to benthic assemblages, plankton, invertebrates, fish, marine reptiles, marine mammals and coastal habitats and communities.

Control Measure
Implement the CGG marine assurance system to ensure compliance of contract vessels with MARPOL, COLREGS, and Marine Orders 21, 30, 31, 59 70,71,72, 91, 95, 96, 97, 98.

The use of fuel to power vessel engines, generators and mobile and fixed plant will result in emissions of greenhouse gases (GHG) such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), along with non-GHG such as sulphur oxides (SO_X) and nitrous oxides (NO_X).

A change in air quality has the potential to result in a change in physical condition. The activity is of a short duration and will only involve up to three vessels. It is a once-off activity. Based on a 2018 seismic survey in Bass Strait, approximately 50 tonnes of fuel were used per day by the vessel spread. This results in the daily emissions of approximately:

- 1.2 tonnes of nitrogen dioxide (NO_X)
- 0.04 tonnes of sulphur dioxide (SO_X)
- 110 tonnes of carbon dioxide (CO_2)

Based on a 90-day survey, it could be expected that 4,500 tonnes of fuel would be used, resulting in similar daily emissions of NO_X, SO_X and CO_2.

Potential receptors above the sea surface within the Environmental Planning Area that may be exposed to reduced air quality include seabirds and marine megafauna that surface for air (e.g., marine mammals and marine turtles). Emissions will be small in quantity and will dissipate quickly into the surrounding atmosphere, therefore any localised reduction in air quality is not expected to result in any measurable effect.

While these emissions add to the GHG load in the atmosphere, which adds to global warming potential, they are relatively small on a state, national and global scale, representing an insignificant contribution to overall GHG emissions. Emissions will be small in quantity and short-term. The emissions from up to three vessels for 90 days will not significantly contribute to climate change.

Therefore, impacts to ecological components of the environment from atmospheric emissions are not predicted and have not been evaluated further.

Table B4-4: Preliminary Environmental Impact Evaluation

Environment Component	Environmental Aspect	Environmental Impact	Effect	Uncertainty	Preliminary Outcome
Air Quality	Atmospheric Emissions	Change to local air quality	Negligible	Low	No further assessment
Ambient Light	Artificial Light	Change in ambient light	Minor	Low	Qualitative assessment
Ambient Sound	Underwater Sound	Change in ambient sound	Minor	Low	Qualitative assessment
Climate	Atmospheric Emissions	Change in climate	Negligible	Low	No further assessment
Water Quality	Planned Discharges	Change to water quality	Negligible	Low	No further assessment
Benthic Assemblages	Underwater Sound	Change in physical condition	Negligible	Low	No further assessment
Coastal habitats and communities	Atmospheric Emissions	Change in ecosystem dynamics	Negligible	Low	No further assessment
Plankton	Artificial Light	Change in fauna behaviour	Minor	Low	Qualitative assessment
	Underwater Sound	Change in fauna behaviour	Minor	Low	Qualitative assessment
		Change in physical condition	Minor	Low	Qualitative assessment
	Atmospheric Emissions	Change in ecosystem dynamics	Negligible	Low	No further assessment
	Planned Discharges	Change in fauna behaviour	Negligible	Low	No further assessment
		Change in physical condition	Negligible	Low	No further assessment
Invertebrates	Artificial Light	Change in fauna behaviour	Minor	Low	Qualitative assessment
	Underwater Sound	Change in fauna behaviour	Minor	Low	Qualitative assessment
		Change in hearing capacity	Negligible	Moderate	Qualitative assessment
		Change in physical condition	Moderate	Low	Qualitative assessment
	Atmospheric Emissions	Change in ecosystem dynamics	Negligible	Low	No further assessment
	Planned Discharges	Change in fauna behaviour	Negligible	Low	No further assessment
		Change in physical condition	Negligible	Low	No further assessment
Fish	Artificial Light	Change to fauna behaviour	Minor	Low	Qualitative assessment
	Underwater Sound	Change in fauna behaviour	Minor	Low	Qualitative assessment
		Change in hearing capacity	Minor	Low	Qualitative assessment
		Change in physical condition	Minor	Low	Qualitative assessment
	Atmospheric Emissions	Change in ecosystem dynamics	Negligible	Low	No further assessment
	Planned Discharges	Change in fauna behaviour	Negligible	Low	No further assessment
		Change in physical condition	Negligible	Low	No further assessment
Birds	Artificial Light	Change in fauna behaviour	Minor	Low	Qualitative assessment
	Underwater Sound	Change in fauna behaviour	Negligible	Low	No further assessment

Environment Component	Environmental Aspect	Environmental Impact	Effect	Uncertainty	Preliminary Outcome
		Change in hearing capacity	Negligible	Low	No further assessment
		Change in physical condition	Negligible	Low	No further assessment
	Atmospheric Emissions	Change in ecosystem dynamics	Negligible	Low	No further assessment
	Planned Discharges	Change in fauna behaviour	Negligible	Low	No further assessment
		Change in physical condition	Negligible	Low	No further assessment
Marine Reptiles	Artificial Light	Change in fauna behaviour	Minor	Low	Qualitative assessment
	Underwater Sound	Change in fauna behaviour	Minor	Moderate	Qualitative assessment
		Change in hearing capacity	Minor	Moderate	Qualitative assessment
		Change in physical condition	Minor	Low	Qualitative assessment
	Atmospheric Emissions	Change in ecosystem dynamics	Negligible	Low	No further assessment
	Planned Discharges	Change in fauna behaviour	Negligible	Low	No further assessment
		Change in physical condition	Negligible	Low	No further assessment
Marine Mammals	Artificial Light	Change in fauna behaviour	Negligible	Low	No further assessment
	Underwater Sound	Change in fauna behaviour	Minor	Moderate	Qualitative assessment
		Change in hearing capacity	Moderate	Moderate	Quantitative assessment
		Change in physical condition	Negligible	Low	No further assessment
	Atmospheric Emissions	Change in ecosystem dynamics	Negligible	Low	No further assessment
	Planned Discharges	Change in fauna behaviour	Negligible	Low	No further assessment
		Change in physical condition	Negligible	Low	No further assessment
Coastal Development	Artificial Light	Change in functions, interests, or activities	Negligible	Low	No further assessment
Commercial Fishing and Aquaculture	Physical Presence	Change in functions, interests, or activities	Moderate	Moderate	Quantitative assessment
Diving	Physical Presence	Change in functions, interests, or activities	Minor	Low	Qualitative assessment
	Underwater Sound	Change in physical condition	Moderate	Moderate	Quantitative assessment
Indigenous Culture	Physical Presence	Change in functions, interests, or activities	Minor	Moderate	Qualitative assessment
Marine industries	Physical Presence	Change in functions, interests, or activities	Minor	Low	Qualitative assessment
Marine Protected Areas	Physical Presence	Change in functions, interests, or activities	Minor	Low	Qualitative assessment
Marine Tourism	Physical Presence	Change in functions, interests, or activities	Minor	Moderate	Qualitative assessment
Recreational Fishing	Physical Presence	Change in functions, interests, or activities	Minor	Low	Qualitative assessment

Planned Discharges

Ecological Environment: Change to water quality, change in fauna behaviour and change in physical condition

Vessel discharges have the potential to result in a change in water quality. As a result of a change in ambient water quality, further impacts may occur to marine fauna, including:

- a change in fauna behaviour
- injury/mortality to fauna

Discharges of organic matter, such as those present in sewage, greywater or food waste can lead to an increase in scavenging behaviour in fauna. Discharges will be localised and temporary as they will be quickly broken down by microbial action and dispersed by wave action and local ocean currents. Sewage solids will be broken down during treatment before being discharged, which will aid the decomposition process. Likewise, under MARPOL, food scraps are required to be macerated to a size small enough to pass through a 25 mm mesh before being discharged.

Control Measure
Implement the CGG marine assurance system to ensure compliance of contract vessels with MARPOL, COLREGS, and Marine Orders 21, 30, 31, 59 70,71,72, 91, 95, 96, 97, 98.

Plankton have a patchy distribution linked to localised and seasonal productivity that produces sporadic bursts in populations (DEWHA 2007). A change in water quality associated with discharges of sewage, greywater or food waste is unlikely to lead to a significant change in plankton distribution at a measurable level and will not result in a change in the viability of the population or ecosystem.

Marine fauna likely to be present within the upper water column are expected to be highly mobile and therefore able to avoid any localised change in ambient water quality. Species with limited mobility (i.e., plankton, fish embryo and larvae) are extremely unlikely to be impacted by any effects of temporary and localised increases in turbidity and low toxicity due to rapid dilution. No significant impacts are expected to plankton species, or on higher trophic levels reliant on plankton abundance.

Levels of contaminants within deck washdown, rainwater and deck drainage are likely to be insignificant. OSPAR (2014) indicates that the predicted no effect concentration (PNEC) for marine organisms exposed to dispersed oil is 70.5 ppb. Due to wave action and ocean currents any low-level contaminants will be quickly diluted and dispersed with no or negligible environmental impact. Shell (2009) conducted modelling that showed discharges of hydrocarbon and other chemical concentrations will be rapidly diluted and expected to be below PNEC within a relatively short time and will meet UNEP (1999) standards within 70m of their discharge.

Bilge water will be treated prior to discharge via an oily water separator with a maximum concentration of 15 ppm oil-in-water being achieved prior to discharge and therefore will have negligible impacts on water quality and hence plankton and marine fauna.

A change in water quality because of routine vessel discharges is unlikely to cause a change in behaviour or a change in physical condition of plankton and marine fauna at a measurable level and will not result in a change in the viability of the population or ecosystem. Therefore, impacts from planned vessel discharges on marine fauna are not predicted and have not been evaluated further.

Underwater Sound

Invertebrates: Change in hearing capacity

Invertebrates detect sound by sensing either the 'particle motion' (Przeslawski et al. 2016a;b; Carroll et al. 2017), through external and/or internal physiological structures such as hairs, statocysts and muscles; or the 'pressure' component (or both) of a sound field in the marine

environment. Invertebrate statocysts are the mechanosensory organ equivalent to the inner ear of humans and are responsible for the detection of gravity, position and movement (Day et al. 2020). Because they lack gas-filled bladders, marine invertebrates are unable to detect the pressure changes associated with sound waves (Carroll et al. 2017; Parry & Gason 2006). As no functional cause-effect relationship has been established for a change in hearing, permanent and/or temporary threshold shifts in invertebrates are not predicted and have not been evaluated further. Impacts to statocysts, a balance sensory receptor present in some aquatic invertebrates, are evaluated under 'Fauna injury/mortality'.

Birds: Change in fauna behaviour, hearing capacity and physical condition

Impulsive and continuous underwater sound emissions have the potential to result in a change in ambient sound. As a result of a change in ambient sound, further impacts may occur to birds, including a change in fauna behaviour, hearing capacity and physical condition.

There are no thresholds for underwater sound impacts to seabirds. As such, no modelling can be conducted. The threshold for physiological damage on the auditory system for seabirds is unknown, however most seabirds are generally shallow divers and utilise surface waters where the acoustic signals 'destructively interfere' with the sea surface, resulting in much lower sound exposure compared with deeper waters (Marine Technology Directorate, 1996: cited in SCAR, 2002) and the time of exposure underwater is short.

If individual birds or flocks are present in the Environmental Planning Area during acquisition, vessel movement is expected to temporarily deter them from foraging in the immediate vicinity of the vessel. The uncertainty of underwater sound impacting individuals or a population of any given species during plunge/dive feeding is extremely low. While resting/rafting on the water surface, there is limited potential for seabirds to be affected by the seismic sound due to the limited transmission of sound between the air-water interface. If there is an effect, it is likely to be a startle response, resulting in the bird flying away. Seabirds feed on multiple prey species and have widespread foraging areas. While displacement of some prey species may result in the displacement of these birds, this impact is localised, temporary and recoverable in any one location. Given their widespread foraging areas (ACAP 2018) and the small area possibly affected by prey displacement, seabirds are not expected to be impacted by reduced net foraging opportunities.

Impacts to shorebird species are not predicted from the activity, given their prey is concentrated within the intertidal zone along the coastline. The little penguin is capable of diving to 72 m but typically dives to 10-20 m. The species is known to generally forage within 20 km of their nesting site during the non-breeding season and 15 km of their nest during the breeding season (October to December) (Australian Wildlife, 2014). The little penguin has a foraging BIA (10 km buffer) around Christmas Island (off the northeast coast of King Island), which is a breeding colony. The Regia Activity Planning Area is more than 25 km from the little penguin BIA. On this basis, encounter rates with little penguin in the Activity Planning Area is considered unlikely. It is inferred that penguins have relatively poor hearing thresholds in the lower frequencies, which is where marine seismic surveys have the most energy (McCauley, 1994). However, Pichegru et al (2017) identified that African penguins switched foraging direction and distance in response to seismic activity but that the response was short-term. As seabirds spend very little time underwater, and shorebirds including the little penguin are located outside of the Activity Planning Area, impacts to birds from underwater sound emissions are not predicted and will not be evaluated further.

Marine Reptiles: Change in hearing capacity; change in physical condition

Underwater sound emissions have the potential to result in a change in ambient sound. As a result of a change in ambient sound, further impacts may occur to marine reptiles,

including change in physical condition. The Sound Exposure Guidelines for Fishes and Sea Turtles Guidelines (Popper et al. 2014) details that there is no direct evidence of mortality or potential mortal injury to marine turtles from shipping and continuous sounds. As no functional cause-effect relationship has been established, no change in physical condition is predicted from continuous underwater sound. Studies to date on marine turtles have not identified a change in physical condition as an impact from seismic sound (Nelms 2016, McCauley et al. 2000, Popper et al. 2014). As no functional cause-effect relationship has been established, changes to the physical condition of turtles from seismic sound will not be evaluated further.

Risk Assessment

Environmental risks are identified and evaluated based on the cause effect pathways that arise from the activity. This PEIRA provides a first pass at evaluating the significance of the environmental risk to:

- Support community consultation.
- Direct further assessment towards areas of higher risk.
- Inform decision making during the activity design.
- Justify if no further assessment is required for negligible effects.

The evaluation step at this preliminary stage involves using professional judgement to compare the estimated environmental risks to our corporate criteria, determining the overall significance of the risks, and deciding on actions for further assessment.

This risk assessment is designed to facilitate consultation with the community, including government agencies, community groups, and other relevant organizations about the nature and scale of environmental risks from the activity. This PEIRA will be published, with a summary, on the Regia MSS Consultation Hub (www.regiamss.com.au) and used in consultation with relevant persons.

Environmental Risk Evaluation

At the preliminary stage, environmental risks are assessed on the basis of a combination of an estimated likelihood combined with a subjectively estimated level of consequence. The risk assessment methodology is explained in the Environmental Assessment Framework document available on the activity website. The outcomes of the evaluation are presented in Table B4-5.

Risks Not Further Assessed

The PEIRA has one environmental aspect where the environmental risks to some environment components are ranked as having a negligible level of effect. Each environmental aspect will be carried through to the full assessment, however, the environment component where the risk is ranked as negligible will not be carried through to the full impact assessment for that environmental aspect. Justification for this decision is provided in the sections below.

Accidental Release of Materials or Waste Overboard

Water Quality: Change in water quality

Legislative Requirement
Marine Order 95: that vessels must have a garbage management plan, placards and maintain a garbage record book. Waste with potential to be windblown shall be stored in covered containers

Loss of materials or waste overboard has the potential to change water quality relied on by marine fauna through ingestion or entanglement. Marine turtles and seabirds are particularly at risk from entanglement. Marine turtles may mistake plastics for food; once ingested, plastics can damage internal tissues and inhibit physiological processes, which can both potentially result in fauna fatality. Floating, non-biodegradable marine debris has been highlighted as a threat to marine turtles, whales, whale sharks, albatrosses and giant petrels in relevant recovery plans and approved conservation advice for those species. Marine debris causing entanglement and ingestion was recognised in 2003 as a key threatening process for marine vertebrates under the EPBC Act leading to the development of the Threat Abatement Plan for the Impacts of Marine Debris on the Vertebrate Wildlife of Australia Coasts and Oceans (DoEE 2018). The recovery plans and approved conservation advice, as well as the threat abatement plan, have specified several recovery actions to help combat this threat. Of relevance to this activity

there is a legislative requirement that prevents this type of marine pollution. Marine Order 95 stipulates that vessels must have a garbage management plan, placards and maintain a garbage record book. Waste with potential to be windblown shall be stored in covered containers to minimise the risk of loss to the marine environment. Marine Order 95 gives effect under Australian law to MARPOL Annex VI.

Benthic assemblages: Change in habitat

Control Measure
Streamers will have recovery units fitted to prevent benthic disturbance in the event of loss.

Loss of equipment or waste has the potential to cause localised seabed disturbance with potential damage to benthic habitats. Given the size of equipment used for a survey, only a relatively small area of the seabed would be disturbed, a maximum of 0.001km^2 based on loss of a streamer that settled on the seabed, though this is unlikely as the streamers will have recovery units. There are no risks to biodiversity or ecosystem function and integrity from any waste that could be lost overboard. Lasting impacts are not predicted as the small area would quickly recover. The consequence to benthic assemblages is ranked as negligible and has not been evaluated further.

Table B4-5 - Preliminary environmental risk evaluation.

Environment Component	Environmental Aspect	Environmental Risk	Probability	Consequence	Preliminary Outcome
Water Quality	Accidental Release of Fuel	Change in water quality	Rare	Moderate	Low
	Accidental Release of Materials or Waste Overboard	Change in water quality	Rare	Negligible	Low (Negligible)
Sediment Quality	Accidental Release of Fuel	Change in sediment quality	Rare	Moderate	Low
Benthic Assemblages	Accidental Release of Fuel	Change in ecosystem dynamics	Rare	Moderate	Low
	Accidental Release of Materials or Waste Overboard	Change in habitat	Rare	Negligible	Low (Negligible)
	Introduction Of Marine Pest Species	Change in ecosystem dynamics	Rare	Severe	Moderate
Plankton	Accidental Release of Fuel	Change in physical condition	Rare	Moderate	Low
Invertebrates	Accidental Release of Fuel	Change in fauna behaviour	Rare	Moderate	Low
		Change in physical condition	Rare	Moderate	Low
	Introduction Of Marine Pest Species	Change in ecosystem dynamics	Rare	Severe	Moderate
Fish	Accidental Release of Fuel	Change in fauna behaviour	Rare	Moderate	Low
		Change in physical condition	Rare	Moderate	Low
	Accidental Release of Materials or Waste Overboard	Change in physical condition	Rare	Minor	Low
	Collisions With Marine Fauna	Change in physical condition	Rare	Moderate	Low
Birds	Accidental Release of Fuel	Change in fauna behaviour	Rare	Moderate	Low
		Change in physical condition	Rare	Moderate	Low
	Accidental Release of Materials or Waste Overboard	Change in physical condition	Rare	Minor	Low
Marine Reptiles	Accidental Release of Fuel	Change in physical condition	Rare	Moderate	Low
	Accidental Release of Materials or Waste Overboard	Change in physical condition	Rare	Minor	Low
	Collisions With Marine Fauna	Change in physical condition	Rare	Moderate	Low
Marine Reptiles	Accidental Release of Fuel	Change in fauna behaviour	Rare	Moderate	Low
	Collisions With Marine Fauna	Change in physical condition	Rare	Moderate	Low
Marine Mammals	Accidental Release of Fuel	Change in fauna behaviour	Rare	Moderate	Low
		Change in physical condition	Rare	Moderate	Low

Environment Component	Environmental Aspect	Environmental Risk	Probability	Consequence	Preliminary Outcome
	Accidental Release of Materials or Waste Overboard	Change in physical condition	Rare	Minor	Low
	Collisions With Marine Fauna	Change in physical condition	Rare	Major	Moderate
Coastal Habitats and Communities	Accidental Release of Fuel	Change in ecosystem dynamics	Rare	Moderate	Low
Commercial Fishing	Accidental Release of Fuel	Change to functions, interests, or activities	Rare	Moderate	Low
	Accidental Release of Materials or Waste Overboard	Change to functions, interests, or activities	Rare	Minor	Low
	Introduction Of Marine Pest Species	Change to functions, interests, or activities	Rare	Severe	Moderate
Shipping Activity	Accidental Release of Fuel	Change to functions, interests, or activities	Rare	Moderate	Low
Traditional Owners	Accidental Release of Fuel	Change to functions, interests, or activities	Rare	Moderate	Low
		Change in aesthetic value	Rare	Moderate	Low
	Accidental Release of Materials or Waste Overboard	Change to functions, interests, or activities	Rare	Minor	Low
Coastal Development	Accidental Release of Fuel	Change to functions, interests, or activities	Rare	Moderate	Low
	Accidental Release of Materials or Waste Overboard	Change to functions, interests, or activities	Rare	Moderate	Low
Marine Protected Areas	Accidental Release of Fuel	Change in aesthetic value	Rare	Moderate	Low
	Accidental Release of Materials Or Waste Overboard	Change in aesthetic value	Rare	Minor	Low

Mitigation and Management

This PEIRA considers the residual environmental impacts and risks that occur with the application of legislative requirements as a minimum. Further, industry standards will be applied during the design of the activity, many of which aim to avoid or minimise environmental impacts and risks. Mitigation measures are adopted within the design and implementation of the activity to further reduce environmental impacts and risks. They are typically specific to the environmental setting of the activity may be informed through consultation and may not be defined until the final details of the activity are known.

Mitigation Measures

In determining the mitigation measures included at any stage of the activity, a hierarchy of controls system will be implemented. This is a widely accepted system to classify mitigation measures and promote adoption of the most effective mitigation measures first. The hierarchy, in order of decreasing effectiveness is:

- Elimination/avoidance
- Substitution
- Engineering
- Administrative/ procedural
- Offsetting

In an environmental context, procedural mitigation measures can include further studies which improve the accuracy of predicted impacts and risks, validate assumptions, establish baselines, monitor impacts, or reduce scientific uncertainty.

Management Plans

In the context of this PEIRA, management plans refer to the strategies, procedures, and measures that are put in place to minimise the environmental impacts and risks associated with the activity. They outline how the impacts or risks will be monitored, managed, and mitigated over the course of the activity. Management plans may include measures such as mitigation measures, monitoring programs, emergency response plans, and contingency plans. They aim to ensure that the proposed activity is carried out in an environmentally responsible and sustainable manner. The following management plans are either mandatory or should be considered by CGG based on this PEIRA:

- Oil Pollution Emergency Plan (mandatory)
- Operational & Scientific Monitoring Program (mandatory)
- Marine Mammal Adaptive Management Plan
- On-water Interactions Management Plan

Conclusion and Recommendations

The following identified environmental impacts and risks will be carried through to the full assessment stage and will be refined based on further assessment and consultation.

Environmental Aspect	Environmental Impact	Preliminary Outcome
Artificial Light	Change in ambient light	Qualitative assessment
	Change in fauna behaviour	Qualitative assessment
Underwater Sound	Change in ambient sound	Qualitative assessment
	Change in fauna behaviour	Qualitative assessment
	Change in hearing capacity	Quantitative assessment
	Change in physical condition	Quantitative assessment
Physical Presence	Change in functions, interests, or activities	Quantitative assessment

Environmental Aspect	Environmental Risk	Preliminary Outcome
Accidental Release of Fuel	Change in water quality	Low
	Change in sediment quality	Low
	Change in ecosystem dynamics	Low
	Change in physical condition	Low
	Change in fauna behaviour	Low
	Change to functions, interests, or activities	Low
	Change in aesthetic value	Low
Introduction Of Marine Pest Species	Change in ecosystem dynamics	Moderate
	Change to functions, interests, or activities	Moderate
Accidental Release of Materials or Waste Overboard	Change in physical condition	Low
	Change to functions, interests, or activities	Low
	Change in aesthetic value	Low
Collisions With Marine Fauna	Change in physical condition	Moderate

The following recommendations are made for CGG to consider:

1. Commission independent underwater sound modelling to understand the effect thresholds and distances for specific receptors within the Environment Planning Area.
2. Split the full assessment of underwater sound into two components for impulsive and continuous sound sources.
3. Review the NERA Reference Case 2018:1003 Consequence analysis of an accidental release of diesel and regionally relevant spill models from similar worst-case events to determine the applicability of the NERA Reference Case and, subsequently, the need for activity specific spill modelling.

This PIERA has not identified any management plans required to be implemented at this stage of the assessment, noting that many environmental impacts and risks have been carried through for full assessment, which is more likely to result in management plan requirements.

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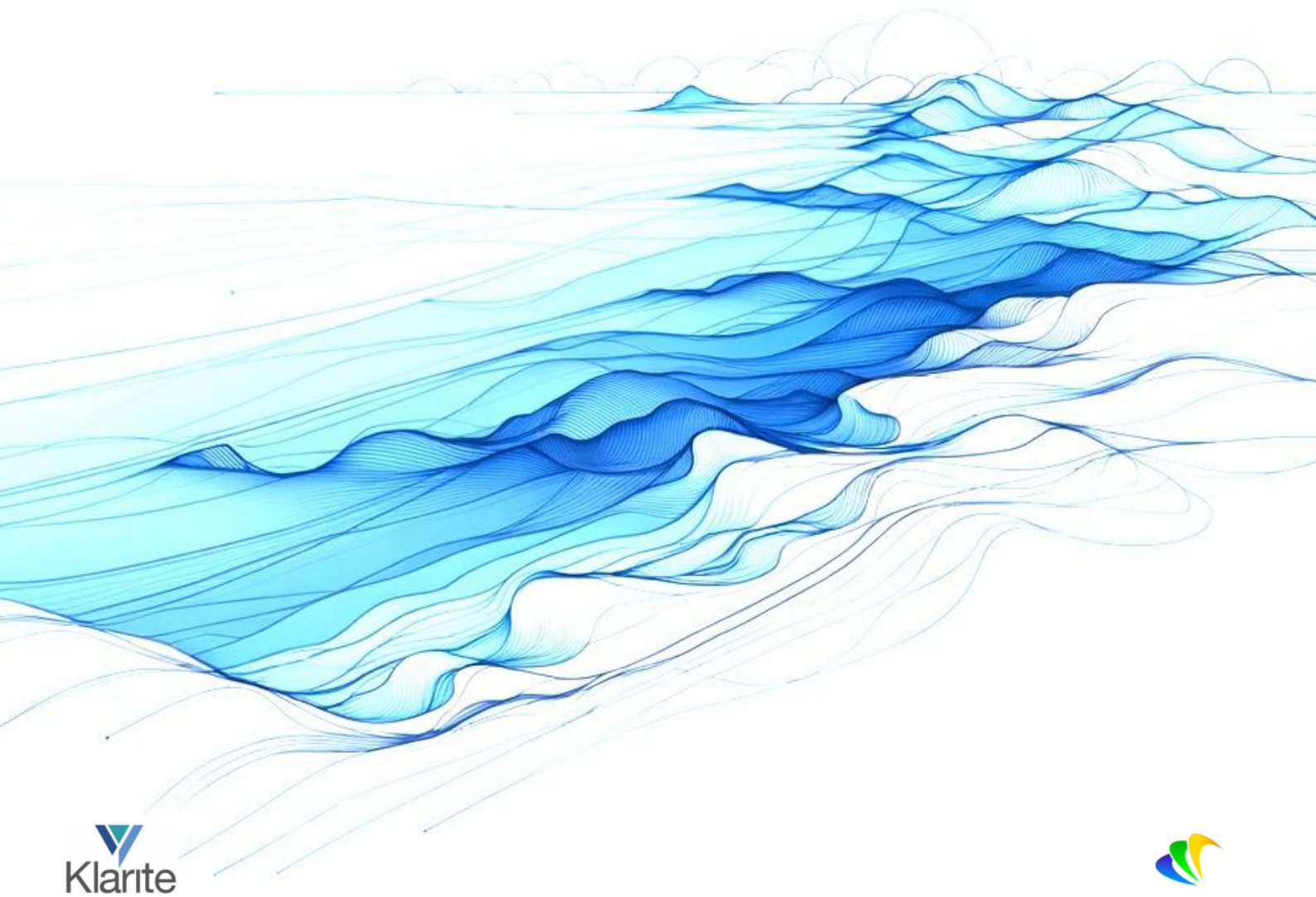
REGIA
Marine Seismic Survey

PMST Reports

Appendix B5: REG-EP-008-B5

Rev 4

December 2025



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1 Introduction

This document includes the Protected Matter Search Tool outputs relevant to various planning areas associated with the Regia MSS. The PMST search tool was initially used to search for environmental values and sensitivities within the Environment Planning Area (EPA), with refined searches complete for different aspects buffered around the Activity Planning Area (APA), as defined by the Preliminary Environmental Impact and Risk Assessment (PEIRA).

Searches were performed again prior to Rev 2 submission because the Active Source Area was established as an area narrower than the Activity Planning Area. The passage of time also meant that changes may have occurred in the intervening period between PMST searches. This search was conducted on 2nd and 4th January 2024.

The searches were then conducted again prior to resubmission (Rev 2) to ensure any changes to species or listings were identified to control for passage of time and in response to Matters: I16 and I17. This search was conducted on the 23rd April and 1st May 2024.

The searches were conducted again prior to submission of Rev 3 to ensure any changes to species or listings were identified to control for passage of time. This search was conducted on 27th February 2025.

This document presents the raw output from the PMST search tool and was used to update the environmental assessment in this Environment Plan. The National Conservation Values Atlas (NCVA) was used to verify Biologically Important Areas (BIAs) identified in the PMST Reports results for searches prior to February 2025. The Australian Marine Spatial Information System (AMSIS) has replaced the NCVA since June 2024, hence, the AMSIS was used as the BIA verification tool for the most recent PMST search (February 2025). Raw outputs for three search events are presented in this report including the January 2024 PMST Search, the April/May 2024 PMST Search, and the February 2025 PMST Search. There are a total of eight searches presented in each of these reports including the following search areas:

1. Active Source Area;
2. Light Environment that May Be Affected (EMBA). (Operational Area + 20 km Buffer);
3. Operational Area;
4. Underwater Sound EMBA for Birds – 50 km. (Active Source Area + 50km Buffer);
5. Underwater Sound EMBA for Fish – 8 km. (Active Source Area + 8km Buffer);
6. Underwater Sound EMBA for LF Cetaceans – 44 km. (Active Source Area + 44km Buffer);
7. Underwater Sound EMBA for Turtle – 6 km (Active Source Area + 6km Buffer); and
8. Environmental Planning Area.

A series of tables summarising the PMST Reports conducted in February 2025 are also presented in this document. These tables include relevant PMST output information for biological receptors under the following categories: Birds, Fish, Marine Mammals, Marine Reptiles, and Sharks.

2 Summary of Changes - February 2025 PMST Reports

Biologically Important Areas

- Pygmy Blue Whale Distribution BIA has been removed (from all areas searched).
- Four Distribution BIAs for White Shark have been removed (from all areas searched).
- Wedge-tailed shearwater Breeding BIA has been removed (from all areas searched).
- Breeding BIA added for Short-tailed Shearwater to the Light EMBA, and Underwater Sound EMBAs for Birds and LF cetaceans.
- Breeding BIA added for White-faced storm-petrel to the EPA.

Listed Species

- Southern Bluefin Tuna no longer appears as being present within any of the eight areas searched.
- Grey Nurse Shark has been added to list - (Species or species habitat may occur within area) for all areas searched.

Matters of National Environmental Significance

- World Heritage Property – Budj Bim Cultural Landscape appeared in one additional search area (EPA)
- National Heritage Places – Quarantine Station and Surrounds (EPA) – new site.
- National Heritage Places - Budj Bim National Heritage Landscape – Tyrendarra Area appeared in one additional search area (EPA).

Listed Threatened Ecological Communities

- One new community - King Island Scrub Complex.

1. Birds

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Seabirds														
Antipodean Albatross	*Diomedea exulans antipodensis ; Diomedea antipodensis ; Diomedea exulans antipodensis ; Diomedea antipodensis*	Vulnerable	Migratory	Listed	Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles)	National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area
Australasian Gannet	*Morus serrator*			Listed	Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles); Aggregation (EPA, Light EMBA, Sound EMBA - Birds, Sound EMBA - LF Cetaceans)		Known to occur	Known to occur; Breeding known to occur within area	Known to occur; Breeding known to occur within area	Known to occur	Known to occur; Breeding known to occur within area	Known to occur	Known to occur	Known to occur; Breeding known to occur within area
Black-browed Albatross	*Thalassarche melanophris*	Vulnerable	Migratory	Listed	Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles)	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on Black-browed Albatross (*Thalassarche melanopris*) (TSSC 2005)	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area
Black-faced Cormorant	*Phalacrocorax fuscescens*			Listed	Breeding (EPA); Foraging (EPA)	Wildlife Conservation Plan for Seabirds (CoA 2020)		Known to occur; Breeding known to occur within area	Breeding known to occur within area		Breeding known to occur within area			Breeding known to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Blue Petrel	*Halobaena caerulea*	Vulnerable		Listed		Conservation Advice *Halobaena caerulea* blue petrel (TSSC 2015) National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	
Bullers Albatross	*Thalassarche bulleri*	Vulnerable	Migratory	Listed	Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles)	National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Campbell Albatross, Campbell Black-browed Albatross	*Thalassarche impavida*	Vulnerable	Migratory	Listed	Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles)	National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	
Cape Gannet	*Morus capensis*			Listed				Breeding known to occur within area	Breeding known to occur within area		Breeding known to occur within area			Breeding known to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Common Diving-petrel	*Pelecanoides urinatrix*				Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles) Breeding (EPA, Light EMBA, Sound EMBA - Birds, Sound EMBA - LF Cetaceans)	National Recovery Plan for Albatrosses and Petrels (CoA 2022)		Breeding known to occur within area	Breeding known to occur within area		Breeding known to occur within area			Breeding known to occur within area
Fairy Prion	*Pachyptila turtur*			Listed			Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area
Fairy Prion (southern)	*Pachyptila turtur subantarctica*	Vulnerable				Conservation Advice *Pachyptila turtur subantarctica* fairy prion (southern) (TSSC 2015)	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area
Flesh-footed Shearwater, Fleshy-footed Shearwater	*Ardenna carneipes*		Migratory	Listed (as *Puffinus carneipes*)			Foraging, feeding or related behaviour likely to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Foraging, feeding or related behaviour likely to occur within area	Species or species habitat known to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Species or species habitat known to occur within area
Gould's Petrel, Australian Gould's Petrel	*Pterodroma leucoptera leucoptera*	Endangered				Gould's Petrel (*Pterodroma leucoptera leucoptera*) Recovery Plan (DECNSW) 2006	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Greater Crested Tern	*Thalasseus bergii*		Migratory	Listed (as *Sterna bergii*)				Breeding known to occur within area	Breeding known to occur within area		Breeding known to occur within area			Breeding known to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Grey-headed Albatross	*Thalassarche chrysostoma*	Endangered	Migratory	Listed		Conservation Advice for *Thalassarche chrysostoma* (Grey-headed Albatross)(DEWHA 2009) National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Indian Yellow-nosed Albatross	*Thalassarche chlororhynchos bassi; Thalassarche carteri; Thalassarche chlororhynchos bassi; Thalassarche carteri*	Vulnerable	Migratory	Listed	Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles)	National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Known to occur; Species or species habitat likely to occur within area	Known to occur; Species or species habitat likely to occur within area	Known to occur; Species or species habitat likely to occur within area	Known to occur; Species or species habitat likely to occur within area	Known to occur; Species or species habitat likely to occur within area	Known to occur; Species or species habitat likely to occur within area	Known to occur; Species or species habitat likely to occur within area	Known to occur; Species or species habitat likely to occur within area
Little Penguin	*Eudyptula minor*			Listed	Breeding (EPA); Foraging (EPA)	Wildlife Conservation Plan for Seabirds (CoA 2020)		Known to occur; Breeding known to occur within area	Breeding known to occur within area		Breeding known to occur within area			Breeding known to occur within area
Little Tern	*Sternula albifrons*	Vulnerable	Migratory	Listed (as *Sterna albifrons*)		Commonwealth Listing Advice on Sterna *albifrons sinensis* (Little Tern (Western Pacific)) (TSSC 2002) Conservation Advice for *Sternula albifrons* (Little Tern) (DCCEEW 2025)		Breeding known to occur within area	Species or species habitat may occur within area		Breeding known to occur within area	Species or species habitat may occur within area		Breeding known to occur within area
Northern Buller's Albatross, Pacific Albatross	*Thalassarche bulleri platei*	Vulnerable		Listed (as Thalassarche sp. nov.)		National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Northern Giant Petrel	*Macronectes halli*	Vulnerable	Migratory	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on *Macronectes halli* (Northern Giant-Petrel) (TSSC 2001)	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Northern Royal Albatross	*Diomedea sanfordi*	Endangered	Migratory	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Salvin's Albatross	*Thalassarche salvini*	Vulnerable	Migratory	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Short-tailed Shearwater	*Ardenna tenuirostris*		Migratory	Listed (as *Puffinus tenuirostris*)	Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles) Breeding (EPA, Light EMBA, Sound EMBA - Birds, Sound EMBA - LF Cetaceans)		Known to occur	Known to occur; Breeding known to occur within area	Known to occur; Breeding known to occur within area	Known to occur	Known to occur; Breeding known to occur within area	Known to occur	Known to occur	Known to occur; Breeding known to occur within area
Shy Albatross	*Thalassarche cauta cauta; Thalassarche cauta; Thalassarche cauta cauta; Thalassarche cauta*	Endangered	Migratory	Listed	Foraging likely (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles)	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Conservation Advice *Thalassarche cauta* Shy Albatross (TSSC 2020)	Likely to occur; Foraging, feeding or related behaviour likely to occur within area	Likely to occur; Foraging, feeding or related behaviour likely to occur within area	Likely to occur; Foraging, feeding or related behaviour likely to occur within area	Likely to occur; Foraging, feeding or related behaviour likely to occur within area	Likely to occur; Foraging, feeding or related behaviour likely to occur within area	Likely to occur; Foraging, feeding or related behaviour likely to occur within area	Likely to occur; Foraging, feeding or related behaviour likely to occur within area	Likely to occur; Foraging, feeding or related behaviour likely to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Silver Gull	*Chroicocephalus novaehollandiae*			Listed (as *Larus novaehollandiae*)		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Breeding known to occur within area	Breeding known to occur within area		Breeding known to occur within area			Breeding known to occur within area
Soft-plumaged Petrel	*Pterodroma mollis*	Vulnerable		Listed		Conservation Advice *Pterodroma Mollis* soft-plumaged petrel (TSSC 2015)	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Sooty Albatross	*Phoebetria fusca*	Vulnerable	Migratory	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Sooty Shearwater	*Ardenna grisea*	Vulnerable	Migratory	Listed (as *Puffinus griseus*)		Wildlife Conservation Plan for Seabirds (CoA 2020) Conservation Advice for *Ardenna grisea* (Sooty Shearwater) (DCCEEW 2023)	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Southern Giant-Petrel, Southern Giant Petrel	*Macronectes giganteus*	Endangered	Migratory	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Species or species habitat may occur within area	Foraging, feeding or related behaviour likely to occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Southern Royal Albatross	*Diomedea epomophora*	Vulnerable	Migratory	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Wandering Albatross	*Diomedea exulans (sensu lato); Diomedea exulans; Diomedea exulans (sensu lato); Diomedea exulans*	Vulnerable	Migratory	Listed	Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles)	National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area	Known to occur; Foraging, feeding or related behaviour likely to occur within area
Wedge-tailed Shearwater	*Ardenna pacifica*				Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles)	Wildlife Conservation Plan for Seabirds (CoA 2020)	Likely to occur	Likely to occur	Likely to occur	Likely to occur	Likely to occur	Likely to occur	Likely to occur	Likely to occur
White-capped Albatross	*Thalassarche steadi*	Vulnerable	Migratory	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area
White-faced Storm-petrel	*Pelagodroma marina*				Breeding (EPA); Foraging (EPA)	Wildlife Conservation Plan for Seabirds (DAWE 2020)		Known to occur						
Shorebirds														
Australasian Bittern	*Botaurus poiciloptilus*	Endangered				Conservation Advice *Botaurus poiciloptilus* Australasian Bittern (TSSC 2019) Commonwealth Listing Advice on *Botaurus poiciloptilus* (Australasian Bittern) (TSSC 2011) National Recovery Plan for the Australasian Bittern (*Botaurus poiciloptilus*) (DCCEEW 2022)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Australian Fairy Tern	*Sternula nereis nereis*	Vulnerable				Approved Conservation Advice for *Sternula nereis nereis* (Fairy Tern) (DSEWPaC. 2011) National Recovery Plan for the Australian Fairy Tern (*Sternula nereis nereis*) (DAWE 2020)	Foraging, feeding or related behaviour likely to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Foraging, feeding or related behaviour likely to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Foraging, feeding or related behaviour likely to occur within area	Species or species habitat known to occur within area
Australian Painted Snipe	*Rostratula australis*	Endangered		Listed - overfly marine area (as *Rostratula benghalensis* (sensu lato))		Approved Conservation Advice for *Rostratula australis* (Australian Painted Snipe) (DSEWPaC 2013) Commonwealth Listing Advice on *Rostratula australis* (Australian Painted Snipe) (TSSC 2013) National Recovery Plan for the Australian Painted Snipe (*Rostratula australis*) (CoA 2022)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area
Australian Pratincole	*Stiltia isabella*			Listed - overfly marine area				Roosting known to occur within area						
Bar-tailed Godwit	*Limosa lapponica*		Migratory	Listed		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area
Black Currawong (King Island)	*Strepera fuliginosa colei*	Vulnerable				Conservation Advice *Strepera fuliginosa colei* black currawong (King Island) (TSSC 2015)		Breeding likely to occur within area						

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Black-eared Cuckoo	*Chalcites osculans*			Listed - overfly marine area (as *Chrysococcyx osculans*)				Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area
Black-faced Monarch	*Monarcha melanopsis*			Listed - overfly marine area				Species or species habitat known to occur within area	Species or species habitat may occur within area		Species or species habitat may occur within area			Species or species habitat may occur within area
Black-tailed Godwit	*Limosa limosa*	Endangered	Migratory	Listed - overfly marine area		Conservation Advice for *Limosa limosa* (black-tailed godwit) (DCCEEW 2024) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area						
Blue-winged Parrot	*Neophema chrysostoma*	Vulnerable		Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Neophema chrysostoma* (Blue-winged Parrot) (DCCEEW 2023)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area
Broad-billed Sandpiper	*Limicola falcinellus*		Migratory	Listed - overfly marine area				Roosting known to occur within area						
Brown Skua	*Stercorarius antarcticus*			Listed (as *Catharacta skua*)			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Brown Treecreeper (south-eastern)	*Climacteris picumnus victoriae*	Vulnerable				Conservation Advice for *Climacteris picumnus victoriae* (brown treecreeper (south-eastern)) (DCCEEW 2023)		Species or species habitat may occur within area	Species or species habitat may occur within area		Species or species habitat may occur within area			Species or species habitat may occur within area
Caspian Tern	*Hydroprogne caspia*		Migratory	Listed (as *Sterna caspia*)				Breeding known to occur within area						
Cattle Egret	*Bubulcus ibis*			Listed - overfly marine area (as *Ardea ibis*)				Species or species habitat may occur within area	Species or species habitat may occur within area		Breeding likely to occur within area			Breeding likely to occur within area
Common Greenshank, Greenshank	*Tringa nebularia*	Endangered	Migratory	Listed - overfly marine area		Conservation Advice for *Tringa nebularia* (Common Greenshank). (DCCEEW 2024) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area
Common Noddy	*Anous stolidus*		Migratory	Listed				Species or species habitat likely to occur within area						
Common Sandpiper	*Actitis hypoleucos*		Migratory	Listed		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area
Curlew Sandpiper	*Calidris ferruginea*	Critically Endangered	Migratory	Listed - overfly marine area		Conservation Advice for *Calidris ferruginea* Curlew Sandpiper (DCCEEW 2023)	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Diamond Firetail	*Stagonopleura guttata*	Vulnerable				Conservation Advice for *Stagonopleura guttata* (diamond firetail) (DCCEEW 2023)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area
Double-banded Plover	*Charadrius bicinctus*		Migratory	Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area
Eastern Curlew, Far Eastern Curlew	*Numenius madagascariensis*	Critically Endangered	Migratory	Listed		Conservation Advice for *Numenius madagascariensis* (Far Eastern Curlew) (DCCEEW 2023)	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area
Eastern Hooded Plover, Eastern Hooded Plover	*Thinornis cucullatus cucullatus*	Vulnerable		Listed - overfly marine area (as *Thinornis rubricollis rubricollis*)		Conservation Advice *Thinornis rubricollis rubricollis* Hooded Plover (eastern) (DoE 2014)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area	Species or species habitat likely to occur within area		Species or species habitat known to occur within area
Fairy Tern	*Sternula nereis*			Listed (as *Sterna nereis*)				Breeding known to occur within area						
Fork-tailed Swift	*Apus pacificus*		Migratory	Listed - overfly marine area			Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Endangered				Conservation Advice for *Callocephalon fimbriatum* (Gang-gang Cockatoo) (DAWE 2022)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Great Knot	*Calidris tenuirostris*	Vulnerable	Migratory	Listed - overfly marine area		Conservation Advice for *Calidris tenuirostris* (great knot) (DCCEEW 2024) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area						
Greater Sand Plover, Large Sand Plover	*Charadrius leschenaultii*	Vulnerable	Migratory	Listed		Conservation Advice for *Charadrius leschenaultia* (Greater Sand Plover) (DCCEEW 2023) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Species or species habitat known to occur within area	Species or species habitat likely to occur within area		Species or species habitat likely to occur within area			Species or species habitat likely to occur within area
Green Rosella (King Island)	*Platycercus caledonicus brownii*	Vulnerable				Conservation Advice *Platycercus caledonicus brownii* green rosella (King Island) (TSSC 2015)		Species or species habitat known to occur within area						
Grey Falcon	*Falco hypoleucos*	Vulnerable				Conservation Advice *Falco hypoleucos* Grey Falcon (TSSC 2020)		Species or species habitat likely to occur within area	Species or species habitat likely to occur within area		Species or species habitat likely to occur within area			Species or species habitat likely to occur within area
Grey Plover	*Pluvialis squatarola*	Vulnerable	Migratory	Listed - overfly marine area		Conservation Advice for *Pluvialis squatarola* (grey plover) (DCCEEW 2024) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area						
Grey-tailed Tattler	*Tringa brevipes*		Migratory	Listed (as *Heteros celus*		Wildlife Conservation Plan for Migratory Shorebirds (CoA		Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
				brevipes)		2015)								
Hooded Plover, Hooded Dotterel	*Thinornis cucullatus*			Listed - overfly marine area (as *Thinornis rubricollis*)		Conservation Advice *Thinornis rubricollis rubricollis* Hooded Plover (eastern) (DoE 2014)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area	Species or species habitat likely to occur within area		Species or species habitat known to occur within area
King Island Brown Thornbill, Brown Thornbill (King Island)	*Acanthiza pusilla magnirostris*	Endangered				Conservation Advice for *Acanthiza pusilla magnirostris* (King Island brown thornbill) (DCCEEW 2023)		Species or species habitat known to occur within area						
King Island Scrubtit, Scrubtit (King Island)	*Acanthornis magna greeniana*	Critically Endangered				Conservation Advice for *Acanthornis magna greeniana* (King Island scrubtit) (DCCEEW 2023) Commonwealth Listing Advice on *Acanthornis magnus greenianus* (Scrubtit (King Island) (TSSC 2002)		Species or species habitat known to occur within area						
Latham's Snipe, Japanese Snipe	*Gallinago hardwickii*	Vulnerable	Migratory	Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Gallinago hardwickii* (Latham's Snipe) (DCCEEW 2024)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area
Lesser Sand Plover, Mongolian Plover	*Charadrius mongolus*	Endangered	Migratory	Listed		Conservation Advice *Charadrius mongolus* Lesser Sand Plover (TSSC 2016) Wildlife Conservation		Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
						Plan for Migratory Shorebirds (CoA 2015)								
Little Curlew, Little Whimbrel	*Numenius minutus*		Migratory	Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting likely to occur within area	Roosting likely to occur within area		Roosting likely to occur within area			Roosting likely to occur within area
Magpie Goose	*Anseranas semipalmata*			Listed - overfly marine area				Species or species habitat may occur within area	Species or species habitat may occur within area		Species or species habitat may occur within area			Species or species habitat may occur within area
Marsh Sandpiper, Little Greenshank	*Tringa stagnatilis*		Migratory	Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area
Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	*Limosa lapponica baueri*	Endangered				Conservation Advice for *Limosa lapponica baueri* Bar-tailed Godwit (western Alaskan) (DCCEEW 2024)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area
Orange-bellied Parrot	*Neophema chrysogaster*	Critically Endangered		Listed - overfly marine area		Commonwealth Listing Advice on *Neophema chrysogaster* (TSSC 2006). National Recovery Plan for the Orange-bellied Parrot, *Neophema chrysogaster* (DEWLP 2016)		Migration route known to occur within area	Species or species habitat known to occur within area	Migration route likely to occur within area	Species or species habitat known to occur within area	Migration route likely to occur within area	Migration route likely to occur within area	Species or species habitat known to occur within area
Osprey	*Pandion haliaetus*		Migratory	Listed		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area
Pacific Golden Plover	*Pluvialis fulva*		Migratory	Listed		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Painted Honeyeater	*Grantiella picta*	Vulnerable				Conservation Advice *Grantiella picta* Painted Honeyeater (DoE 2015) National Recovery Plan for the Painted Honeyeater (*Grantiella picta*) (DAWE 2021)		Species or species habitat known to occur within area	Species or species habitat may occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area
Pectoral Sandpiper	*Calidris melanotos*		Migratory	Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area
Pied Stilt, Black-winged Stilt	*Himantopus himantopus*			Listed - overfly marine area				Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area
Pin-tailed Snipe	*Gallinago stenura*		Migratory	Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting likely to occur within area	Roosting likely to occur within area		Roosting likely to occur within area			Roosting likely to occur within area
Plains-wanderer	*Pedionomus torquatus*	Critically Endangered				Conservation Advice *Pedionomus torquatus* plains-wanderer (DoE 2015) National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*) (DEWNR 2016)		Species or species habitat may occur within area			Species or species habitat may occur within area			Species or species habitat may occur within area
Rainbow Bee-eater	*Merops ornatus*			Listed - overfly marine area				Species or species habitat may occur within area	Species or species habitat may occur within area		Species or species habitat may occur within area			Species or species habitat may occur within area

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Red Knot, Knot	*Calidris canutus*	Vulnerable	Migratory	Listed - overfly marine area		Conservation Advice for *Calidris canutus* Red Knot (DCCEEW 2024) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area
Red-capped Plover	*Charadrius ruficapillus*			Listed - overfly marine area				Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area
Red-necked Avocet	*Recurvirostra novaehollandiae*			Listed - overfly marine area				Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area
Red-necked Phalarope	*Phalaropus lobatus*		Migratory	Listed		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area						
Red-necked Stint	*Calidris ruficollis*		Migratory	Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area
Regent Honeyeater	*Anthochaera phrygia*	Critically Endangered				Conservation Advice *Anthochaera Phrygia Regent* Honeyeater (DoE 2015) National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) (DoE 2016)		Species or species habitat known to occur within area	Species or species habitat may occur within area		Species or species habitat may occur within area			Species or species habitat may occur within area
Ruddy Turnstone	*Arenaria interpres*	Vulnerable	Migratory	Listed		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Arenaria interpres* (Ruddy		Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area

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						Turnstone) (DCCEEW 2024)								
Rufous Fantail	*Rhipidura rufifrons*			Listed - overfly marine area				Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area
Sanderling	*Calidris alba*		Migratory	Listed		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area
Satin Flycatcher	*Myiagra cyanoleuca*			Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Breeding known to occur within area	Breeding known to occur within area		Breeding known to occur within area			Breeding known to occur within area
Sharp-tailed Sandpiper	*Calidris acuminata*	Vulnerable	Migratory	Listed		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Calidris acuminata* (Sharptailed Sandpiper) (DCCEEW 2024)	Species or species habitat may occur within area	Roosting known to occur within area	Roosting known to occur within area	Species or species habitat may occur within area	Roosting known to occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Roosting known to occur within area
Sooty Tern	*Onychoprion fuscatus*			Listed (as *Sterna fuscata*)				Breeding known to occur within area						
South-eastern Hooded Robin, Hooded Robin (south-eastern)	*Melanodryas cucullata cucullata*	Endangered				Conservation Advice for *Melanodryas cucullata cucullata* (hooded robin (south-eastern)) (DCCEEW 2023)		Species or species habitat may occur within area	Species or species habitat may occur within area		Species or species habitat may occur within area			Species or species habitat may occur within area
South-eastern Red-tailed Black-Cockatoo	*Calyptorhynchus banksii graptogyne*	Endangered				National Recovery Plan for the South-Eastern Red-tailed Black-Cockatoo (CoA 2007)		Breeding known to occur within area			Species or species habitat known to occur within area			Species or species habitat known to occur within area

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Southern Whiteface	*Aphelocephala leucopsis*	Vulnerable				Conservation Advice for *Aphelocephala leucopsis* (southern whiteface) (DCCEEW 2023)		Species or species habitat may occur within area			Species or species habitat likely to occur within area			Species or species habitat may occur within area
Swift Parrot	*Lathamus discolor*	Critically Endangered		Listed - overfly marine area		National Recovery Plan for the Swift Parrot (*Lathamus discolor*) (Saunders & Tzaros 2011) Conservation Advice *Lathamus discolor* Swift Parrot (TSSC 2016)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area
Swinhoe's Snipe	*Gallinago megala*		Migratory	Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting likely to occur within area	Roosting likely to occur within area		Roosting likely to occur within area			Roosting likely to occur within area
Tasmanian Azure Kingfisher	*Ceyx azureus diemenensis*	Endangered				Approved Conservation Advice for *Ceyx azureus diemenensis* (Tasmanian Azure Kingfisher) (DEWHA 2010) Commonwealth Listing Advice on *Ceyx azureus diemenensis* (Tasmanian Azure Kingfisher) (TSSC 2010)		Species or species habitat known to occur within area						
Tasmanian Wedge-tailed Eagle, Wedge-tailed Eagle (Tasmanian)	*Aquila audax fleayi*	Endangered						Species or species habitat may occur within area						

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Terek Sandpiper	*Xenus cinereus*	Vulnerable	Migratory	Listed - overfly marine area		Conservation Advice for *Xenus cinereus* (terek sandpiper) (DCCEEW 2024) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area						
Whimbrel	*Numenius phaeopus*		Migratory	Listed		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area
White-bellied Sea-Eagle	*Haliaeetus leucogaster*			Listed		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Breeding known to occur within area	Breeding known to occur within area		Breeding known to occur within area			Breeding known to occur within area
White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian)	*Fregetta grallaria grallaria*	Vulnerable						Species or species habitat likely to occur within area						
White-faced Storm-Petrel	*Pelagodroma marina*			Listed				Breeding known to occur within area						
White-fronted Tern	*Sterna striata*			Listed			Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
White-throated Needletail	*Hirundapus caudacutus*	Vulnerable	Migratory	Listed - overfly marine area		Conservation Advice *Hirundapus caudacutus* White-throated Needletail (TSSC 2019)		Roosting known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Wood Sandpiper	*Tringa glareola*		Migratory	Listed - overfly marine area		Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)		Roosting known to occur within area	Roosting known to occur within area		Roosting known to occur within area			Roosting known to occur within area
Yellow Wagtail	*Motacilla flava*		Migratory	Listed - overfly marine area				Species or species habitat known to occur within area	Species or species habitat may occur within area		Species or species habitat may occur within area			Species or species habitat may occur within area

2. Fish

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF Cetaceans
Fish														
Australian Grayling	*Prototroctes maraena*	Vulnerable				Conservation Advice *Prototroctes maraena* Australian Grayling (TSSC 2021)	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat likely to occur within area	Species or species habitat known to occur within area	Species or species habitat may occur within area
Blue Warehou	*Seriolella brama*	Conservation Dependent				Commonwealth Listing Advice *Seriolella brama* Blue Warehou (TSSC 2015)	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Eastern Dwarf Galaxias, Dwarf Galaxias	*Galaxiella pusilla*	Endangered				National Recovery Plan for the Dwarf Galaxias (*Galaxiella pusilla*) (Saddlier et al. 2010) Conservation Advice *Galaxiella pusilla* (dwarf galaxias) (DCCEEW 2023)		Species or species habitat may occur within area						
Eastern Gemfish	*Rexea solandri* (eastern Australian population)	Conservation Dependent				Commonwealth Listing Advice *Rexea solandri* (TSSC 2009)		Species or species habitat may occur within area						
Orange Roughy, Deep-sea Perch, Red Roughy	*Hoplostethus atlanticus*	Conservation Dependent					Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF Cetaceans
Yarra Pygmy Perch	*Nannoperca obscura*	Endangered				National Recovery Plan for the Yarra Pygmy Perch (*Nannoperca obscura*) (Sadler and Hammer 2010) Conservation Advice for *Nannoperca obscura* (Yarra pygmy perch) (DCCEEW 2023)		Species or species habitat known to occur within area	Species or species habitat known to occur within area		Species or species habitat known to occur within area			Species or species habitat known to occur within area
Sygnathids														
Australian Smooth Pipefish, Smooth Pipefish	*Lissocampus caudalis*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse	*Hippocampus abdominalis*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Brushtail Pipefish	*Leptoichthys fistularius*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Bullneck Seahorse	*Hippocampus minotaur*			Listed				Species or species habitat may occur within area			Species or species habitat may occur within area		Species or species habitat may occur within area	
Common Seadragon, Weedy Seadragon	*Phyllopteryx taeniolatus*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish	*Histiogamphelus briggsii*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF Cetaceans
Deepbody Pipefish, Deep-bodied Pipefish	*Kaupus costatus*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Hairy Pipefish	*Urocampus carinirostris*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Halfbanded Pipefish	*Mitotichthys semistriatus*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Javelin Pipefish	*Lissocampus runa*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Knifesnout Pipefish, Knife-snouted Pipefish	*Hypselognathus rostratus*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Leafy Seadragon	*Phycodurus eques*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish	*Vanacampus poecilolaemus*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Mollison's Pipefish	*Mitotichthys mollisoni*			Listed				Species or species habitat may occur within area						
Mother-of-pearl Pipefish	*Vanacampus margaritifer*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF Cetaceans
Port Phillip Pipefish	*Vanacampus phillipi*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Pugnose Pipefish, Pug-nosed Pipefish	*Pugnaso curtirostris*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Red Pipefish	*Notiocampus ruber*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish	*Histiogamphelus cristatus*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Ringback Pipefish, Ring-backed Pipefish	*Stipecampus cristatus*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Robust Pipehorse, Robust Spiny Pipehorse	*Solegnathus robustus*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Sawtooth Pipefish	*Maroubra perserrata*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Short-head Seahorse, Short-snouted Seahorse	*Hippocampus breviceps*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Spiny Pipehorse, Australian Spiny Pipehorse	*Solegnathus spinosissimus*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF Cetaceans
Spotted Pipefish, Gulf Pipefish, Peacock Pipefish	*Stigmatopora argus*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Trawl Pipefish, Bass Strait Pipefish	*Kimblaeus bassensis*			Listed				Species or species habitat may occur within area			Species or species habitat may occur within area		Species or species habitat may occur within area	
Tucker's Pipefish	*Mitotichthys tuckeri*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish	*Heraldia nocturna*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish	*Stigmatopora nigra*			Listed			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

3. Marine Mammals

Common Name	Scientific Name	Threatened Category	Migratory Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Whales													
Andrew's Beaked Whale	*Mesoplodon bowdoini*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Antarctic Minke Whale, Dark-shoulder Minke Whale	*Balaenoptera bonaerensis*		Migratory			Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Arnoux's Beaked Whale	*Berardius arnuxii*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Blainville's Beaked Whale, Dense-beaked Whale	*Mesoplodon densirostris*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Blue Whale	*Balaenoptera musculus*	Endangered	Migratory		Conservation Management Plan for the Blue Whale (DoE 2015)	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area
Cuvier's Beaked Whale, Goose-beaked Whale	*Ziphius cavirostris*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Dwarf Sperm Whale	*Kogia sima*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
False Killer Whale	*Pseudorca crassidens*					Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Fin Whale	*Balaenoptera physalus*	Vulnerable	Migratory		Conservation Advice *Balaenoptera physalus* Fin Whale (TSSC 2015)	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area
Gray's Beaked Whale, Scamperdown Whale	*Mesoplodon grayi*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Hector's Beaked Whale	*Mesoplodon hectori*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Humpback Whale	*Megaptera novaeangliae*		Migratory		Listing Advice *Megaptera novaeangliae* Humpback Whale (DAWE 2022)	Species or species habitat likely to occur within area	Species or species habitat known to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat known to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat known to occur within area
Killer Whale, Orca	*Orcinus orca*		Migratory			Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Long-finned Pilot Whale	*Globicephala melas*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Minke Whale	*Balaenoptera acutorostrata*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Pygmy Blue Whale	*Balaenoptera musculus brevicauda*			Foraging (ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles) Foraging (annual high use area)	Conservation Management Plan for the Blue Whale (DoE 2015)	Likely to be present; Known to occur	Likely to be present; Known to occur	Likely to be present; Known to occur	Likely to be present; Known to occur	Likely to be present; Known to occur	Likely to be present; Known to occur	Likely to be present; Known to occur	Likely to be present; Known to occur

Common Name	Scientific Name	Threatened Category	Migratory Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
				(ASA, EPA, Light EMBA, OA, Sound EMBA - Birds, Sound EMBA - Fish, Sound EMBA - LF Cetaceans, Sound EMBA - Turtles); Known Foraging Area (EPA)								
Pygmy Right Whale	*Caperea marginata*		Migratory			Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Pygmy Sperm Whale	*Kogia breviceps*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Sei Whale	*Balaenoptera borealis*	Vulnerable	Migratory		Conservation Advice *Balaenoptera borealis* sei whale (TSSC 2015)	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area
Shepherd's Beaked Whale, Tasman Beaked Whale	*Tasmacetus shepherdi*						Species or species habitat may occur within area						
Short-finned Pilot Whale	*Globicephala macrorhynchus*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Southern Bottlenose Whale	*Hyperoodon planifrons*						Species or species habitat may occur within area						

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Southern Right Whale	*Eubalaena australis*	Endangered	Migratory (as *Balaena glacialis australis*)	Reproduction (May to September) (EPA, Sound EMBA - LF Cetaceans) Migration (April-October)(ASA, EPA, OA, Sound EMBA - LF Cetaceans)	Conservation Management Plan for the Southern Right Whale (CoA 2012) National Recovery Plan for the Southern Right Whale (DCCEEW 2024)	Breeding known to occur within area	Breeding known to occur within area	Breeding known to occur within area	Breeding known to occur within area	Breeding known to occur within area	Breeding known to occur within area	Breeding known to occur within area	Breeding known to occur within area
Sperm Whale	*Physeter macrocephalus*		Migratory			Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale	*Mesoplodon layardii*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
True's Beaked Whale	*Mesoplodon mirus*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Pinnipeds													
Australian Fur-seal, Australo-African Fur-seal	*Arctocephalus pusillus*					Species or species habitat likely to occur within area	Breeding known to occur within area	Breeding known to occur within area	Species or species habitat likely to occur within area	Breeding known to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Breeding known to occur within area
Australian Sea-lion, Australian Sea Lion	*Neophoca cinerea*	Endangered			Conservation Advice *Neophoca cinerea* Australian Sea Lion (TSSC 2020) Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaC 2013)	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

Common Name	Scientific Name	Threatened Category	Migratory Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF cetaceans
Long-nosed Fur-seal, New Zealand Fur-seal	*Arctocephalus forsteri*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Dolphins													
Bottlenose Dolphin	*Tursiops truncatus s. str.*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Common Dolphin, Short-beaked Common Dolphin	*Delphinus delphis*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Dusky Dolphin	*Lagenorhynchus obscurus*		Migratory			Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin	*Tursiops aduncus*					Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Risso's Dolphin, Grampus	*Grampus griseus*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Southern Right Whale Dolphin	*Lissodelphis peronii*					Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

4. Marine Reptiles

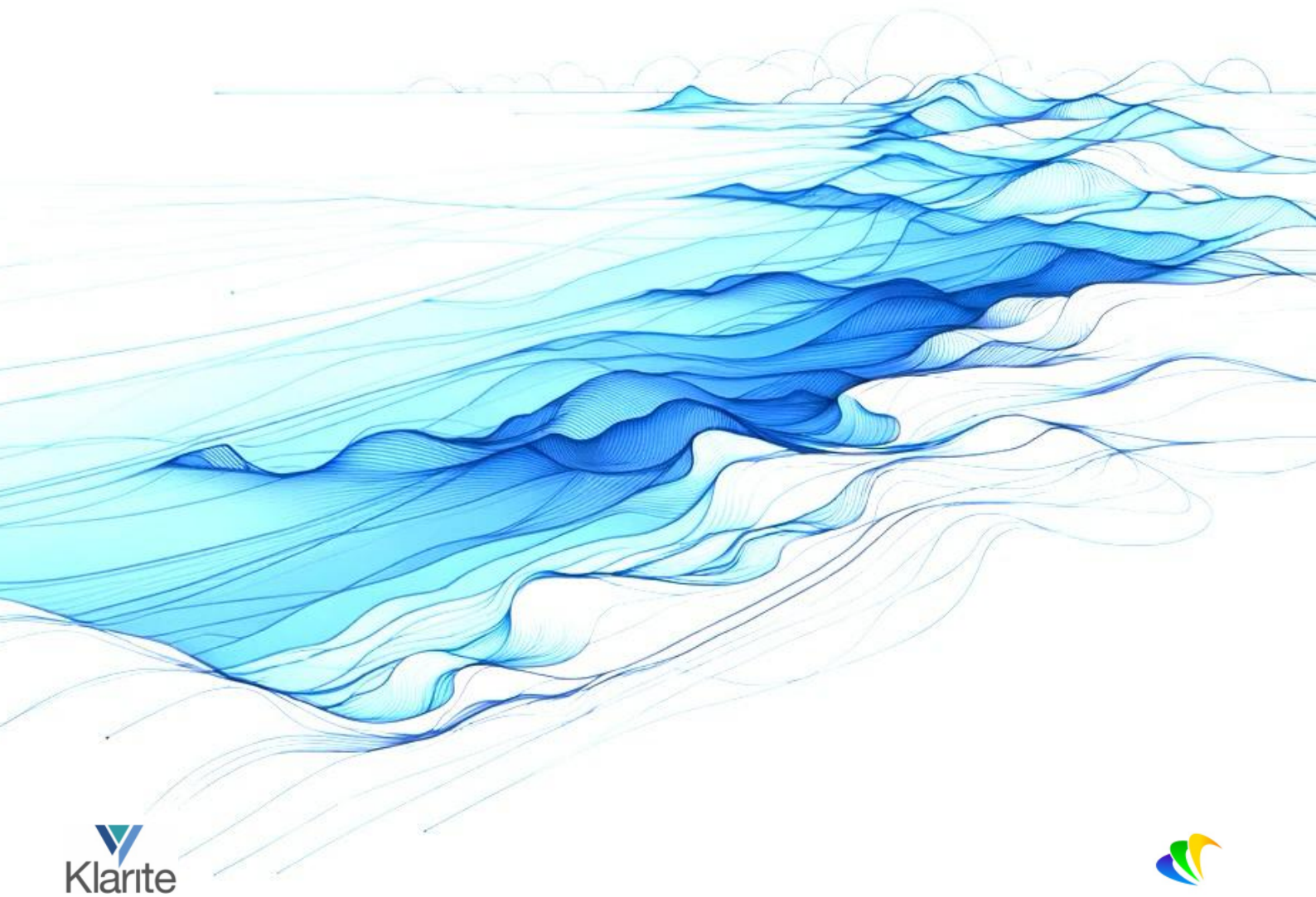
Common Name	Scientific Name	Threatened Status	Migratory Status	Marine Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA -Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF Cetaceans
Green Turtle	*Chelonia mydas*	Vulnerable	Migratory	Listed		Recovery Plan for Marine Turtles in Australia (CoA 2017).	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Leatherback Turtle, Leathery Turtle	*Dermochelys coriacea*	Endangered	Migratory	Listed		Commonwealth Listing Advice on *Dermochelys coriacea* (TSSC 2009). Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle) (DoEWHA 2008). Recovery Plan for Marine Turtles in Australia (CoA 2017).	Species or species habitat likely to occur within area	Foraging, feeding or related behaviour known to occur within area	Breeding likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat known to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat known to occur within area
Loggerhead Turtle	*Caretta caretta*	Endangered	Migratory	Listed		Recovery Plan for Marine Turtles in Australia (CoA 2017).	Species or species habitat likely to occur within area	Foraging, feeding or related behaviour known to occur within area	Breeding likely to occur within area	Species or species habitat likely to occur within area	Breeding likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Breeding likely to occur within area

5. Sharks

Common Name	Scientific Name	Threatened Status	Migratory Status	BIA	Management Plan Conservation Advice Listing Advice	Active Source Area (ASA)	Environment Planning Area (EPA)	Light EMBA	Operational Area (OA)	Underwater Sound EMBA - Birds	Underwater Sound EMBA - Fish	Underwater Sound EMBA - Turtles	Underwater Sound EMBA – LF Cetaceans
Grey Nurse Shark	*Carcharias taurus*	Critically Endangered	Migratory		Commonwealth Listing Advice on Carcharias taurus, Grey Nurse Shark (East Coast population) (TSSC 2001). Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) (DoE 2014).	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species may occur within area	Species or species may occur within area	Species or species may occur within area	Species or species may occur within area	Species or species may occur within area	Species or species may occur within area
Little Gulper Shark	*Centrophorus uyato*	Conservation Dependent			Commonwealth Listing Advice on *Centrophorus zeehaani* (southern dogfish) (TSS 2013).	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Porbeagle, Mackerel Shark	*Lamna nasus*		Migratory			Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark	*Galeorhinus galeus*	Conservation Dependent			Commonwealth Listing Advice on *Galeorhinus galeus* (TSSC 2009).	Species or species habitat may occur within area	Species or species habitat likely to occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Shortfin Mako, Mako Shark	*Isurus oxyrinchus*		Migratory		Listing Advice *Isurus oxyrinchus* shortfin mako shark (TSSC 2014).	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
White Shark, Great White Shark	*Carcharodon carcharias*	Vulnerable	Migratory	Foraging (ASA, Light EMBA, OA, EPA, Sound EMBA for Birds, Fish, LF cetaceans, and Turtles)	Recovery Plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013).	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area

REGIA
Marine Seismic Survey

February 2025 PMST Search



Klarite

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 27-Feb-2025

[Summary](#)

[Details](#)

- [Matters of NES](#)
- [Other Matters Protected by the EPBC Act](#)
- [Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

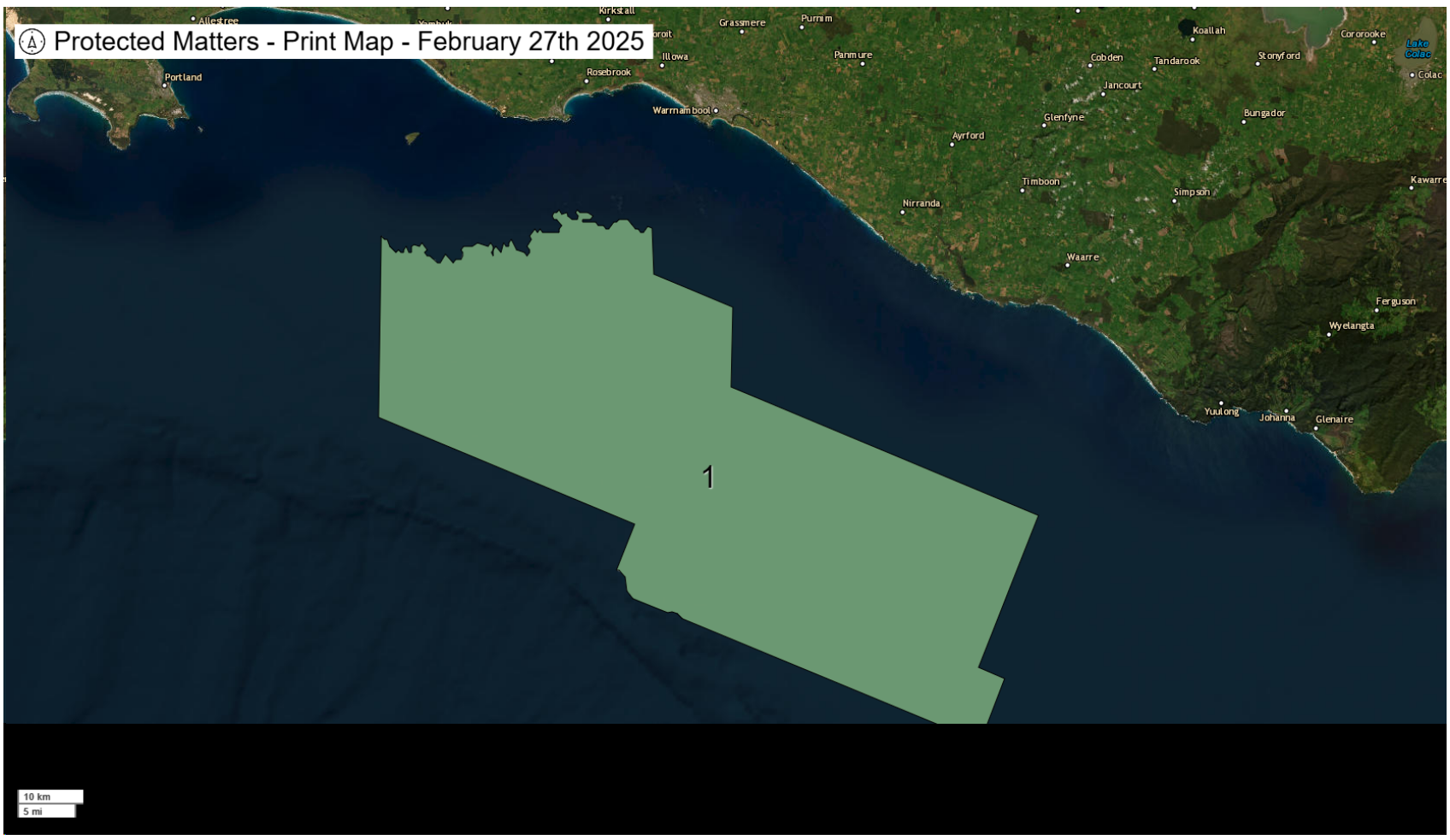


Figure 1: PMST Search Area - Active Source Area

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	40
Listed Migratory Species:	41

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	62
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	34
Key Ecological Features (Marine):	2
Biologically Important Areas:	14
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
FISH		
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
MAMMAL		
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Breeding known to occur within area
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
REPTILE		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
SHARK		
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caperea marginata		
Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Physeter macrocephalus		
Sperm Whale [59]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus		
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri platei as Thalassarche sp. nov.		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Fish		
Heraldia nocturna		
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis		
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Berardius arnuxii](#) Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
[Delphinus delphis](#) Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area
[Globicephala macrorhynchus](#) Short-finned Pilot Whale [62]		Species or species habitat may occur within area
[Globicephala melas](#) Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
[Grampus griseus](#) Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
[Kogia breviceps](#) Pygmy Sperm Whale [57]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Geographe-A gas exploration well	2000/82		Completed
Hydrocarbon exploration wells	2003/1062		Completed
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795		Completed
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Spinifex Offshore Surveys	2022/09359		Completed
Spinifex Offshore Wind Farm - Offshore Investigations	2024/09918		Referral Decision
Strike Oil NL Seismic Surveys	2000/107		Completed
Thylacine-A Exploration Well	2000/81		Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Vic-P51 and Vic-P52 3D seismic survey	2002/799		Completed
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Not controlled action			
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Not controlled action (particular manner)			
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Bonney Coast Upwelling	South-east
West Tasmania Canyons	South-east

Biologically Important Areas		[Resource Information]
Scientific Name	Behaviour	Presence
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 27-Feb-2025

[Summary](#)

[Details](#)

- [Matters of NES](#)
- [Other Matters Protected by the EPBC Act](#)
- [Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

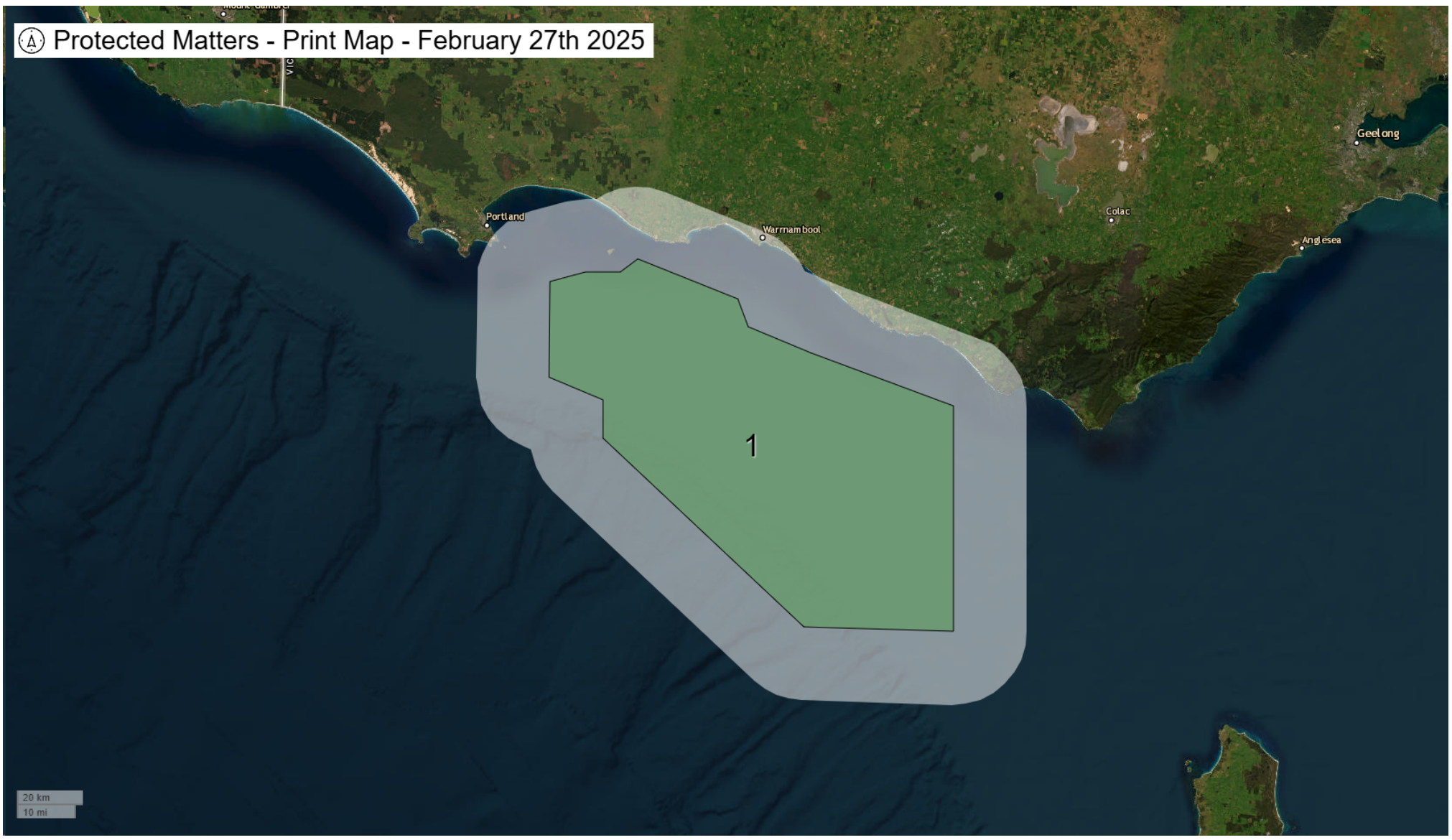

Figure 1: PMST Search Area - Light EMBA (Operational Area + 20km Buffer)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	98
Listed Migratory Species:	64

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	108
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	19
Regional Forest Agreements:	1
Nationally Important Wetlands:	4
EPBC Act Referrals:	81
Key Ecological Features (Marine):	2
Biologically Important Areas:	17
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Great Ocean Road and Scenic Environs	VIC	Listed place	In buffer area only

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area	In buffer area only
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In feature area
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community may occur within area	In buffer area only
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In buffer area only
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
CRUSTACEAN			
Euastacus bispinosus			
Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat likely to occur within area	In buffer area only
FISH			
Hoplostethus atlanticus			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Nannoperca obscura			
Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
FROG			
Litoria raniformis			
Southern Bell Frog, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
INSECT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Synemon plana](#) Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area	In buffer area only
MAMMAL			
[Antechinus minimus maritimus](#) Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Dasyurus maculatus maculatus (SE mainland population)](#) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
[Isoodon obesulus obesulus](#) Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Mastacomys fuscus mordicus](#) Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Miniopterus orianae bassanii](#) Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area	In buffer area only
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Potorous tridactylus trisulcatus Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area	In buffer area only
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pseudomys shortridgei Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area	In buffer area only
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In buffer area only
PLANT			
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia concolor Crimson Spider-orchid, Maroon Spider-orchid [5505]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia hastata Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Prasophyllum suaveolens Fragrant Leek-orchid [64956]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area	In buffer area only
Thelymitra matthewsii Spiral Sun-orchid [4168]	Endangered	Species or species habitat may occur within area	In buffer area only
Thelymitra orientalis Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Lissolepis coventryi Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area	In buffer area only
SHARK			
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Centrophorus uyato			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna tenuirostris			
Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi			
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus			
Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus			
Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus			
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae			
Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Orcinus orca			
Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus			
Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only
Migratory Wetlands Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata			
Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In buffer area only
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea as Puffinus griseus			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna tenuirostris as Puffinus tenuirostris			
Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Arenaria interpres			
Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chroicocephalus novaehollandiae as Larus novaehollandiae			
Silver Gull [82326]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi			
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eudyptula minor			
Little Penguin [1085]		Breeding known to occur within area	In buffer area only
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Gallinago megala			
Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura			
Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster			
White-bellied Sea-Eagle [943]		Breeding known to occur within area	In buffer area only
Halobaena caerulea			
Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In buffer area only
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Morus capensis Cape Gannet [59569]		Breeding known to occur within area	In buffer area only
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area	In buffer area only
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri platei as Thalassarche sp. nov.			
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma			
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thalasseus bergii as Sterna bergii			
Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis			
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Tringa brevipes as Heteroscelus brevipes			
Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola			
Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Tringa stagnatilis			
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
Fish			
Heraldia nocturna			
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis			
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps			
Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Histiogamphelus briggsii			
Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus			
Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus			
Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Bay of Islands Coastal Park	Conservation Park	VIC	In buffer area only
Curdie Vale N.C.R.	Natural Features Reserve	VIC	In buffer area only
Deen Maar	Indigenous Protected Area	VIC	In buffer area only
Goose Lagoon W.R	Natural Features Reserve	VIC	In buffer area only
Great Otway	National Park	VIC	In buffer area only
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC	In buffer area only
Lake Aringa W.R	Nature Conservation Reserve	VIC	In buffer area only
Latrobe B.R.	Natural Features Reserve	VIC	In buffer area only
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC	In buffer area only
Merri	Marine Sanctuary	VIC	In buffer area only
Port Campbell	National Park	VIC	In buffer area only
Pretty Hill F.R	Nature Conservation Reserve	VIC	In buffer area only
Princetown W.R	Natural Features Reserve	VIC	In buffer area only
St Helens F.R	Nature Conservation Reserve	VIC	In buffer area only
The Arches	Marine Sanctuary	VIC	In buffer area only
Tower Hill W.R	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Twelve Apostles	Marine National Park	VIC	In buffer area only
Yambuk F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Lower Merri River Wetlands	VIC	In buffer area only
Princetown Wetlands	VIC	In buffer area only
Tower Hill	VIC	In buffer area only
Yambuk Wetlands	VIC	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Completed	In buffer area only
Decommissioning of the Minerva Pipeline in Victorian state waters	2024/09879		Completed	In buffer area only
Geographe-A gas exploration well	2000/82		Completed	In feature area
Hydrocarbon exploration wells	2003/1062		Completed	In feature area
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795		Completed	In feature area
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
SEA Gas Project transmission pipeline	2001/513		Completed	In buffer area only
SMAP telecommunications submarine cable installation	2024/09989		Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Southern Winds Offshore Wind Project	2022/09435		Completed	In buffer area only
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed	In buffer area only
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Spinifex Offshore Wind Farm - Offshore Investigations	2024/09918		Referral Decision	In feature area
Strike Oil NL Seismic Surveys	2000/107		Completed	In feature area
Thylacine-A Exploration Well	2000/81		Completed	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799		Completed	In feature area
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval	In buffer area only
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In feature area
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In feature area
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval	In buffer area only
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed	In buffer area only
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed	In buffer area only
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Gas Fields Development	2011/5879	Not Controlled Action	Completed	In buffer area only
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed	In buffer area only
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed	In buffer area only
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In buffer area only
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed	In buffer area only
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed	In buffer area only
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed	In buffer area only
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed	In buffer area only
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed	In feature area
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed	In buffer area only
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2006/2937	Not Controlled Action	Completed	In buffer area only
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In feature area
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In buffer area only
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
Portland Wave Energy Project	2008/3946	Referral Decision	Completed	In buffer area only
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [84292]	Breeding	Known to occur	In buffer area only
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur	In buffer area only
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur	In buffer area only
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 27-Feb-2025

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

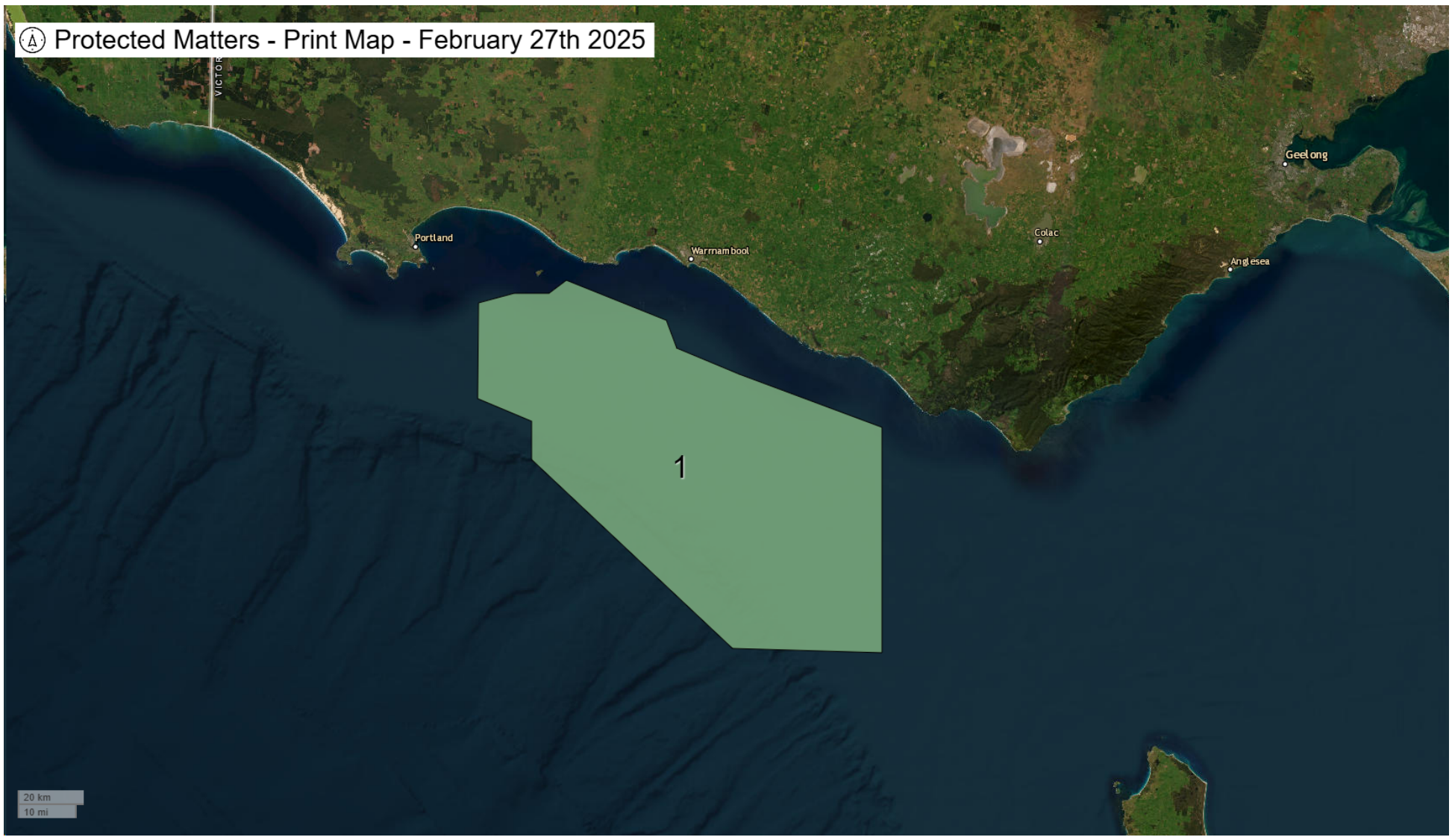

Figure 1: PMST Search Area - Operational Area

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	41
Listed Migratory Species:	41

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	63
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	42
Key Ecological Features (Marine):	2
Biologically Important Areas:	14
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Ardenna grisea		
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus		
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
FISH		
[Hoplostethus atlanticus](#) Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
[Seriolella brama](#) Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
MAMMAL		
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
REPTILE		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus		
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea		
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Migratory Wetlands Species		
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		

Current Scientific Name	Status	Type of Presence
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Geographe-A gas exploration well	2000/82		Completed
Hydrocarbon exploration wells	2003/1062		Completed
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795		Completed
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Spinifex Offshore Surveys	2022/09359		Completed
Spinifex Offshore Wind Farm - Offshore Investigations	2024/09918		Referral Decision
Strike Oil NL Seismic Surveys	2000/107		Completed
Thylacine-A Exploration Well	2000/81		Completed
Vic-P51 and Vic-P52 3D seismic survey	2002/799		Completed
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Not controlled action			
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Bonney Coast Upwelling	South-east
West Tasmania Canyons	South-east

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 27-Feb-2025

[Summary](#)

[Details](#)

- [Matters of NES](#)
- [Other Matters Protected by the EPBC Act](#)
- [Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

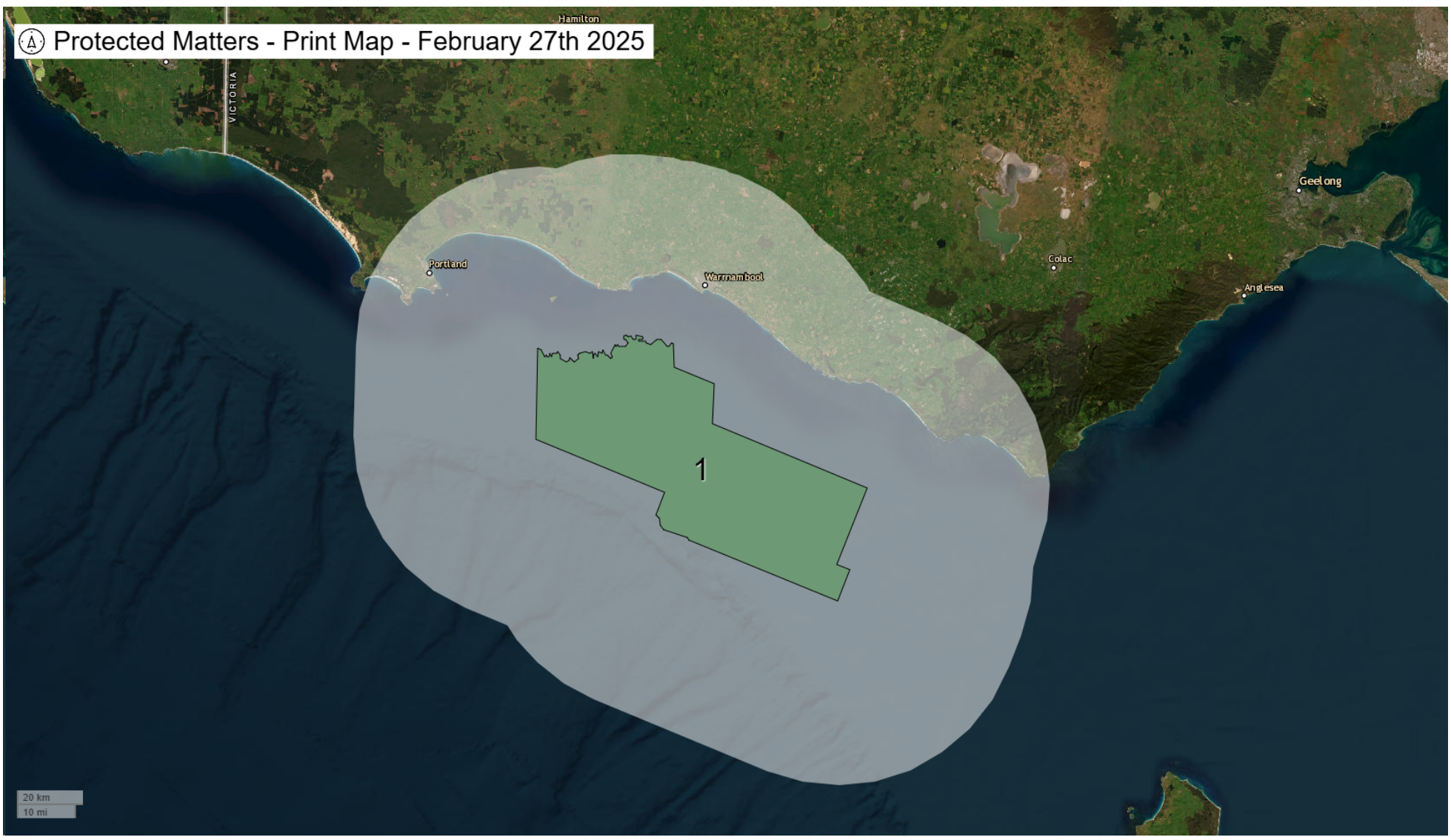

Figure 1: PMST Search Area - Underwater Sound EMBA for Birds (Active Source Area + 50km Buffer)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	3
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	9
Listed Threatened Species:	114
Listed Migratory Species:	64

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	20
Commonwealth Heritage Places:	None
Listed Marine Species:	110
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	1
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	67
Regional Forest Agreements:	1
Nationally Important Wetlands:	8
EPBC Act Referrals:	105
Key Ecological Features (Marine):	2
Biologically Important Areas:	17
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status	Buffer Status
Budj Bim Cultural Landscape	VIC	Declared property	In buffer area only

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Great Ocean Road and Scenic Environs	VIC	Listed place	In buffer area only
Indigenous			
Budj Bim National Heritage Landscape - Mt Eccles Lake Condah Area	VIC	Listed place	In buffer area only
Budj Bim National Heritage Landscape - Tyrendarra Area	VIC	Listed place	In buffer area only

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Glenelg estuary and discovery bay wetlands	Within 10km of Ramsar site	In buffer area only
Western district lakes	10 - 20km upstream from Ramsar site	In buffer area only

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area	In buffer area only

Community Name	Threatened Category	Presence Text	Buffer Status
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In buffer area only
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In buffer area only
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	Endangered	Community may occur within area	In buffer area only
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calyptorhynchus banksii graptogyne South-eastern Red-tailed Black-Cockatoo [25982]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Falco hypoleucos](#) Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Grantiella picta](#) Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Halobaena caerulea](#) Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
[Limosa lapponica baueri](#) Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Melanodryas cucullata cucullata](#) South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In buffer area only
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
CRUSTACEAN			
[Euastacus bispinosus](#) Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat known to occur within area	In buffer area only
FISH			
[Hoplostethus atlanticus](#) Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
[Nannoperca obscura](#) Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Seriolella brama](#) Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
FROG			
[Litoria raniformis](#) Southern Bell Frog, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
INSECT			
[Synemon plana](#) Golden Sun Moth [25234]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
MAMMAL			
[Antechinus minimus maritimus](#) Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isoodon obesulus obesulus			
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In buffer area only
Mastacomys fuscus mordicus			
Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area	In buffer area only
Miniopterus orianae bassanii			
Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area	In buffer area only
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area	In buffer area only
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Potorous tridactylus trisulcatus			
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area	In buffer area only
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pseudomys shortridgei Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area	In buffer area only
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In buffer area only
PLANT			
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Astelia australiana Tall Astelia [10851]	Vulnerable	Translocated population known to occur within area	In buffer area only
Caladenia calcicola Limestone Spider-orchid [10065]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Caladenia concolor Crimson Spider-orchid, Maroon Spider-orchid [5505]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia hastata Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caladenia ornata Ornate Pink Fingers [76213]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Cassinia rugata Wrinkled Cassinia, Wrinkled Dollybush [21885]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area	In buffer area only
Dipodium campanulatum Bell Flower Hyacinth Orchid [55051]	Endangered	Species or species habitat may occur within area	In buffer area only
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area	In buffer area only
Pimelea spinescens subsp. spinescens Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Poa sallacustris Salt-lake Tussock-grass [24424]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Prasophyllum suaveolens Fragrant Leek-orchid [64956]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thelymitra epipactoides](#) Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Thelymitra matthewsii](#) Spiral Sun-orchid [4168]	Endangered	Species or species habitat may occur within area	In buffer area only
[Thelymitra orientalis](#) Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
[Xerochrysum palustre](#) Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Delma impar](#) Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
[Lissolepis coventryi](#) Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area	In buffer area only
SHARK			
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Centrophorus uyato](#) Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Galeorhinus galeus](#) School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species

[Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
[Ardenna carneipes](#) Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
[Ardenna grisea](#) Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
[Ardenna tenuirostris](#) Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis			
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caperea marginata			
Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharias taurus			
Grey Nurse Shark [64469]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus			
Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus			
Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus			
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae			
Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Orcinus orca			
Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus			
Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - Training Depot, Darts RD 3305 Portland [21019]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21023]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21018]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21010]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21022]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21012]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21013]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21007]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21011]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21016]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21017]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21015]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21014]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21024]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21008]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21009]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21020]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21021]	VIC	In buffer area only
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC	In buffer area only
Unknown		
Commonwealth Land - [21583]	VIC	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Breeding likely to occur within area overfly marine area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
[Chalcites osculans as Chrysococcyx osculans](#) Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In buffer area only
[Charadrius bicinctus](#) Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
[Charadrius ruficapillus](#) Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
[Chroicocephalus novaehollandiae as Larus novaehollandiae](#) Silver Gull [82326]		Breeding known to occur within area	In buffer area only
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In buffer area only
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Morus capensis Cape Gannet [59569]		Breeding known to occur within area	In buffer area only
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area	In buffer area only
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
Fish			
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area	In buffer area only
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In buffer area only
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories	Buffer Status
Apollo	Multiple Use Zone (IUCN VI)	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Aire River	Heritage River	VIC	In buffer area only
Aire River W.R.	Natural Features Reserve	VIC	In buffer area only
Bats Ridge W.R	Nature Conservation Reserve	VIC	In buffer area only
Bay of Islands Coastal Park	Conservation Park	VIC	In buffer area only
Bolwarra H43 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H44 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H45 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I90 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I91 B.R.	Natural Features Reserve	VIC	In buffer area only
Brucknell Creek F.F.R	Nature Conservation Reserve	VIC	In buffer area only
Budj Bim	National Park	VIC	In buffer area only
Cape Nelson	State Park	VIC	In buffer area only
Carpendeit	Reference Area	VIC	In buffer area only
Cooriemungle	Reference Area	VIC	In buffer area only
Cooriemungle Creek F.R	Nature Conservation Reserve	VIC	In buffer area only
Coradjil B.R.	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Coradjil N.C.R.	Natural Features Reserve	VIC	In buffer area only
Crinoline Creek	Reference Area	VIC	In buffer area only
Curdie Vale N.C.R.	Natural Features Reserve	VIC	In buffer area only
Deen Maar	Indigenous Protected Area	VIC	In buffer area only
Discovery Bay Coastal Park	Conservation Park	VIC	In buffer area only
Dunmore B.R.	Natural Features Reserve	VIC	In buffer area only
Ecklin South Swamp N.C.R.	Natural Features Reserve	VIC	In buffer area only
Fitzroy River SS.R.	Natural Features Reserve	VIC	In buffer area only
Framlingham Forest	Indigenous Protected Area	VIC	In buffer area only
Goose Lagoon W.R	Natural Features Reserve	VIC	In buffer area only
Gorae B.R.	Natural Features Reserve	VIC	In buffer area only
Great Otway	National Park	VIC	In buffer area only
Heywood B.R.	Natural Features Reserve	VIC	In buffer area only
Hopkins Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Hopkins River, Framlingham SS.R.	Natural Features Reserve	VIC	In buffer area only
Jancourt N.C.R.	Natural Features Reserve	VIC	In buffer area only
Johanna Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Kurtonitj	Indigenous Protected Area	VIC	In buffer area only
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC	In buffer area only
Lake Aringa W.R	Nature Conservation Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Lake Condah	Indigenous Protected Area	VIC	In buffer area only
Lake Gillear W.R	Natural Features Reserve	VIC	In buffer area only
Latrobe B.R.	Natural Features Reserve	VIC	In buffer area only
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC	In buffer area only
Merri	Marine Sanctuary	VIC	In buffer area only
Myamyn B.R.	Natural Features Reserve	VIC	In buffer area only
Narrawong F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nine Mile F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nullawarre F.R.	Nature Conservation Reserve	VIC	In buffer area only
Port Campbell	National Park	VIC	In buffer area only
Portland H46 B.R.	Natural Features Reserve	VIC	In buffer area only
Portland H47 B.R.	Natural Features Reserve	VIC	In buffer area only
Pretty Hill F.R	Nature Conservation Reserve	VIC	In buffer area only
Princetown W.R	Natural Features Reserve	VIC	In buffer area only
St Helens F.R	Nature Conservation Reserve	VIC	In buffer area only
The Arches	Marine Sanctuary	VIC	In buffer area only
The Stones	Reference Area	VIC	In buffer area only
The Stones W.R.	Nature Conservation Reserve	VIC	In buffer area only
Timboon I1 B.R	Natural Features Reserve	VIC	In buffer area only
Tomahawk Creek	Reference Area	VIC	In buffer area only
Tower Hill W.R	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Trewalla H48 B.R.	Natural Features Reserve	VIC	In buffer area only
Trewalla H49 B.R.	Natural Features Reserve	VIC	In buffer area only
Twelve Apostles	Marine National Park	VIC	In buffer area only
Tyrendarra	Indigenous Protected Area	VIC	In buffer area only
Tyrendarra F.R	Nature Conservation Reserve	VIC	In buffer area only
Unnamed P0059	Private Nature Reserve	VIC	In buffer area only
Unnamed P0126	Private Nature Reserve	VIC	In buffer area only
Woolsthorpe N.C.R.	Natural Features Reserve	VIC	In buffer area only
Yambuk F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Aire River	VIC	In buffer area only
Cobden-Terang Volcanic Craters	VIC	In buffer area only
Lake Condah	VIC	In buffer area only
Lower Aire River Wetlands	VIC	In buffer area only
Lower Merri River Wetlands	VIC	In buffer area only
Princetown Wetlands	VIC	In buffer area only
Tower Hill	VIC	In buffer area only
Yambuk Wetlands	VIC	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Completed	In buffer area only
Decommissioning of the Minerva Pipeline in Victorian state waters	2024/09879		Completed	In buffer area only
Geographe-A gas exploration well	2000/82		Completed	In feature area
Hexham Wind Farm	2022/09287		Assessment	In buffer area only
Hydrocarbon exploration wells	2003/1062		Completed	In feature area
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795		Completed	In feature area
Mumblin Wind Farm	2024/10068		Assessment	In buffer area only
Normanville Energy Park	2024/10070		Referral Decision	In buffer area only
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Portland Energy Park	2024/09947		Assessment	In buffer area only
SEA Gas Project transmission pipeline	2001/513		Completed	In buffer area only
SMAP telecommunications submarine cable installation	2024/09989		Completed	In buffer area only
Southern Winds Offshore Wind Project	2022/09435		Completed	In buffer area only
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed	In buffer area only
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Spinifex Offshore Wind Farm - Offshore Investigations	2024/09918		Referral Decision	In feature area
Strike Oil NL Seismic Surveys	2000/107		Completed	In feature area
Swansons Lane Wind Farm	2024/09949		Assessment	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Thylacine-A Exploration Well	2000/81		Completed	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799		Completed	In feature area
Willatook Wind Farm, Vic	2019/8439		Assessment	In buffer area only
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Kentbruck Green Power Hub, Vic	2019/8510	Controlled Action	Assessment Approach	In buffer area only
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval	In buffer area only
Penshurst Wind Energy Facility	2011/5991	Controlled Action	Completed	In buffer area only
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In buffer area only
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval	In buffer area only
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed	In buffer area only
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Development of wind energy facility	2005/2224	Not Controlled Action	Completed	In buffer area only
Drilling of Callister-1 exploration well in VIC/P51	2004/1633	Not Controlled Action	Completed	In buffer area only
Ellerslie Timber Bridge Partial Restoration	2009/4734	Not Controlled Action	Completed	In buffer area only
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed	In buffer area only
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Gas Fields Development	2011/5879	Not Controlled Action	Completed	In buffer area only
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed	In buffer area only
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed	In buffer area only
Hawkesdale Wind Farm	2005/2140	Not Controlled Action	Completed	In buffer area only
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In buffer area only
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed	In buffer area only
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed	In buffer area only
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed	In buffer area only
Newfield wind farm	2007/3226	Not Controlled Action	Completed	In buffer area only
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed	In buffer area only
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed	In buffer area only
Portland Landfill Borehole Installation, Vic	2017/7886	Not Controlled Action	Completed	In buffer area only
Pulp mill and associated infrastructure 3km north of Heywood	2005/2125	Not Controlled Action	Completed	In buffer area only
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed	In buffer area only
Redevelopment Project to Upgrade and Extend the Portland Trawler Wharf	2008/4317	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2006/2937	Not Controlled Action	Completed	In buffer area only
Shaw River Power Station Project	2009/5088	Not Controlled Action	Completed	In buffer area only
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
Tarrone Power Station Project	2010/5299	Not Controlled Action	Completed	In buffer area only
The Sisters Wind Farm	2008/4268	Not Controlled Action	Completed	In buffer area only
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In buffer area only
Water pipelines, Mortlake Power Station	2006/2881	Not Controlled Action	Completed	In buffer area only
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed	In buffer area only
Wind farm development	2005/1960	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Wind Farm Development	2004/1929	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Gas Pipeline Crossing at Mount Emu Creek	2009/4913	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
8 Lot Industrial Subdivision	2008/4527	Referral Decision	Completed	In buffer area only
Portland Wave Energy Project	2008/3946	Referral Decision	Completed	In buffer area only
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			

Scientific Name	Behaviour	Presence	Buffer Status
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [84292]	Breeding	Known to occur	In buffer area only
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur	In buffer area only
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur	In buffer area only
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			

Scientific Name	Behaviour	Presence	Buffer Status
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 27-Feb-2025

[Summary](#)

[Details](#)

- [Matters of NES](#)
- [Other Matters Protected by the EPBC Act](#)
- [Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

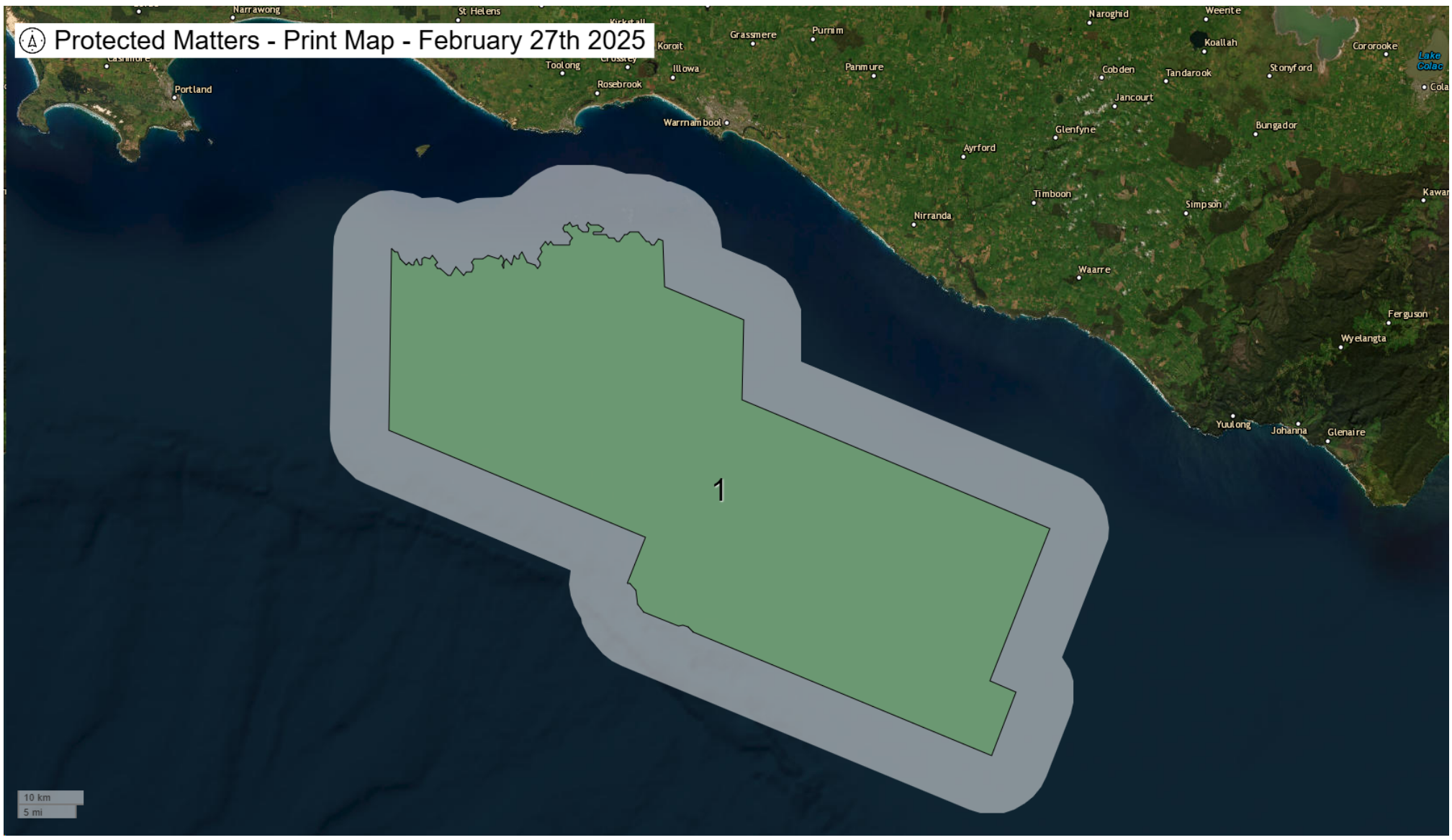

Figure 1: PMST Search Area - Underwater Sound EMBA for Fish (Active Source Area + 8km Buffer)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	43
Listed Migratory Species:	44

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	68
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	39
Key Ecological Features (Marine):	2
Biologically Important Areas:	14
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche impavida](#)			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche melanophris](#)			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche salvini](#)			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#)			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Thinornis cucullatus cucullatus](#)			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
FISH			
[Hoplostethus atlanticus](#)			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
[Prototroctes maraena](#)			
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Seriolella brama](#)			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
MAMMAL			
[Balaenoptera borealis](#)			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera musculus](#)			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
[Physeter macrocephalus](#) Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus			
Osprey [952]		Species or species habitat known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat likely to occur within area overfly marine area	In buffer area only
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In buffer area only
Fish			
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Vanacampus phillipi](#) Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
[Vanacampus poecilolaemus](#) Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
[Balaenoptera acutorostrata](#) Minke Whale [33]		Species or species habitat may occur within area	In feature area
[Balaenoptera bonaerensis](#) Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Geographe-A gas exploration well	2000/82		Completed	In feature area
Hydrocarbon exploration wells	2003/1062		Completed	In feature area
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795		Completed	In feature area
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Spinifex Offshore Wind Farm - Offshore Investigations	2024/09918		Referral Decision	In feature area
Strike Oil NL Seismic Surveys	2000/107		Completed	In feature area
Thylacine-A Exploration Well	2000/81		Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Vic-P51 and Vic-P52 3D seismic survey	2002/799		Completed	In feature area
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 27-Feb-2025

[Summary](#)

[Details](#)

- [Matters of NES](#)
- [Other Matters Protected by the EPBC Act](#)
- [Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

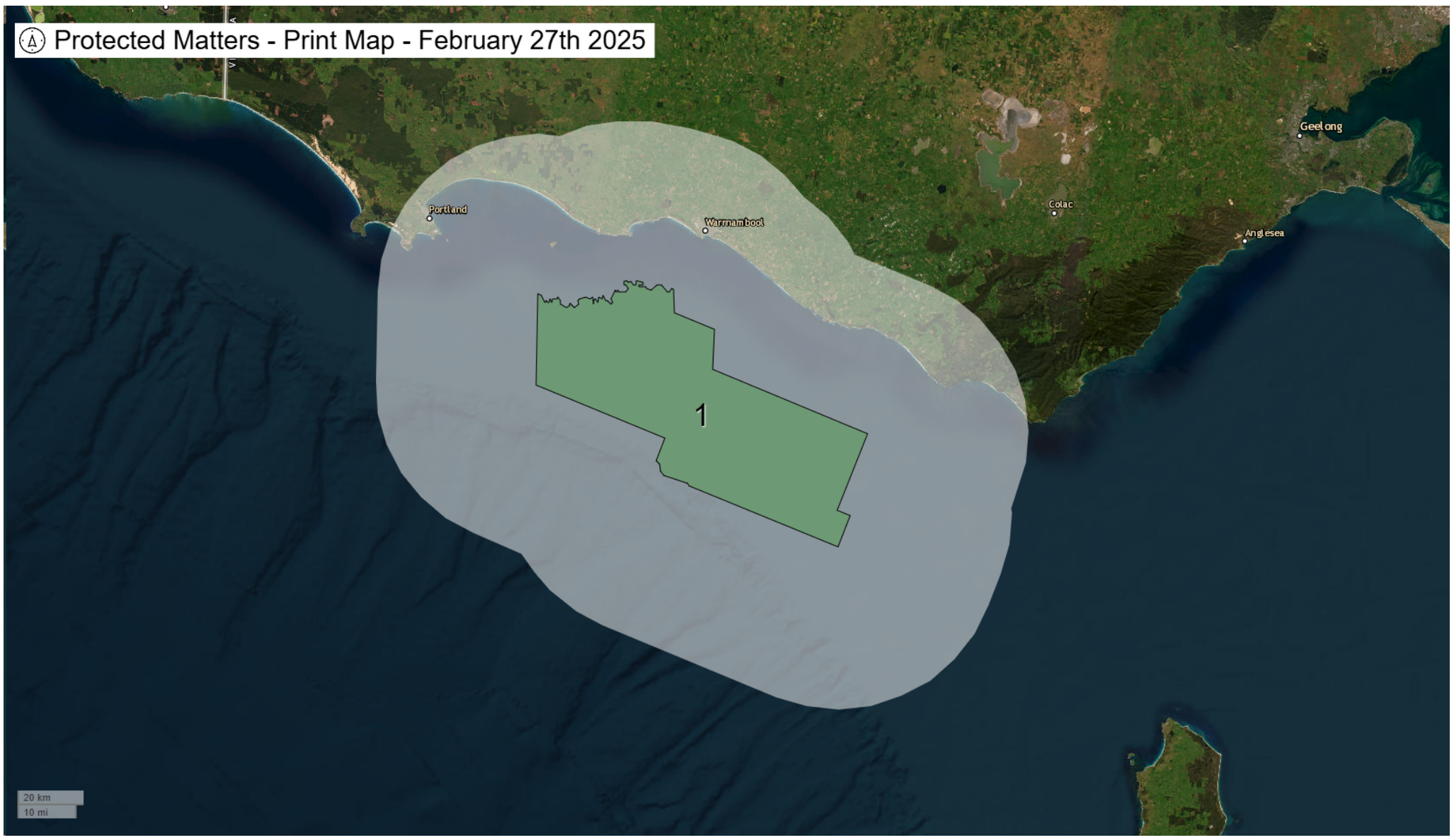

Figure 1: PMST Search Area - Underwater Sound EMBA for LF Cetaceans (Active Source Area + 44km Buffer)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	3
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	9
Listed Threatened Species:	108
Listed Migratory Species:	64

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	19
Commonwealth Heritage Places:	None
Listed Marine Species:	110
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	1
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	58
Regional Forest Agreements:	1
Nationally Important Wetlands:	5
EPBC Act Referrals:	99
Key Ecological Features (Marine):	2
Biologically Important Areas:	17
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status	Buffer Status
Budj Bim Cultural Landscape	VIC	Declared property	In buffer area only

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Great Ocean Road and Scenic Environs	VIC	Listed place	In buffer area only
Indigenous			
Budj Bim National Heritage Landscape - Mt Eccles Lake Condah Area	VIC	Listed place	In buffer area only
Budj Bim National Heritage Landscape - Tyrendarra Area	VIC	Listed place	In buffer area only

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area	In buffer area only
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In buffer area only
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In buffer area only
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain	Endangered	Community may occur within area	In buffer area only

Community Name	Threatened Category	Presence Text	Buffer Status
Bioregion			
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Aphelocephala leucopsis			
Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Arenaria interpres			
Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Botaurus poiciloptilus			
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calyptorhynchus banksii graptogyne South-eastern Red-tailed Black-Cockatoo [25982]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Neophema chrysostoma](#) Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Pachyptila turtur subantarctica](#) Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Pedionomus torquatus](#) Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Pterodroma leucoptera leucoptera](#) Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
[Pterodroma mollis](#) Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Stagonopleura guttata](#) Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Sternula nereis nereis](#) Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
CRUSTACEAN			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Euastacus bispinosus			
Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat known to occur within area	In buffer area only
FISH			
Hoplostethus atlanticus			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Nannoperca obscura			
Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
FROG			
Litoria raniformis			
Southern Bell Frog, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
INSECT			
Synemon plana			
Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Antechinus minimus maritimus			
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isoodon obesulus obesulus			
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In buffer area only
Mastacomys fuscus mordicus			
Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area	In buffer area only
Miniopterus orianae bassanii			
Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area	In buffer area only
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area	In buffer area only
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Potorous tridactylus trisulcatus			
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pseudomys fumeus			
Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pseudomys shortridgei Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area	In buffer area only
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In buffer area only
PLANT			
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia concolor Crimson Spider-orchid, Maroon Spider-orchid [5505]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia hastata Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caladenia ornata Ornate Pink Fingers [76213]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area	In buffer area only
Dipodium campanulatum Bell Flower Hyacinth Orchid [55051]	Endangered	Species or species habitat may occur within area	In buffer area only
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Prasophyllum suaveolens Fragrant Leek-orchid [64956]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pterostylis tenuissima](#) Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Rutidosis leptorhynchoides](#) Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Senecio macrocarpus](#) Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Senecio psilocarpus](#) Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Thelymitra epipactoides](#) Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Thelymitra matthewsii](#) Spiral Sun-orchid [4168]	Endangered	Species or species habitat may occur within area	In buffer area only
[Thelymitra orientalis](#) Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
[Xerochrysum palustre](#) Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Delma impar](#) Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Lissolepis coventryi			
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area	In buffer area only
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna tenuirostris			
Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
[Physeter macrocephalus](#) Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
[Calidris alba](#) Sanderling [875]		Roosting known to occur within area	In buffer area only
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - Training Depot, Darts RD 3305 Portland [21019]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21010]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21022]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21009]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21018]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21007]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21012]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21013]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21011]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21016]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21017]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21014]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21015]	VIC	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - Training Depot, Darts RD 3305 Portland [21024]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21023]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21008]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21021]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21020]	VIC	In buffer area only
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC	In buffer area only

Listed Marine Species

[Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Breeding likely to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chroicocephalus novaehollandiae as Larus novaehollandiae			
Silver Gull [82326]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi			
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eudyptula minor			
Little Penguin [1085]		Breeding known to occur within area	In buffer area only
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Gallinago megala			
Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura			
Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster			
White-bellied Sea-Eagle [943]		Breeding known to occur within area	In buffer area only
Halobaena caerulea			
Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In buffer area only
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Morus capensis Cape Gannet [59569]		Breeding known to occur within area	In buffer area only
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area	In buffer area only
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tringa brevipes as Heteroscelus brevipes](#) Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
[Tringa glareola](#) Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
Fish			
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
[Hippocampus minotaur](#) Bullneck Seahorse [66705]		Species or species habitat may occur within area	In buffer area only
[Histiogamphelus briggsii](#) Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
[Hypselognathus rostratus](#) Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In buffer area only
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Arctocephalus pusillus			
Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area	In feature area
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata			
Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera bonaerensis			
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Australian Marine Parks		[Resource Information]
Park Name	Zone & IUCN Categories	Buffer Status
Apollo	Multiple Use Zone (IUCN VI)	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Aire River W.R.	Natural Features Reserve	VIC	In buffer area only
Bay of Islands Coastal Park	Conservation Park	VIC	In buffer area only
Bolwarra H43 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H44 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H45 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I90 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I91 B.R.	Natural Features Reserve	VIC	In buffer area only
Brucknell Creek F.F.R	Nature Conservation Reserve	VIC	In buffer area only
Budj Bim	National Park	VIC	In buffer area only
Cape Nelson	State Park	VIC	In buffer area only
Cooriemungle	Reference Area	VIC	In buffer area only
Cooriemungle Creek F.R	Nature Conservation Reserve	VIC	In buffer area only
Coradjil B.R.	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Coradjil N.C.R.	Natural Features Reserve	VIC	In buffer area only
Crinoline Creek	Reference Area	VIC	In buffer area only
Curdie Vale N.C.R.	Natural Features Reserve	VIC	In buffer area only
Deen Maar	Indigenous Protected Area	VIC	In buffer area only
Discovery Bay Coastal Park	Conservation Park	VIC	In buffer area only
Ecklin South Swamp N.C.R.	Natural Features Reserve	VIC	In buffer area only
Fitzroy River SS.R.	Natural Features Reserve	VIC	In buffer area only
Framlingham Forest	Indigenous Protected Area	VIC	In buffer area only
Goose Lagoon W.R	Natural Features Reserve	VIC	In buffer area only
Gorae B.R.	Natural Features Reserve	VIC	In buffer area only
Great Otway	National Park	VIC	In buffer area only
Hopkins Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Hopkins River, Framlingham SS.R.	Natural Features Reserve	VIC	In buffer area only
Johanna Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Kurtonitj	Indigenous Protected Area	VIC	In buffer area only
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC	In buffer area only
Lake Aringa W.R	Nature Conservation Reserve	VIC	In buffer area only
Lake Gillear W.R	Natural Features Reserve	VIC	In buffer area only
Latrobe B.R.	Natural Features Reserve	VIC	In buffer area only
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Merri	Marine Sanctuary	VIC	In buffer area only
Narrawong F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nine Mile F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nullawarre F.R.	Nature Conservation Reserve	VIC	In buffer area only
Port Campbell	National Park	VIC	In buffer area only
Portland H46 B.R.	Natural Features Reserve	VIC	In buffer area only
Portland H47 B.R.	Natural Features Reserve	VIC	In buffer area only
Pretty Hill F.R	Nature Conservation Reserve	VIC	In buffer area only
Princetown W.R	Natural Features Reserve	VIC	In buffer area only
St Helens F.R	Nature Conservation Reserve	VIC	In buffer area only
The Arches	Marine Sanctuary	VIC	In buffer area only
The Stones	Reference Area	VIC	In buffer area only
The Stones W.R.	Nature Conservation Reserve	VIC	In buffer area only
Timboon I1 B.R	Natural Features Reserve	VIC	In buffer area only
Tomahawk Creek	Reference Area	VIC	In buffer area only
Tower Hill W.R	Natural Features Reserve	VIC	In buffer area only
Trewalla H48 B.R.	Natural Features Reserve	VIC	In buffer area only
Twelve Apostles	Marine National Park	VIC	In buffer area only
Tyrendarra	Indigenous Protected Area	VIC	In buffer area only
Tyrendarra F.R	Nature Conservation Reserve	VIC	In buffer area only
Unnamed P0059	Private Nature Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Unnamed P0126	Private Nature Reserve	VIC	In buffer area only
Woolsthorpe N.C.R.	Natural Features Reserve	VIC	In buffer area only
Yambuk F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Cobden-Terang Volcanic Craters	VIC	In buffer area only
Lower Merri River Wetlands	VIC	In buffer area only
Princetown Wetlands	VIC	In buffer area only
Tower Hill	VIC	In buffer area only
Yambuk Wetlands	VIC	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629	Completed		In buffer area only
Decommissioning of the Minerva Pipeline in Victorian state waters	2024/09879	Completed		In buffer area only
Geographe-A gas exploration well	2000/82	Completed		In feature area
Hexham Wind Farm	2022/09287	Assessment		In buffer area only
Hydrocarbon exploration wells	2003/1062	Completed		In feature area
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795	Completed		In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Normanville Energy Park	2024/10070		Referral Decision	In buffer area only
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Portland Energy Park	2024/09947		Assessment	In buffer area only
SEA Gas Project transmission pipeline	2001/513		Completed	In buffer area only
SMAP telecommunications submarine cable installation	2024/09989		Completed	In buffer area only
Southern Winds Offshore Wind Project	2022/09435		Completed	In buffer area only
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed	In buffer area only
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Spinifex Offshore Wind Farm - Offshore Investigations	2024/09918		Referral Decision	In feature area
Strike Oil NL Seismic Surveys	2000/107		Completed	In feature area
Swansons Lane Wind Farm	2024/09949		Assessment	In buffer area only
Thylacine-A Exploration Well	2000/81		Completed	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799		Completed	In feature area
Willatook Wind Farm, Vic	2019/8439		Assessment	In buffer area only
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval	In buffer area only
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In buffer area only
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval	In buffer area only
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed	In buffer area only
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed	In buffer area only
Development of wind energy facility	2005/2224	Not Controlled Action	Completed	In buffer area only
Drilling of Callister-1 exploration well in VIC/P51	2004/1633	Not Controlled Action	Completed	In buffer area only
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed	In buffer area only
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Gas Fields Development	2011/5879	Not Controlled Action	Completed	In buffer area only
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed	In buffer area only
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed	In buffer area only
Hawkesdale Wind Farm	2005/2140	Not Controlled Action	Completed	In buffer area only
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In buffer area only
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed	In buffer area only
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed	In buffer area only
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed	In buffer area only
Newfield wind farm	2007/3226	Not Controlled Action	Completed	In buffer area only
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed	In buffer area only
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed	In buffer area only
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed	In buffer area only
Portland Landfill Borehole Installation, Vic	2017/7886	Not Controlled Action	Completed	In buffer area only
Pulp mill and associated infrastructure 3km north of Heywood	2005/2125	Not Controlled Action	Completed	In buffer area only
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed	In buffer area only
Redevelopment Project to Upgrade and Extend the Portland Trawler Wharf	2008/4317	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2006/2937	Not Controlled Action	Completed	In buffer area only
Shaw River Power Station Project	2009/5088	Not Controlled Action	Completed	In buffer area only
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
Tarrone Power Station Project	2010/5299	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In buffer area only
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed	In buffer area only
Wind farm development	2005/1960	Not Controlled Action	Completed	In buffer area only
Wind Farm Development	2004/1929	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Gas Pipeline Crossing at Mount Emu Creek	2009/4913	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
8 Lot Industrial Subdivision	2008/4527	Referral Decision	Completed	In buffer area only
Portland Wave Energy Project	2008/3946	Referral Decision	Completed	In buffer area only
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [84292]	Breeding	Known to occur	In buffer area only
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur	In buffer area only
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur	In buffer area only
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 27-Feb-2025

[Summary](#)

[Details](#)

- [Matters of NES](#)
- [Other Matters Protected by the EPBC Act](#)
- [Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

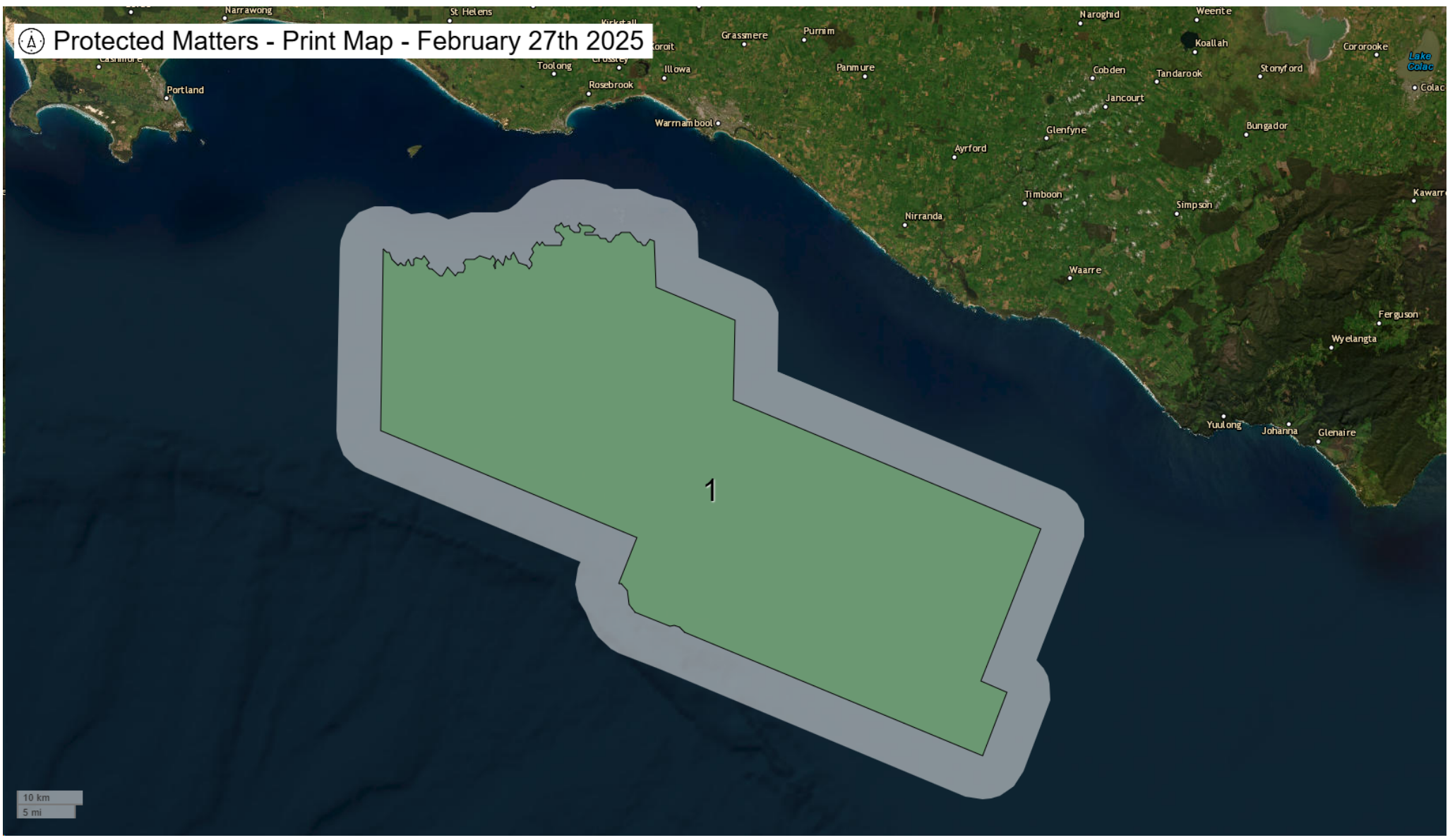

Figure 1: PMST Search Area - Underwater Sound for Turtles (Active Source Area + 6km Buffer)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	41
Listed Migratory Species:	41

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	63
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	38
Key Ecological Features (Marine):	2
Biologically Important Areas:	14
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
FISH			
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area	In feature area
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
MAMMAL			
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis			
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caperea marginata			
Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Fish			
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Geographe-A gas exploration well	2000/82		Completed	In feature area
Hydrocarbon exploration wells	2003/1062		Completed	In feature area
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795		Completed	In feature area
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Spinifex Offshore Wind Farm - Offshore Investigations	2024/09918		Referral Decision	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Strike Oil NL Seismic Surveys	2000/107		Completed	In feature area
Thylacine-A Exploration Well	2000/81		Completed	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799		Completed	In feature area
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 27-Feb-2025

[Summary](#)

[Details](#)

- [Matters of NES](#)
- [Other Matters Protected by the EPBC Act](#)
- [Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

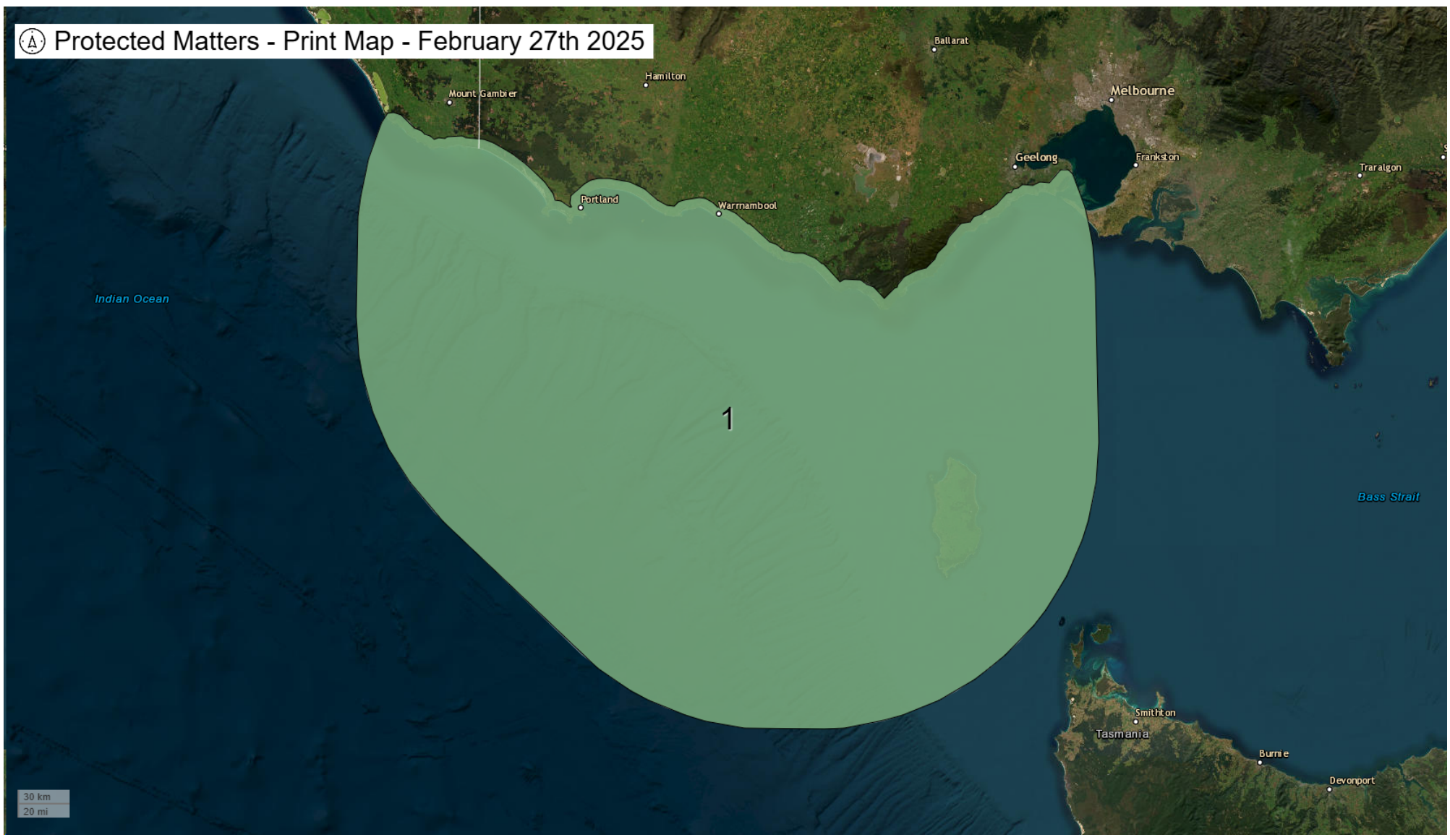

Figure 1: PMST Search Area - Environmental Planning Area

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	4
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	12
Listed Threatened Species:	140
Listed Migratory Species:	72

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	43
Commonwealth Heritage Places:	6
Listed Marine Species:	123
Whales and Other Cetaceans:	31
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	7
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	161
Regional Forest Agreements:	2
Nationally Important Wetlands:	21
EPBC Act Referrals:	204
Key Ecological Features (Marine):	2
Biologically Important Areas:	25
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Legal Status
Budj Bim Cultural Landscape	VIC	Declared property

National Heritage Places		[Resource Information]
Name	State	Legal Status
Historic		
Great Ocean Road and Scenic Environs	VIC	Listed place
Point Nepean Defence Sites and Quarantine Station Area	VIC	Listed place
Quarantine Station and Surrounds	VIC	Within listed place
Indigenous		
Budj Bim National Heritage Landscape - Tyrendarra Area	VIC	Listed place

Wetlands of International Importance (Ramsar Wetlands)	[Resource Information]
Ramsar Site Name	Proximity
Glenelg estuary and discovery bay wetlands	Within Ramsar site
Lavinia	Within Ramsar site
Piccaninnie ponds karst wetlands	Within Ramsar site
Port phillip bay (western shoreline) and bellarine peninsula	Within Ramsar site

Commonwealth Marine Area	[Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities	[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	Endangered	Community likely to occur within area
King Island scrub complex	Endangered	Community likely to occur within area
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community likely to occur within area
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (Eucalyptus ovata / E. brookeriana)	Critically Endangered	Community likely to occur within area
Tasmanian white gum (Eucalyptus viminalis) wet forest	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Acanthiza pusilla magnirostris		
King Island Brown Thornbill, Brown Thornbill (King Island) [91709]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Acanthornis magna greeniana King Island Scrubtit, Scrubtit (King Island) [82329]	Critically Endangered	Species or species habitat known to occur within area
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area
Aquila audax fleayi Tasmanian Wedge-tailed Eagle, Wedge-tailed Eagle (Tasmanian) [64435]	Endangered	Species or species habitat may occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calyptorhynchus banksii graptogyne South-eastern Red-tailed Black-Cockatoo [25982]	Endangered	Breeding known to occur within area
Ceyx azureus diemenensis Tasmanian Azure Kingfisher [25977]	Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Roosting known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route known to occur within area

Scientific Name	Threatened Category	Presence Text
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Platycercus caledonicus brownii Green Rosella (King Island) [67041]	Vulnerable	Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Strepera fuliginosa colei Black Currawong (King Island) [67113]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Xenus cinereus		
Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area
CRUSTACEAN		
Euastacus bispinosus		
Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat known to occur within area
FISH		
Galaxiella pusilla		
Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Endangered	Species or species habitat may occur within area
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Nannoperca obscura		
Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area
Nannoperca variegata		
Variegated Pygmy Perch, Ewens Pygmy Perch, Golden Pygmy Perch [26178]	Vulnerable	Species or species habitat known to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
Rexea solandri (eastern Australian population)		
Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Seriolella brama](#)		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
FROG		
[Litoria raniformis](#)		
Southern Bell Frog, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
INSECT		
[Synemon plana](#)		
Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area
MAMMAL		
[Antechinus minimus maritimus](#)		
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area
[Balaenoptera borealis](#)		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera musculus](#)		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera physalus](#)		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Dasyurus maculatus maculatus (SE mainland population)](#)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
[Eubalaena australis](#)		
Southern Right Whale [40]	Endangered	Breeding known to occur within area
[Isoodon obesulus obesulus](#)		
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area
Miniopterus orianae bassanii Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus trisulcatus Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pseudomys shortridgei Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
OTHER		
Hyridella glenelgensis Glenelg Freshwater Mussel [82953]	Critically Endangered	Species or species habitat likely to occur within area
PLANT		

Scientific Name	Threatened Category	Presence Text
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat known to occur within area
Astelia australiana Tall Astelia [10851]	Vulnerable	Species or species habitat likely to occur within area
Caladenia calcicola Limestone Spider-orchid [10065]	Vulnerable	Species or species habitat likely to occur within area
Caladenia colorata Coloured Spider-orchid, Small Western Spider-orchid, Painted Spider-orchid [54999]	Endangered	Species or species habitat known to occur within area
Caladenia concolor Crimson Spider-orchid, Maroon Spider-orchid [5505]	Vulnerable	Species or species habitat may occur within area
Caladenia hastata Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area
Caladenia orientalis Eastern Spider Orchid [83410]	Endangered	Species or species habitat known to occur within area
Caladenia ornata Ornate Pink Fingers [76213]	Vulnerable	Species or species habitat known to occur within area
Caladenia robinsonii Frankston Spider-orchid [24375]	Endangered	Species or species habitat likely to occur within area
Caladenia tensa Greencomb Spider-orchid, Rigid Spider-orchid [24390]	Endangered	Species or species habitat may occur within area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat may occur within area
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area
Euphrasia collina subsp. muelleri Purple Eyebright, Mueller's Eyebright [16151]	Endangered	Species or species habitat known to occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area
Grevillea infecunda Anglesea Grevillea [22026]	Vulnerable	Species or species habitat known to occur within area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area
Hiya distans listed as Hypolepis distans Scrambling Ground-fern [92548]	Endangered	Species or species habitat known to occur within area
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area
Leiocarpa gatesii Wrinkled Buttons [76212]	Vulnerable	Species or species habitat known to occur within area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat may occur within area
Pimelea spinescens subsp. spinescens Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat likely to occur within area
Pomaderris halmaturina subsp. halmaturina Kangaroo Island Pomaderris [21964]	Vulnerable	Species or species habitat known to occur within area
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat known to occur within area
Prasophyllum frenchii Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid, French's Leek-orchid, Swamp Leek-orchid [9704]	Endangered	Species or species habitat known to occur within area
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area
Prasophyllum suaveolens Fragrant Leek-orchid [64956]	Endangered	Species or species habitat may occur within area
Prasophyllum validum Sturdy Leek-orchid, Mount Remarkable Leek-orchid [10268]	Vulnerable	Species or species habitat may occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat known to occur within area
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat likely to occur within area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area
Taraxacum cygnorum Coast Dandelion, Native Dandelion [2508]	Vulnerable	Species or species habitat known to occur within area
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Endangered	Species or species habitat known to occur within area
Thelymitra orientalis Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Delma impar		
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Lissolepis coventryi		
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area
Tympanocryptis pinguicolla		
Victorian Grassland Earless Dragon [66727]	Critically Endangered	Species or species habitat likely to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus		
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus		
Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		

Scientific Name	Threatened Category	Presence Text
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Eubalaena australis as Balaena glacialis australis		
Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus		
Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus		
Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus		
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca		
Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus		
Sperm Whale [59]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Roosting known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres		
Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Defence	
Defence - CROWS NEST CAMP - QUEENSCLIFF [21029]	VIC
Defence - CROWS NEST CAMP - QUEENSCLIFF [21028]	VIC
Defence - CROWS NEST CAMP - QUEENSCLIFF [21026]	VIC
Defence - CROWS NEST CAMP - QUEENSCLIFF [21027]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21031]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21032]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21033]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21034]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21030]	VIC
Defence - SWAN ISLAND TRAINING AREA [21447]	VIC
Defence - SWAN ISLAND TRAINING AREA [21448]	VIC
Defence - SWAN ISLAND TRAINING AREA [21446]	VIC
Defence - TRAINING CENTRE (Norris Barracks) - Portsea [21025]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21015]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21013]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21023]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21022]	VIC

Commonwealth Land Name	State
Defence - Training Depot, Darts RD 3305 Portland [21024]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21021]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21020]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21011]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21016]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21014]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21018]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21019]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21010]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21012]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21009]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21017]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21008]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21007]	VIC
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC
Transport and Regional Services - Australian Maritime Safety Authority	
Commonwealth Land - Australian Maritime Safety Authority [41289]	SA
Commonwealth Land - Australian Maritime Safety Authority [41288]	SA
Unknown	
Commonwealth Land - [21570]	VIC
Commonwealth Land - [21583]	VIC
Commonwealth Land - [60113]	TAS
Commonwealth Land - [60111]	TAS
Commonwealth Land - [60112]	TAS
Commonwealth Land - [21492]	VIC
Commonwealth Land - [60115]	TAS
Commonwealth Land - [22391]	VIC
Commonwealth Land - [60114]	TAS

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Cape Northumberland Lighthouse	SA	Listed place
Cape Wickham Lighthouse	TAS	Listed place
Fort Queenscliff	VIC	Listed place
Sorrento Post Office	VIC	Listed place
Swan Island Defence Precinct	VIC	Listed place
Natural		
Swan Island and Naval Waters	VIC	Listed place

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Roosting known to occur within area overfly marine area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Morus capensis Cape Gannet [59569]		Breeding known to occur within area
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area
Stiltia isabella Australian Pratincole [818]		Roosting known to occur within area overfly marine area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys mollisoni Mollison's Pipefish [66260]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		

Scientific Name	Threatened Category	Presence Text
Arctocephalus forsteri		
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus		
Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata		
Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area

Current Scientific Name	Status	Type of Presence
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Hyperoodon planifrons Southern Bottlenose Whale [71]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tasmacetus shepherdi Shepherd's Beaked Whale, Tasman Beaked Whale [55]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Australian Marine Parks [Resource Information]

Park Name	Zone & IUCN Categories
Apollo	Multiple Use Zone (IUCN VI)
Franklin	Multiple Use Zone (IUCN VI)
Zeehan	Multiple Use Zone (IUCN VI)
Franklin	National Park Zone (IUCN II)
Nelson	National Park Zone (IUCN II)
Zeehan	National Park Zone (IUCN II)
Zeehan	Special Purpose Zone (IUCN VI)

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State
Aire River	Heritage River	VIC
Aire River W.R.	Natural Features Reserve	VIC
Aireys Inlet B.R.	Natural Features Reserve	VIC

Protected Area Name	Reserve Type	State
Anglesea B.R.	Natural Features Reserve	VIC
Aquila Creek	Reference Area	VIC
Badger Box Creek	Nature Reserve	TAS
Barham Paradise S.R.	Natural Features Reserve	VIC
Barwon Bluff	Marine Sanctuary	VIC
Bats Ridge W.R	Nature Conservation Reserve	VIC
Bay of Islands Coastal Park	Conservation Park	VIC
Bellarine I109 B.R.	Natural Features Reserve	VIC
Bellarine I110 B.R.	Natural Features Reserve	VIC
Black Pyramid Rock	Nature Reserve	TAS
Bolwarra H43 B.R.	Natural Features Reserve	VIC
Bolwarra H44 B.R.	Natural Features Reserve	VIC
Bolwarra H45 B.R.	Natural Features Reserve	VIC
Breamlea F.F.R.	Nature Conservation Reserve	VIC
Bucks Lake	Game Reserve	SA
Calder River	Reference Area	VIC
Canunda	National Park	SA
Cape Nelson	State Park	VIC
Cape Wickham	State Reserve	TAS
Cape Wickham	Conservation Area	TAS
Carpenter Rocks	Conservation Park	SA
Cataraqui Point	Conservation Area	TAS
Christmas Island	Nature Reserve	TAS

Protected Area Name	Reserve Type	State
City of Melbourne Bay	Conservation Area	TAS
Cobboboonee	National Park	VIC
Colliers Forest Reserve	Conservation Covenant	TAS
Colliers Swamp	Conservation Area	TAS
Conewarre K47 SS.R.	Natural Features Reserve	VIC
Conewarre K48 SS.R.	Natural Features Reserve	VIC
Councillor Island	Nature Reserve	TAS
Counsel Hill	Conservation Area	TAS
Crinoline Creek	Reference Area	VIC
Curdie Vale N.C.R.	Natural Features Reserve	VIC
Currie Lightkeepers Residence	Historic Site	TAS
Deen Maar	Indigenous Protected Area	VIC
Deep Lagoons	Conservation Area	TAS
Dingley Dell	Conservation Park	SA
Disappointment Bay	State Reserve	TAS
Discovery Bay	Marine National Park	VIC
Discovery Bay Coastal Park	Conservation Park	VIC
Douglas Point	Conservation Park	SA
Drakes B.R.	Natural Features Reserve	VIC
Dry Creek	Forest Reserve	SA
Eagle Rock	Marine Sanctuary	VIC
Edna Bowman N.C.R.	Natural Features Reserve	VIC
Eldorado	Conservation Area	TAS
Ewens Ponds	Conservation Park	SA

Protected Area Name	Reserve Type	State
Fitzroy River SS.R.	Natural Features Reserve	VIC
Gentle Annie	Conservation Area	TAS
Glenelg River	Heritage River	VIC
Goose Lagoon W.R	Natural Features Reserve	VIC
Gorae B.R.	Natural Features Reserve	VIC
Great Otway	National Park	VIC
Hedditch Hill S.R.	Natural Features Reserve	VIC
Hells Hole	Forest Reserve	SA
Heywood B.R.	Natural Features Reserve	VIC
Hopkins Falls S.R.	Natural Features Reserve	VIC
Johanna Falls S.R.	Natural Features Reserve	VIC
Johnstones Creek F.R	Nature Conservation Reserve	VIC
Kentbruck H14 B.R	Natural Features Reserve	VIC
Kentbruck H50 B.R.	Natural Features Reserve	VIC
Kentbruck Heath	Reference Area	VIC
Kentford Forest	Nature Reserve	TAS
Kentford Forest	Conservation Area	TAS
Kentford Rd Nugara	Conservation Covenant	TAS
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC
Lake Aringa W.R	Nature Conservation Reserve	VIC
Lake Connewarre W.R	Natural Features Reserve	VIC
Lake Gillear W.R	Natural Features Reserve	VIC

Protected Area Name	Reserve Type	State
Laslett	Forest Reserve	SA
Latrobe B.R.	Natural Features Reserve	VIC
Lavinia	State Reserve	TAS
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC
Lily Lagoon	Nature Reserve	TAS
Lily Pond B.R.	Natural Features Reserve	VIC
Lonsdale Lakes W.R	Nature Conservation Reserve	VIC
Lower Glenelg	National Park	VIC
Lower Glenelg River	Conservation Park	SA
Lower South East	Marine Park	SA
Lymwood	Conservation Covenant	TAS
Marengo N.C.R.	Nature Conservation Reserve	VIC
Marengo Reefs	Marine Sanctuary	VIC
Merri	Marine Sanctuary	VIC
Millwood Road	Conservation Covenant	TAS
Mornington Peninsula	National Park	VIC
Mount Richmond	National Park	VIC
Mouzie B.R	Natural Features Reserve	VIC
Mouzie N.F.R	Natural Features Reserve	VIC
Muddy Lagoon	Nature Reserve	TAS
Narrawong F.R.	Nature Conservation Reserve	VIC
Nelson SS.R.	Natural Features Reserve	VIC
Nene Valley	Conservation Park	SA

Protected Area Name	Reserve Type	State
New Year Island	Game Reserve	TAS
Nine Mile F.F.R.	Nature Conservation Reserve	VIC
Nullawarre F.R.	Nature Conservation Reserve	VIC
Painkalac Creek	Reference Area	VIC
Parker River	Reference Area	VIC
Pegarah	Private Nature Reserve	TAS
Pegarah Forest	Conservation Covenant	TAS
Pegarah Rd King Island	Conservation Covenant	TAS
Penambol	Conservation Park	SA
Piccaninnie Ponds	Conservation Park	SA
Point Addis	Marine National Park	VIC
Point Danger	Marine Sanctuary	VIC
Point Nepean	National Park	VIC
Porky Beach	Conservation Area	TAS
Port Campbell	National Park	VIC
Portland H46 B.R.	Natural Features Reserve	VIC
Portland H47 B.R.	Natural Features Reserve	VIC
Port Phillip Heads	Marine National Park	VIC
Pretty Hill F.R	Nature Conservation Reserve	VIC
Princetown W.R	Natural Features Reserve	VIC
Queenscliff N.F.R	Natural Features Reserve	VIC
Red Hut Point	Conservation Area	TAS
Red Hut Road #1	Conservation Covenant	TAS
Red Hut Road #2	Conservation Covenant	TAS

Protected Area Name	Reserve Type	State
Reekara Road #1	Conservation Covenant	TAS
Reekara Road #2	Conservation Covenant	TAS
Reid Rocks	Nature Reserve	TAS
Salt Lagoon, St Leonards W.R	Nature Conservation Reserve	VIC
Sartoris Rd Nugara	Conservation Covenant	TAS
Sea Elephant	Conservation Area	TAS
Sea Elephant Bootlace	Conservation Covenant	TAS
Sea Elephant River	Conservation Covenant	TAS
Seal Rocks	Conservation Area	TAS
Seal Rocks	State Reserve	TAS
South Rd Nugara	Conservation Covenant	TAS
Stokes Point	Conservation Area	TAS
Stony Creek (Otways)	Reference Area	VIC
Swan Bay - Edwards Point W.R	Nature Conservation Reserve	VIC
Tambar	Conservation Covenant	TAS
Tathams Lagoon	Conservation Area	TAS
The Arches	Marine Sanctuary	VIC
Tin Mine Rd Loorana	Conservation Covenant	TAS
Tower Hill W.R	Natural Features Reserve	VIC
Trewalla H48 B.R.	Natural Features Reserve	VIC
Trewalla H49 B.R.	Natural Features Reserve	VIC
Twelve Apostles	Marine National Park	VIC
Tyrendarra	Indigenous Protected Area	VIC
Tyrendarra F.R	Nature Conservation Reserve	VIC

Protected Area Name	Reserve Type	State
Unnamed (No.HA1038)	Heritage Agreement	SA
Unnamed (No.HA1166)	Heritage Agreement	SA
Unnamed (No.HA1180)	Heritage Agreement	SA
Unnamed (No.HA1404)	Heritage Agreement	SA
Unnamed (No.HA1457)	Heritage Agreement	SA
Unnamed (No.HA1560)	Heritage Agreement	SA
Unnamed (No.HA26)	Heritage Agreement	SA
Unnamed (No.HA42)	Heritage Agreement	SA
Unnamed (No.HA497)	Heritage Agreement	SA
Unnamed P0176	Private Nature Reserve	VIC
Warreanga	Forest Reserve	SA
Wicks Road Nugara	Conservation Covenant	TAS
Wild Dog B.R.	Natural Features Reserve	VIC
Wild Dog Creek SS.R.	Natural Features Reserve	VIC
Wongarra B.R.	Natural Features Reserve	VIC
Yambacoona	Conservation Covenant	TAS
Yambuk F.F.R.	Nature Conservation Reserve	VIC
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State
Tasmania RFA	Tasmania
West Victoria RFA	Victoria

Nationally Important Wetlands [Resource Information]

Wetland Name	State

Wetland Name	State
Aire River	VIC
Bungaree Lagoon	TAS
Ewens Ponds	SA
Glenelg Estuary	VIC
Glenelg River	VIC
Lake Connewarre State Wildlife Reserve	VIC
Lake Flannigan	TAS
Lavinia Nature Reserve	TAS
Long Swamp	VIC
Lower Aire River Wetlands	VIC
Lower Merri River Wetlands	VIC
Mud Islands	VIC
Pearshape Lagoon 1	TAS
Pearshape Lagoon 2	TAS
Pearshape Lagoon 3	TAS
Pearshape Lagoon 4	TAS
Piccaninnie Ponds	SA
Princetown Wetlands	VIC
Swan Bay & Swan Island	VIC
Tower Hill	VIC
Yambuk Wetlands	VIC

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Apollo Bay to Skenes Creek Coastal Trail	2022/09274		Assessment
Barwon Heads Road Reserve Road to Lower Duneed Road Upgrade Project	2023/09724		Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Completed
City Of Greater Geelong Mosquito Control Program 2021-2030, Vic	2020/8782		Approval
Decommissioning of the Minerva Pipeline in Victorian state waters	2024/09879		Completed
Dolphin Tungsten Mine Grassy King Island	2023/09653		Referral Decision
Geographe-A gas exploration well	2000/82		Completed
Great Ocean Road Coastal Trail (GORCT) ? Fairhaven to Grey River	2024/10073		Referral Decision
Hydrocarbon exploration wells	2003/1062		Completed
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795		Completed
Normanville Energy Park	2024/10070		Referral Decision
Offshore Tidal Energy Facility and Submarine Cable	2008/4480		Completed
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Point Nepean Research & Education Field Station	2024/09963		Completed
Portland Energy Park	2024/09947		Assessment
SEA Gas Project transmission pipeline	2001/513		Completed
Shearwater 2D and 3D marine seismic survey	2005/2180		Completed
SMAP telecommunications submarine cable installation	2024/09989		Completed
Southern Winds Offshore Wind Project	2022/09435		Completed
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed
Spinifex Offshore Surveys	2022/09359		Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Spinifex Offshore Wind Farm - Offshore Investigations	2024/09918		Referral Decision
Strike Oil NL Seismic Surveys	2000/107		Completed
Thylacine-A Exploration Well	2000/81		Completed
Vic-P51 and Vic-P52 3D seismic survey	2002/799		Completed
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Basalt Quarry Extension (Mountainview Quarry)	2004/1329	Controlled Action	Completed
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Establishment of plantation for use of effluent water	2003/1063	Controlled Action	Completed
Geelong Salt Fields Urban Renewal Project	2012/6630	Controlled Action	Assessment Approach
Glenelg Dolomite Quarry	2017/8021	Controlled Action	Post-Approval
Green Point Wind Farm	2001/529	Controlled Action	Post-Approval
Kentbruck Green Power Hub, Vic	2019/8510	Controlled Action	Assessment Approach
Lonsdale Golf Club Redevelopment	2003/969	Controlled Action	Post-Approval
Lorne Golf Course redevelopment	2004/1513	Controlled Action	Post-Approval
Mosquito Control	2005/2132	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval
Pelican Point residential subdivision	2006/2529	Controlled Action	Completed
Port Phillip Bay Channel Deepening	2002/576	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Redevelopment of post office and construction of dwellings	2007/3639	Controlled Action	Completed
Residential and Golf Course Development Project	2003/1144	Controlled Action	Post-Approval
Residential Estate, 251-319 Melaluka Rd	2007/3308	Controlled Action	Post-Approval
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed
Residential Subdivision and Stormwater Enhancements for land west of Ash Road	2012/6544	Controlled Action	Completed
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Wind Turbines	2001/439	Controlled Action	Completed
Not controlled action			
Airey Inlet water reclamation plant to Anglesea sewerage system	2006/2539	Not Controlled Action	Completed
Allendale wind farm	2007/3549	Not Controlled Action	Completed
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed
Anglesea Mine South Wall Vegetation removal, Anglesea, Vic	2017/8060	Not Controlled Action	Completed
Apollo Bay Water Storage Basin, VIC	2012/6484	Not Controlled Action	Completed
Barwon Heads Rd gas pipeline installation	2006/2769	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Barwon Heads Stormwater Outfall upgrade, Victoria	2016/7650	Not Controlled Action	Completed
Barwon River Parkland Initiative, Taits Point, Stages 1 and 2	2010/5437	Not Controlled Action	Completed
Bluff Heights Estate Stages 2 to 4	2003/1047	Not Controlled Action	Completed
Boneo Park Equestrian Centre	2008/4639	Not Controlled Action	Completed
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed
Construction and operation of Barwon Water biosolids treatment facility	2008/4345	Not Controlled Action	Completed
Construction of a Dwelling	2011/6160	Not Controlled Action	Completed
Construction of Barwon Heads Bridge	2005/2375	Not Controlled Action	Completed
Construction of Infrastructure to Extract, Treat & Transfer Groundwater to Wurde	2008/4104	Not Controlled Action	Completed
Construction of Overtaking Lanes on Great Ocean Rd	2008/4044	Not Controlled Action	Completed
construction of pump station for pump diversion from the Barham River	2003/1242	Not Controlled Action	Completed
Construction of the Edgars Road Extension, from Childs Road, Lalor to Cooper Street, Epping	2003/1135	Not Controlled Action	Completed
Development of Pt Nepean Quarantine Station (former) National Centre for Coasts and Climate	2008/4653	Not Controlled Action	Completed
Divestment of Norris Barracks	2003/963	Not Controlled Action	Completed
Drilling of Callister-1 exploration well in VIC/P51	2004/1633	Not Controlled Action	Completed
Eight Mile Creek Drainage Works, Peacocks Road, Eight Mile Creek, SA	2014/7170	Not Controlled Action	Completed
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Extension of Mountain View basalt quarry by 113 hectares (stage one)	2004/1591	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed
Gas Fields Development	2011/5879	Not Controlled Action	Completed
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed
Geelong Bypass Sections 1 & 2	2005/2097	Not Controlled Action	Completed
Gleneig Spiny Crayfish Habitat Rehabilitation	2011/6164	Not Controlled Action	Completed
Golflinks Road Residential Development & Water Storage Facility at Barwon Heads	2004/1793	Not Controlled Action	Completed
Grevillea infecunda tip cuttings and soil samples	2005/1979	Not Controlled Action	Completed
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
Huxley Hill Wind Farm expansion	2005/2499	Not Controlled Action	Completed
Huxley Hill Wind Farm Expansion	2002/570	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Installation of a 35 metre telecommunications facility at Jirrahlinga Animal San	2003/1151	Not Controlled Action	Completed
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed
Kongorong Wind Farm	2002/568	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Laslett Wind Farm	2007/3550	Not Controlled Action	Completed
Lot 5 Pelican Point Road, Pelican Point SA - Proposed New Dwelling	2021/9011	Not Controlled Action	Completed
Maintenance and priority works to heritage buildings at Point Nepean Quarantine	2006/3151	Not Controlled Action	Completed
Maintenance Dredging South Channel 2012	2011/6198	Not Controlled Action	Completed
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed
Maintenance works at Barwon Heads Bridge	2003/1199	Not Controlled Action	Completed
Marine and Freshwater Resources Institute (MAFRI) Facility	2000/121	Not Controlled Action	Completed
Millwood Road Gravel Quarry	2002/602	Not Controlled Action	Completed
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed
Newfield wind farm	2007/3226	Not Controlled Action	Completed
New Water Infrastructure Upgrade, Grassy Dam, King Island	2013/6882	Not Controlled Action	Completed
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed
Ocean Grove rising main 2 upgrade	2009/4978	Not Controlled Action	Completed
Ocean Grove Rising Main 2 Upgrade (OGRM2) - East Section & River Crossing	2010/5508	Not Controlled Action	Completed
Oceanlinx South Australia 1mW Greenwave Project	2012/6528	Not Controlled Action	Completed
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed
Piccaninnie Ponds flow path restoration project, SA	2013/6711	Not Controlled Action	Completed
Point Nepean Quarantine Station (former)/Restoration of Medical Superintendent's	2006/3149	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed
Portland Landfill Borehole Installation, Vic	2017/7886	Not Controlled Action	Completed
Port Phillip Channel Deepening Project - Trial Dredge Program	2005/2164	Not Controlled Action	Completed
Proposed replacement of existing road culvert	2013/7077	Not Controlled Action	Completed
Pulp mill and associated infrastructure 3km north of Heywood	2005/2125	Not Controlled Action	Completed
Queenscliff Harbour Redevelopment	2004/1352	Not Controlled Action	Completed
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed
Redevelopment Project to Upgrade and Extend the Portland Trawler Wharf	2008/4317	Not Controlled Action	Completed
Rehabilitation of Lake Connewarre State Game Reserve	2002/708	Not Controlled Action	Completed
Remedial Works to the Swan Island Bridge	2003/1129	Not Controlled Action	Completed
Replacement of sewer pipelines	2002/623	Not Controlled Action	Completed
Residential/Resort/Golf Course development	2002/907	Not Controlled Action	Completed
Residential Development, 409 The Esplanade, St Leonards	2006/2950	Not Controlled Action	Completed
Residential Dwelling	2004/1896	Not Controlled Action	Completed
Ryan Corner Wind Farm	2006/2937	Not Controlled Action	Completed
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed
Sparrovale Wetland stormwater management, Armstrong Creek and Charlemont, VIC	2018/8375	Not Controlled Action	Completed
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
St Quentin Consulting Pty Ltd /Residential development/305 Great Ocean Road, Jan Juc/VIC/Development	2014/7184	Not Controlled Action	Completed
Torquay Sewerage Strategy - pipe replacement between Torquay and the Black Rock	2004/1704	Not Controlled Action	Completed
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed
Transfer of 90ha Point Nepean Quarantine Station from Commonwealth to Victorian	2008/4521	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Victorian Generator Project	2005/1984	Not Controlled Action	Completed
Wastewater Treatment System Upgrade	2004/1420	Not Controlled Action	Completed
West Triton Drilling Program - Otway Basin	2007/3909	Not Controlled Action	Completed
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey in Permit Areas T/32P and T/33P	2002/845	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2008/3962	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
2D seismic survey, Petroleum Exploration Permit Area EPP27	2006/2776	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey in VIC/P50 and VIC/P46	2004/1810	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval
2D Siesmic Marine Survey	2008/4074	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey within Torquay Sub-basin off sthn Victoria	2012/6256	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
Barwon Heads Rising Main No.11 Sewerage Pipe Upgrade	2008/4091	Not Controlled Action (Particular Manner)	Post-Approval
Benbows Paddock residential development, Cape Bridgewater	2007/3247	Not Controlled Action (Particular Manner)	Post-Approval
Bernoulli 3D Seismic Survey	2006/3053	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
construction of a 14km , 33kV distribution line, including connection to the Lake Bonney Central win	2003/1108	Not Controlled Action (Particular Manner)	Post-Approval
Construction of bridge across Barwon River	2006/2947	Not Controlled Action (Particular Manner)	Post-Approval
Construct private dwelling	2008/4234	Not Controlled Action (Particular Manner)	Post-Approval
Construct single dwelling	2008/4504	Not Controlled Action (Particular Manner)	Post-Approval
Controlled Burn, Understorey Clearance and Removal of UXO	2003/1030	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
development of retirement village, Bellarine Lakes Golf Course, Bellarine Hwy	2006/3015	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval
Fuelbreak construction	2009/4915	Not Controlled Action (Particular Manner)	Post-Approval
Geelong Bypass Section 3	2005/2099	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Maintenance Dredging Program 2012-21 in Port of Melbourne	2012/6332	Not Controlled Action (Particular Manner)	Post-Approval
OTE10 2D Marine Seismic Survey	2009/5223	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Seismic Survey in Petroleum Permit Area EPP27	2002/648	Not Controlled Action (Particular Manner)	Post-Approval
Seismic Survey VIC-P46	2002/826	Not Controlled Action (Particular Manner)	Post-Approval
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins T/35P and T/36P 3D Seismic Surveys	2007/3817	Not Controlled Action (Particular Manner)	Post-Approval
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval
Surface Geochemical Exploration Program, TAS	2010/5780	Not Controlled Action (Particular Manner)	Post-Approval
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval
Torquay Sub-basin (VIC/P62) OTE12-3D Seismic Survey	2012/6655	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vegetation clearance and residential subdivision near Mt Gambier	2004/1370	Not Controlled Action (Particular Manner)	Post-Approval
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Wolseley 3D seismic acquisition survey	2010/5703	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
2D & 3D Seismic Surveys - Permit Area - VIC/P50	2008/4517	Referral Decision	Completed
3D Marine Seismic Survey	2011/6156	Referral Decision	Completed
3D Seismic Survey	2008/4014	Referral Decision	Completed
8 Lot Industrial Subdivision	2008/4527	Referral Decision	Completed
Alteration Reconstruction Restoration and Repairs to Buildings	2008/4179	Referral Decision	Completed
Portland Wave Energy Project	2008/3946	Referral Decision	Completed
Residential Development Elizabeth Avenue, Rosebud West, VIC	2015/7603	Referral Decision	Completed
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed
Upgrade of Services Infrastructure Point Nepean Quarantine Station	2008/4591	Referral Decision	Completed
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed
Wind Farm	2001/139	Referral Decision	Completed
Wolseley 3D Seismic Acquisition Survey in Permit T/32P	2010/5291	Referral Decision	Completed
Works to the buildings and surrounds at the former Point Nepean Quarantine Stati	2008/4156	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Bonney Coast Upwelling	South-east
West Tasmania Canyons	South-east

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Breeding	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [84292]	Breeding	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Eudyptula minor Little Penguin [1085]	Breeding	Known to occur
Eudyptula minor Little Penguin [1085]	Foraging	Known to occur
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Breeding	Known to occur

Scientific Name	Behaviour	Presence
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Breeding	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur

Scientific Name	Behaviour	Presence
Balaenoptera musculus brevicauda		
Pygmy Blue Whale [81317]	Known Foraging Area	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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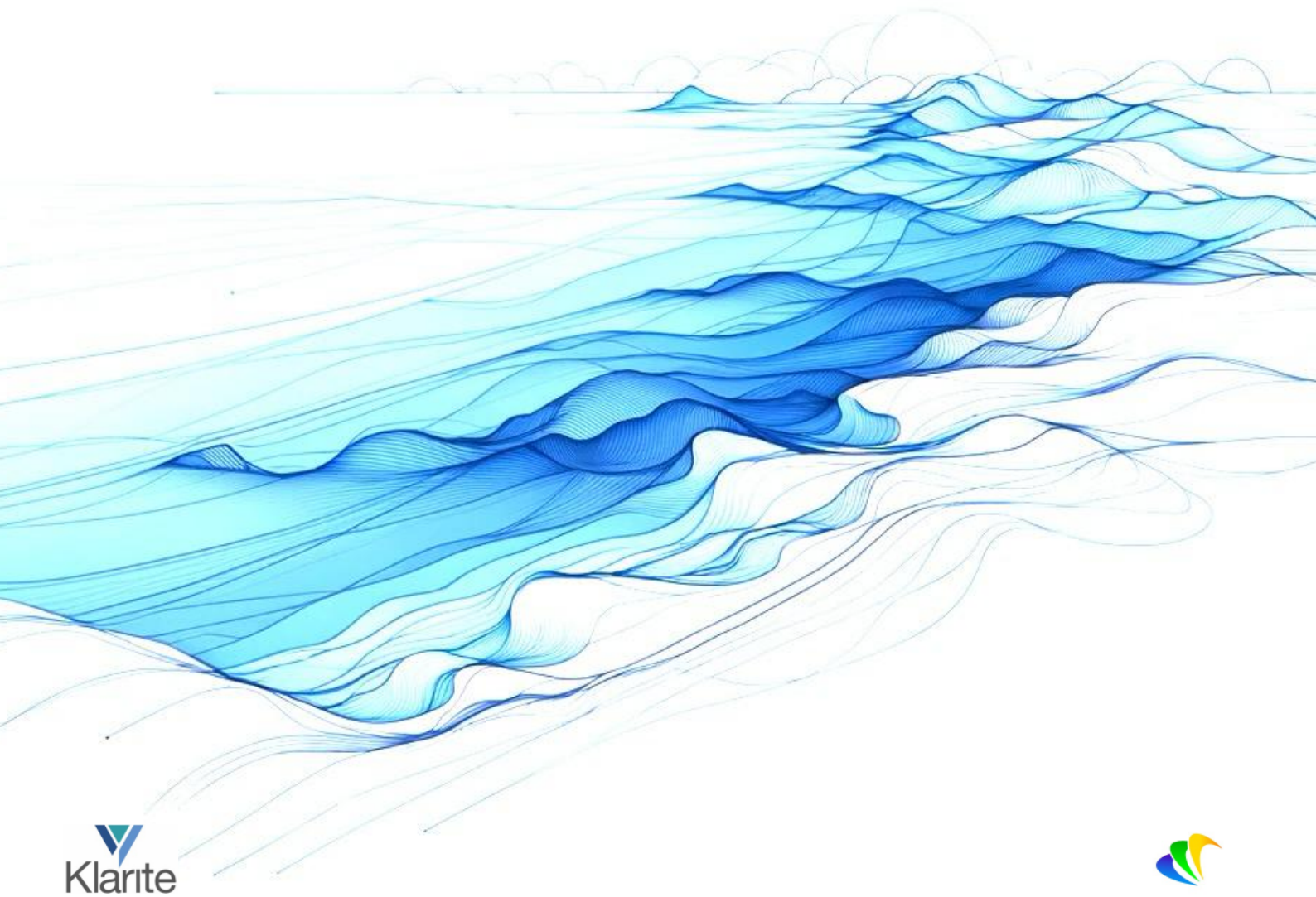
REGIA
Marine Seismic Survey

April/May 2024 PMST Search



Klarite

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Apr-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

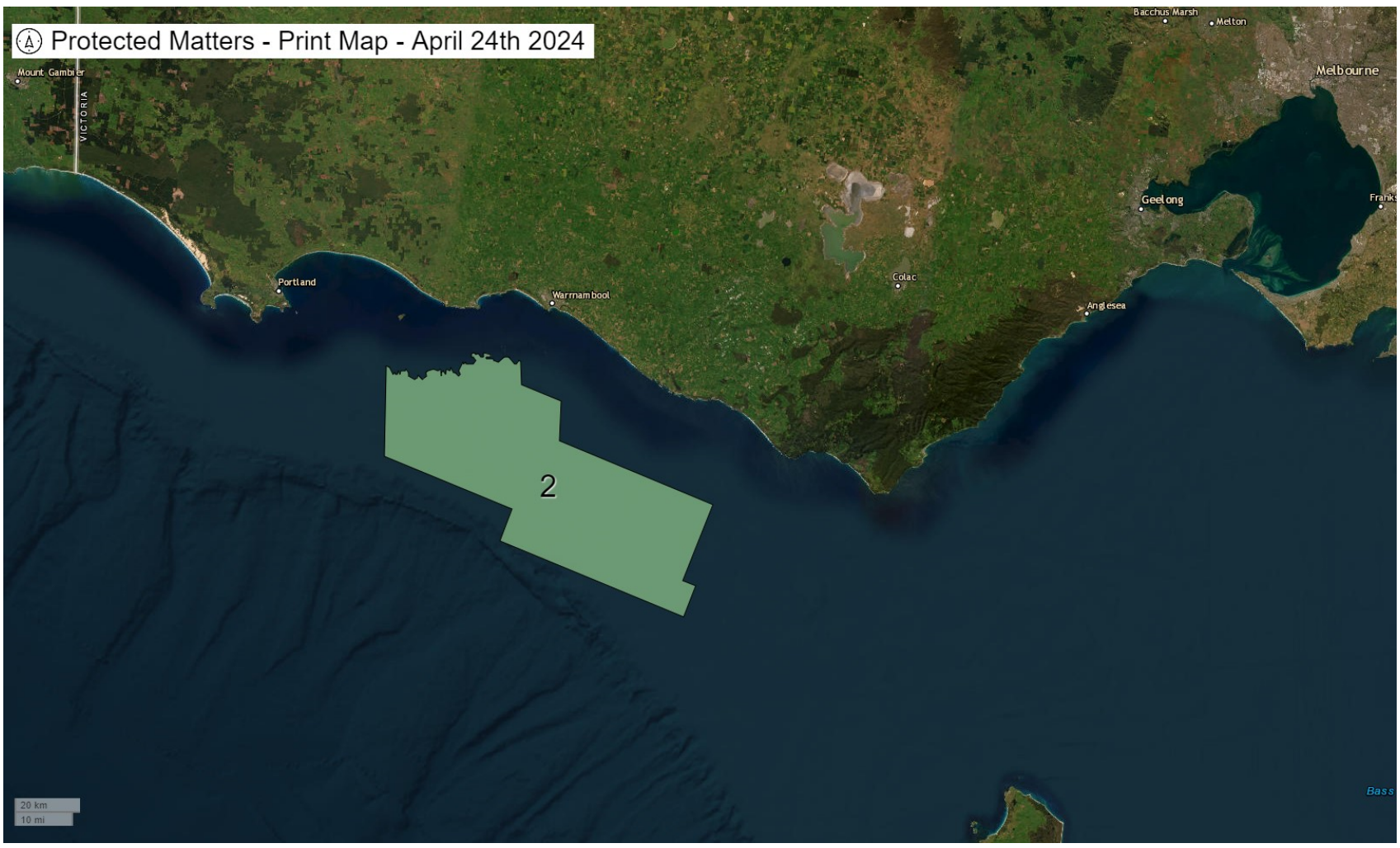


Figure 1: PMST Search Area - Active Source Area

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	41
Listed Migratory Species:	40

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	62
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	32
Key Ecological Features (Marine):	2
Biologically Important Areas:	19
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
FISH		
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii		
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area
MAMMAL		
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Breeding known to occur within area
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
REPTILE		

Scientific Name	Threatened Category	Presence Text
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus		
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea		
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caperea marginata		
Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area

Migratory Wetlands Species

Scientific Name	Threatened Category	Presence Text
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Fish		
Heraldia nocturna		
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis		
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps		
Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Vanacampus poecilolaemus](#)		
Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
[Arctocephalus forsteri](#)		
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
[Arctocephalus pusillus](#)		
Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
[Neophoca cinerea](#)		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
[Caretta caretta](#)		
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
[Chelonia mydas](#)		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
[Dermochelys coriacea](#)		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

Whales and Other Cetaceans [Resource Information]

Current Scientific Name	Status	Type of Presence
Mammal		
[Balaenoptera acutorostrata](#)		
Minke Whale [33]		Species or species habitat may occur within area
[Balaenoptera bonaerensis](#)		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
[Balaenoptera borealis](#)		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Current Scientific Name	Status	Type of Presence
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Berardius arnuxii](#) Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
[Delphinus delphis](#) Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area
[Globicephala macrorhynchus](#) Short-finned Pilot Whale [62]		Species or species habitat may occur within area
[Globicephala melas](#) Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
[Grampus griseus](#) Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
[Kogia breviceps](#) Pygmy Sperm Whale [57]		Species or species habitat may occur within area
[Kogia sima](#) Dwarf Sperm Whale [85043]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Spinifex Offshore Surveys	2022/09359		Completed
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Not controlled action			
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Gas Field Development	2006/2635	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Not controlled action (particular manner)			
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region

Name	Region
Bonney Coast Upwelling	South-east
West Tasmania Canyons	South-east

Biologically Important Areas		[Resource Information]
Scientific Name	Behaviour	Presence
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur

Scientific Name	Behaviour	Presence
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Apr-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

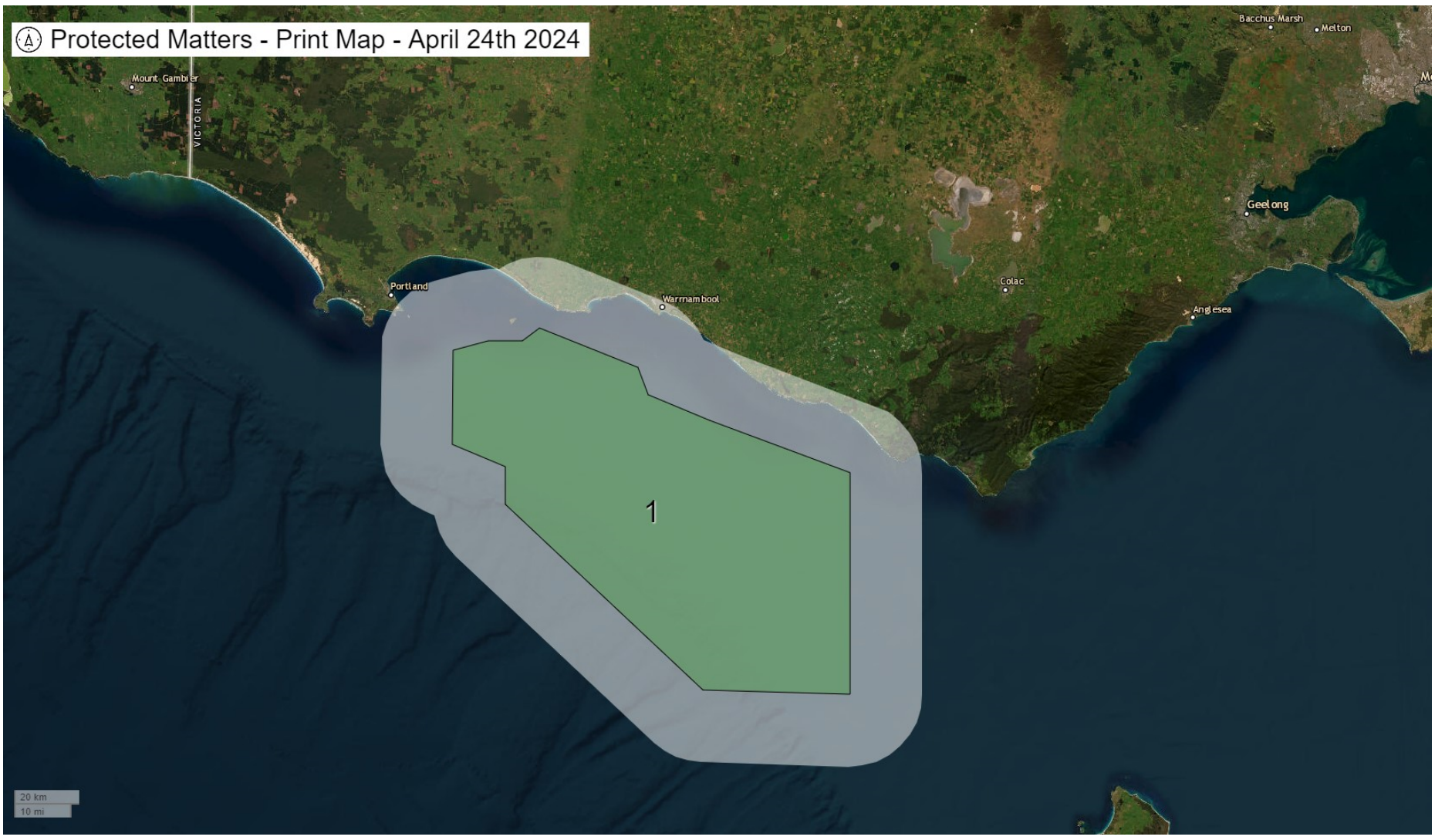

Figure 1: PMST Search Area - Light Environment that May Be Affected (Operational Area + 20km Buffer)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	99
Listed Migratory Species:	66

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	108
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	19
Regional Forest Agreements:	1
Nationally Important Wetlands:	4
EPBC Act Referrals:	77
Key Ecological Features (Marine):	2
Biologically Important Areas:	22
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Great Ocean Road and Scenic Environs	VIC	Listed place	In buffer area only

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area	In buffer area only
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In feature area
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community may occur within area	In buffer area only
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In buffer area only
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
CRUSTACEAN			
Euastacus bispinosus			
Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat likely to occur within area	In buffer area only
FISH			
Hoplostethus atlanticus			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Nannoperca obscura			
Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
FROG			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Litoria raniformis](#)			
Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
INSECT			
[Synemon plana](#)			
Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area	In buffer area only
MAMMAL			
[Antechinus minimus maritimus](#)			
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Balaenoptera borealis](#)			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera musculus](#)			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera physalus](#)			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Dasyurus maculatus maculatus (SE mainland population)](#)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Eubalaena australis](#)			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
[Isoodon obesulus obesulus](#)			
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Mastacomys fuscus mordicus](#)			
Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Miniopterus orianae bassanii](#)			
Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Potorous tridactylus trisulcatus Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area	In buffer area only
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pseudomys shortridgei Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area	In buffer area only
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In buffer area only
PLANT			
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia concolor Crimson Spider-orchid, Maroon Spider-orchid [5505]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia hastata Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Prasophyllum suaveolens Fragrant Leek-orchid [64956]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area	In buffer area only
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thelymitra orientalis Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Lissolepis coventryi Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area	In buffer area only
SHARK			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Sternula albifrons](#) Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche chrysostoma](#) Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
[Balaenoptera bonaerensis](#) Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus			
Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus			
Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus			
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae			
Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Orcinus orca			
Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus			
Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Monarcha melanopsis			
Black-faced Monarch [609]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Breeding known to occur within area	In buffer area only
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In buffer area only
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
[Calidris alba](#) Sanderling [875]		Roosting known to occur within area	In buffer area only
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
[Charadrius bicinctus](#) Double-banded Plover [895]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Morus capensis Cape Gannet [59569]		Breeding known to occur within area	In buffer area only
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area	In buffer area only
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalasseus bergii as Sterna bergii](#) Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
[Thinornis cucullatus as Thinornis rubricollis](#) Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only
[Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis](#) Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
[Tringa brevipes as Heteroscelus brevipes](#) Grey-tailed Tattler [851]		Roosting known to occur within area overfly marine area	In buffer area only
[Tringa glareola](#) Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
Fish			
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
[Histiogamphelus briggsii](#) Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area

Whales and Other Cetaceans		[Resource Information]	
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
[Balaenoptera acutorostrata](#) Minke Whale [33]		Species or species habitat may occur within area	In feature area
[Balaenoptera bonaerensis](#) Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
[Tursiops aduncus](#) Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
[Tursiops truncatus s. str.](#) Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
[Ziphius cavirostris](#) Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Bay of Islands Coastal Park	Conservation Park	VIC	In buffer area only
Curdie Vale N.C.R.	Natural Features Reserve	VIC	In buffer area only
Deen Maar	Indigenous Protected Area	VIC	In buffer area only
Goose Lagoon W.R	Natural Features Reserve	VIC	In buffer area only
Great Otway	National Park	VIC	In buffer area only
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC	In buffer area only
Lake Aringa W.R	Nature Conservation Reserve	VIC	In buffer area only
Latrobe B.R.	Natural Features Reserve	VIC	In buffer area only
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC	In buffer area only
Merri	Marine Sanctuary	VIC	In buffer area only
Port Campbell	National Park	VIC	In buffer area only
Pretty Hill F.R	Nature Conservation Reserve	VIC	In buffer area only
Princetown W.R	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
St Helens F.R	Nature Conservation Reserve	VIC	In buffer area only
The Arches	Marine Sanctuary	VIC	In buffer area only
Tower Hill W.R	Natural Features Reserve	VIC	In buffer area only
Twelve Apostles	Marine National Park	VIC	In buffer area only
Yambuk F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements

[Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In buffer area only

Nationally Important Wetlands

[Resource Information]

Wetland Name	State	Buffer Status
Lower Merri River Wetlands	VIC	In buffer area only
Princetown Wetlands	VIC	In buffer area only
Tower Hill	VIC	In buffer area only
Yambuk Wetlands	VIC	In buffer area only

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Referral Decision	In buffer area only
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Southern Winds Offshore Wind Project	2022/09435		Assessment	In buffer area only
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed	In buffer area only
Spinifex Offshore Surveys	2022/09359		Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval	In buffer area only
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In feature area
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In feature area
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval	In buffer area only
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed	In buffer area only
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed	In buffer area only
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed	In buffer area only
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Gas Fields Development	2011/5879	Not Controlled Action	Completed	In buffer area only
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed	In buffer area only
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In buffer area only
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed	In buffer area only
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed	In buffer area only
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed	In buffer area only
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed	In buffer area only
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed	In feature area
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed	In buffer area only
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2006/2937	Not Controlled Action	Completed	In buffer area only
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In feature area
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In buffer area only
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
SEA Gas Project transmission pipeline	2001/513	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
Portland Wave Energy Project	2008/3946	Referral Decision	Completed	In buffer area only
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Referral decision				
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur	In buffer area only
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur	In buffer area only
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur	In buffer area only
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Apr-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

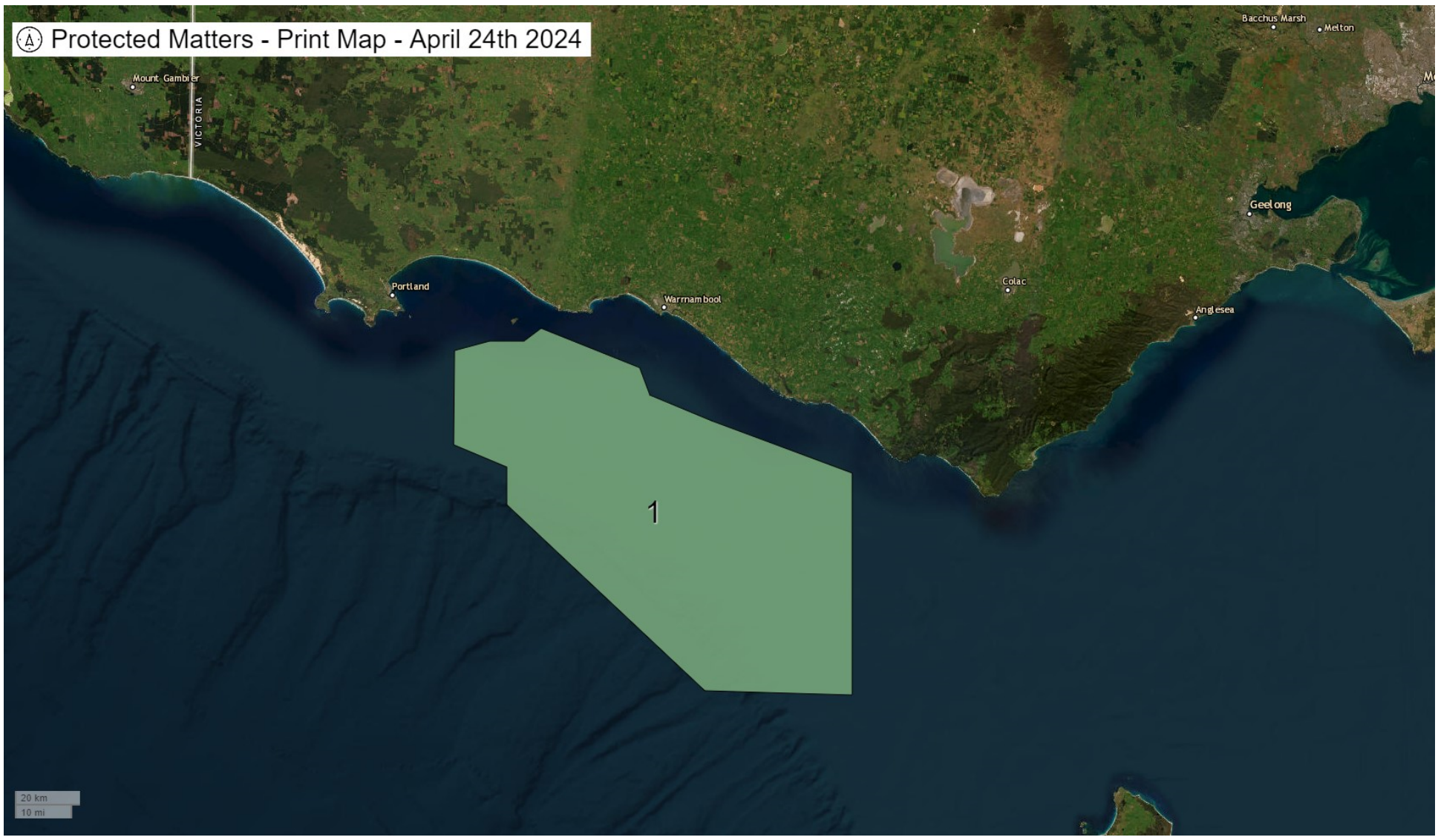

Figure 1: PMST Search Area - Operational Area

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	42
Listed Migratory Species:	40

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	63
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	40
Key Ecological Features (Marine):	2
Biologically Important Areas:	19
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Ardenna grisea		
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus		
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
FISH		
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii		
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area
MAMMAL		
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
SHARK		
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Migratory Wetlands Species		
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		

Current Scientific Name	Status	Type of Presence
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Spinifex Offshore Surveys	2022/09359		Completed
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Otway Development	2002/621	Controlled Action	Post-Approval
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Not controlled action			
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Bonney Coast Upwelling	South-east
West Tasmania Canyons	South-east

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence
Seabirds		

Scientific Name	Behaviour	Presence
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur

Scientific Name	Behaviour	Presence
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Apr-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

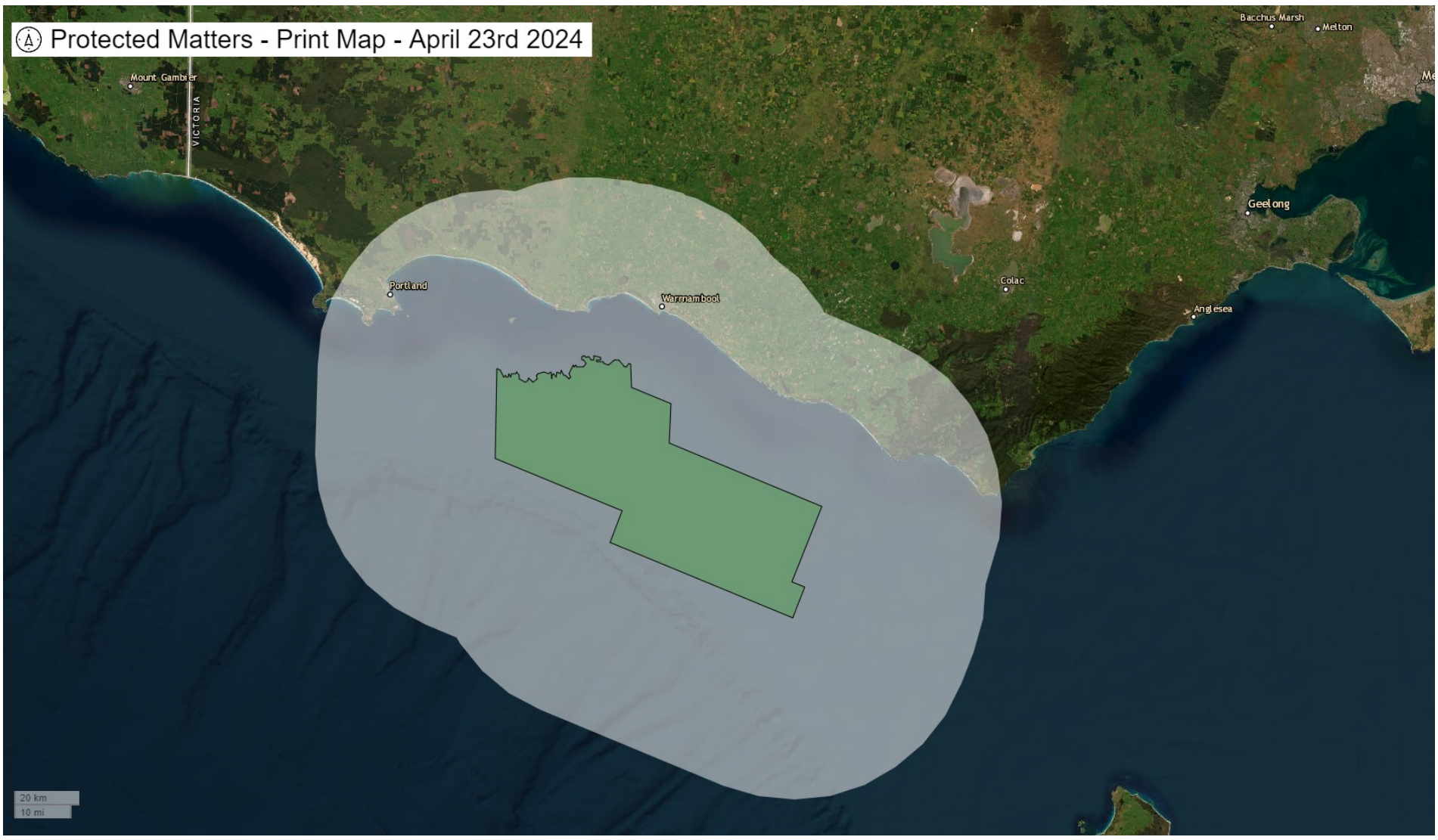

Figure 1: PMST Search Area - Underwater Sound for Birds (Active Source Area + 50km Buffer)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	3
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	9
Listed Threatened Species:	115
Listed Migratory Species:	66

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	20
Commonwealth Heritage Places:	None
Listed Marine Species:	110
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	1
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	67
Regional Forest Agreements:	1
Nationally Important Wetlands:	8
EPBC Act Referrals:	97
Key Ecological Features (Marine):	2
Biologically Important Areas:	22
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status	Buffer Status
Budj Bim Cultural Landscape	VIC	Declared property	In buffer area only

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Great Ocean Road and Scenic Environs	VIC	Listed place	In buffer area only
Indigenous			
Budj Bim National Heritage Landscape - Mt Eccles Lake Condah Area	VIC	Listed place	In buffer area only
Budj Bim National Heritage Landscape - Tyrendarra Area	VIC	Listed place	In buffer area only

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Glenelg estuary and discovery bay wetlands	Within 10km of Ramsar site	In buffer area only
Western district lakes	10 - 20km upstream from Ramsar site	In buffer area only

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area	In buffer area only

Community Name	Threatened Category	Presence Text	Buffer Status
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In buffer area only
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In buffer area only
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	Endangered	Community may occur within area	In buffer area only
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calyptorhynchus banksii graptogyne South-eastern Red-tailed Black-Cockatoo [25982]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Falco hypoleucos](#) Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Grantiella picta](#) Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Halobaena caerulea](#) Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
[Limosa lapponica baueri](#) Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Melanodryas cucullata cucullata](#) South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In buffer area only
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
CRUSTACEAN			
[Euastacus bispinosus](#) Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat known to occur within area	In buffer area only
FISH			
[Hoplostethus atlanticus](#) Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
[Nannoperca obscura](#) Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Seriolella brama](#) Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
[Thunnus maccoyii](#) Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
FROG			
[Litoria raniformis](#) Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
INSECT			
[Synemon plana](#) Golden Sun Moth [25234]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
MAMMAL			
[Antechinus minimus maritimus](#) Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In buffer area only
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area	In buffer area only
Miniopterus orianae bassanii Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area	In buffer area only
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area	In buffer area only
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Potorous tridactylus trisulcatus Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area	In buffer area only
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pseudomys shortridgei Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area	In buffer area only
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In buffer area only
PLANT			
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Astelia australiana Tall Astelia [10851]	Vulnerable	Translocated population known to occur within area	In buffer area only
Caladenia calcicola Limestone Spider-orchid [10065]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Caladenia concolor Crimson Spider-orchid, Maroon Spider-orchid [5505]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia hastata Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caladenia ornata Ornate Pink Fingers [76213]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Cassinia rugata Wrinkled Cassinia, Wrinkled Dollybush [21885]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area	In buffer area only
Dipodium campanulatum Bell Flower Hyacinth Orchid [55051]	Endangered	Species or species habitat may occur within area	In buffer area only
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pimelea spinescens subsp. spinescens Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Poa sallacustris Salt-lake Tussock-grass [24424]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Prasophyllum suaveolens Fragrant Leek-orchid [64956]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Senecio psilocarpus](#) Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Thelymitra epipactoides](#) Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Thelymitra matthewsii](#) Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thelymitra orientalis](#) Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
[Xerochrysum palustre](#) Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Delma impar](#) Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
[Lissolepis coventryi](#) Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area	In buffer area only
SHARK			
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Centrophorus uyato			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna tenuirostris			
Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi			
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
[Eubalaena australis as Balaena glacialis australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
[Isurus oxyrinchus](#) Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
[Lagenorhynchus obscurus](#) Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
[Physeter macrocephalus](#) Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat may occur within area	In buffer area only
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Breeding known to occur within area	In buffer area only
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In buffer area only
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
[Calidris alba](#) Sanderling [875]		Roosting known to occur within area	In buffer area only
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
[Charadrius bicinctus](#) Double-banded Plover [895]		Roosting known to occur within area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - Training Depot, Darts RD 3305 Portland [21019]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21023]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21018]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21010]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21022]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21012]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21013]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21007]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21011]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21016]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21017]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21015]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21014]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21024]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21008]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21009]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21020]	VIC	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - Training Depot, Darts RD 3305 Portland [21021]	VIC	In buffer area only
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC	In buffer area only
Unknown		
Commonwealth Land - [21583]	VIC	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Breeding likely to occur within area overfly marine area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In buffer area only
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Morus capensis Cape Gannet [59569]		Breeding known to occur within area	In buffer area only
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area	In buffer area only
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tringa glareola](#) Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
Fish			
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
[Hippocampus minotaur](#) Bullneck Seahorse [66705]		Species or species habitat may occur within area	In buffer area only
[Histiogamphelus briggsii](#) Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
[Hypselognathus rostratus](#) Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
[Kaupus costatus](#) Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In buffer area only
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
[Balaenoptera acutorostrata](#) Minke Whale [33]		Species or species habitat may occur within area	In feature area
[Balaenoptera bonaerensis](#) Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Berardius arnuxii](#) Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Australian Marine Parks [Resource Information]		
Park Name	Zone & IUCN Categories	Buffer Status
Apollo	Multiple Use Zone (IUCN VI)	In buffer area only

Extra Information

State and Territory Reserves [Resource Information]			
Protected Area Name	Reserve Type	State	Buffer Status
Aire River	Heritage River	VIC	In buffer area only
Aire River W.R.	Natural Features Reserve	VIC	In buffer area only
Bats Ridge W.R	Nature Conservation Reserve	VIC	In buffer area only
Bay of Islands Coastal Park	Conservation Park	VIC	In buffer area only
Bolwarra H43 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H44 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H45 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I90 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I91 B.R.	Natural Features Reserve	VIC	In buffer area only
Brucknell Creek F.F.R	Nature Conservation Reserve	VIC	In buffer area only
Budj Bim	National Park	VIC	In buffer area only
Cape Nelson	State Park	VIC	In buffer area only
Carpendeit	Reference Area	VIC	In buffer area only
Cooriemungle	Reference Area	VIC	In buffer area only
Cooriemungle Creek F.R	Nature Conservation Reserve	VIC	In buffer area only
Coradjil B.R.	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Coradjil N.C.R.	Natural Features Reserve	VIC	In buffer area only
Crinoline Creek	Reference Area	VIC	In buffer area only
Curdie Vale N.C.R.	Natural Features Reserve	VIC	In buffer area only
Deen Maar	Indigenous Protected Area	VIC	In buffer area only
Discovery Bay Coastal Park	Conservation Park	VIC	In buffer area only
Dunmore B.R.	Natural Features Reserve	VIC	In buffer area only
Ecklin South Swamp N.C.R.	Natural Features Reserve	VIC	In buffer area only
Fitzroy River SS.R.	Natural Features Reserve	VIC	In buffer area only
Framlingham Forest	Indigenous Protected Area	VIC	In buffer area only
Goose Lagoon W.R	Natural Features Reserve	VIC	In buffer area only
Gorae B.R.	Natural Features Reserve	VIC	In buffer area only
Great Otway	National Park	VIC	In buffer area only
Heywood B.R.	Natural Features Reserve	VIC	In buffer area only
Hopkins Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Hopkins River, Framlingham SS.R.	Natural Features Reserve	VIC	In buffer area only
Jancourt N.C.R.	Natural Features Reserve	VIC	In buffer area only
Johanna Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Kurtonitj	Indigenous Protected Area	VIC	In buffer area only
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC	In buffer area only
Lake Aringa W.R	Nature Conservation Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Lake Condah	Indigenous Protected Area	VIC	In buffer area only
Lake Gillear W.R	Natural Features Reserve	VIC	In buffer area only
Latrobe B.R.	Natural Features Reserve	VIC	In buffer area only
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC	In buffer area only
Merri	Marine Sanctuary	VIC	In buffer area only
Myamyn B.R.	Natural Features Reserve	VIC	In buffer area only
Narrawong F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nine Mile F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nullawarre F.R.	Nature Conservation Reserve	VIC	In buffer area only
Port Campbell	National Park	VIC	In buffer area only
Portland H46 B.R.	Natural Features Reserve	VIC	In buffer area only
Portland H47 B.R.	Natural Features Reserve	VIC	In buffer area only
Pretty Hill F.R	Nature Conservation Reserve	VIC	In buffer area only
Princetown W.R	Natural Features Reserve	VIC	In buffer area only
St Helens F.R	Nature Conservation Reserve	VIC	In buffer area only
The Arches	Marine Sanctuary	VIC	In buffer area only
The Stones	Reference Area	VIC	In buffer area only
The Stones W.R.	Nature Conservation Reserve	VIC	In buffer area only
Timboon I1 B.R	Natural Features Reserve	VIC	In buffer area only
Tomahawk Creek	Reference Area	VIC	In buffer area only
Tower Hill W.R	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Trewalla H48 B.R.	Natural Features Reserve	VIC	In buffer area only
Trewalla H49 B.R.	Natural Features Reserve	VIC	In buffer area only
Twelve Apostles	Marine National Park	VIC	In buffer area only
Tyrendarra	Indigenous Protected Area	VIC	In buffer area only
Tyrendarra F.R	Nature Conservation Reserve	VIC	In buffer area only
Unnamed P0059	Private Nature Reserve	VIC	In buffer area only
Unnamed P0126	Private Nature Reserve	VIC	In buffer area only
Woolsthorpe N.C.R.	Natural Features Reserve	VIC	In buffer area only
Yambuk F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Aire River	VIC	In buffer area only
Cobden-Terang Volcanic Craters	VIC	In buffer area only
Lake Condah	VIC	In buffer area only
Lower Aire River Wetlands	VIC	In buffer area only
Lower Merri River Wetlands	VIC	In buffer area only
Princetown Wetlands	VIC	In buffer area only
Tower Hill	VIC	In buffer area only
Yambuk Wetlands	VIC	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Referral Decision	In buffer area only
Hexham Wind Farm	2022/09287		Assessment	In buffer area only
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Southern Winds Offshore Wind Project	2022/09435		Assessment	In buffer area only
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed	In buffer area only
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Willatook Wind Farm, Vic	2019/8439		Post-Approval	In buffer area only
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Kentbruck Green Power Hub, Vic	2019/8510	Controlled Action	Assessment Approach	In buffer area only
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval	In buffer area only
Penshurst Wind Energy Facility	2011/5991	Controlled Action	Completed	In buffer area only
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In buffer area only
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval	In buffer area only
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed	In buffer area only
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed	In buffer area only
Development of wind energy facility	2005/2224	Not Controlled Action	Completed	In buffer area only
Drilling of Callister-1 exploration well in VIC/P51	2004/1633	Not Controlled Action	Completed	In buffer area only
Ellerslie Timber Bridge Partial Restoration	2009/4734	Not Controlled Action	Completed	In buffer area only
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed	In buffer area only
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Gas Fields Development	2011/5879	Not Controlled Action	Completed	In buffer area only
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed	In buffer area only
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed	In buffer area only
Hawkesdale Wind Farm	2005/2140	Not Controlled Action	Completed	In buffer area only
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In buffer area only
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed	In buffer area only
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed	In buffer area only
Newfield wind farm	2007/3226	Not Controlled Action	Completed	In buffer area only
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed	In buffer area only
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed	In buffer area only
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed	In buffer area only
Portland Landfill Borehole Installation, Vic	2017/7886	Not Controlled Action	Completed	In buffer area only
Pulp mill and associated infrastructure 3km north of Heywood	2005/2125	Not Controlled Action	Completed	In buffer area only
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed	In buffer area only
Redevelopment Project to Upgrade and Extend the Portland Trawler Wharf	2008/4317	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2006/2937	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed	In buffer area only
Shaw River Power Station Project	2009/5088	Not Controlled Action	Completed	In buffer area only
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
Tarrone Power Station Project	2010/5299	Not Controlled Action	Completed	In buffer area only
The Sisters Wind Farm	2008/4268	Not Controlled Action	Completed	In buffer area only
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In buffer area only
Water pipelines, Mortlake Power Station	2006/2881	Not Controlled Action	Completed	In buffer area only
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed	In buffer area only
Wind farm development	2005/1960	Not Controlled Action	Completed	In buffer area only
Wind Farm Development	2004/1929	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		(Particular Manner)		
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Gas Pipeline Crossing at Mount Emu Creek	2009/4913	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
SEA Gas Project transmission pipeline	2001/513	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
8 Lot Industrial Subdivision	2008/4527	Referral Decision	Completed	In buffer area only
Portland Wave Energy Project	2008/3946	Referral Decision	Completed	In buffer area only
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur	In buffer area only
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur	In buffer area only
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur	In buffer area only
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
[Carcharodon carcharias](#) White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
[Balaenoptera musculus brevicauda](#) Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
[Balaenoptera musculus brevicauda](#) Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
[Balaenoptera musculus brevicauda](#) Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Apr-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

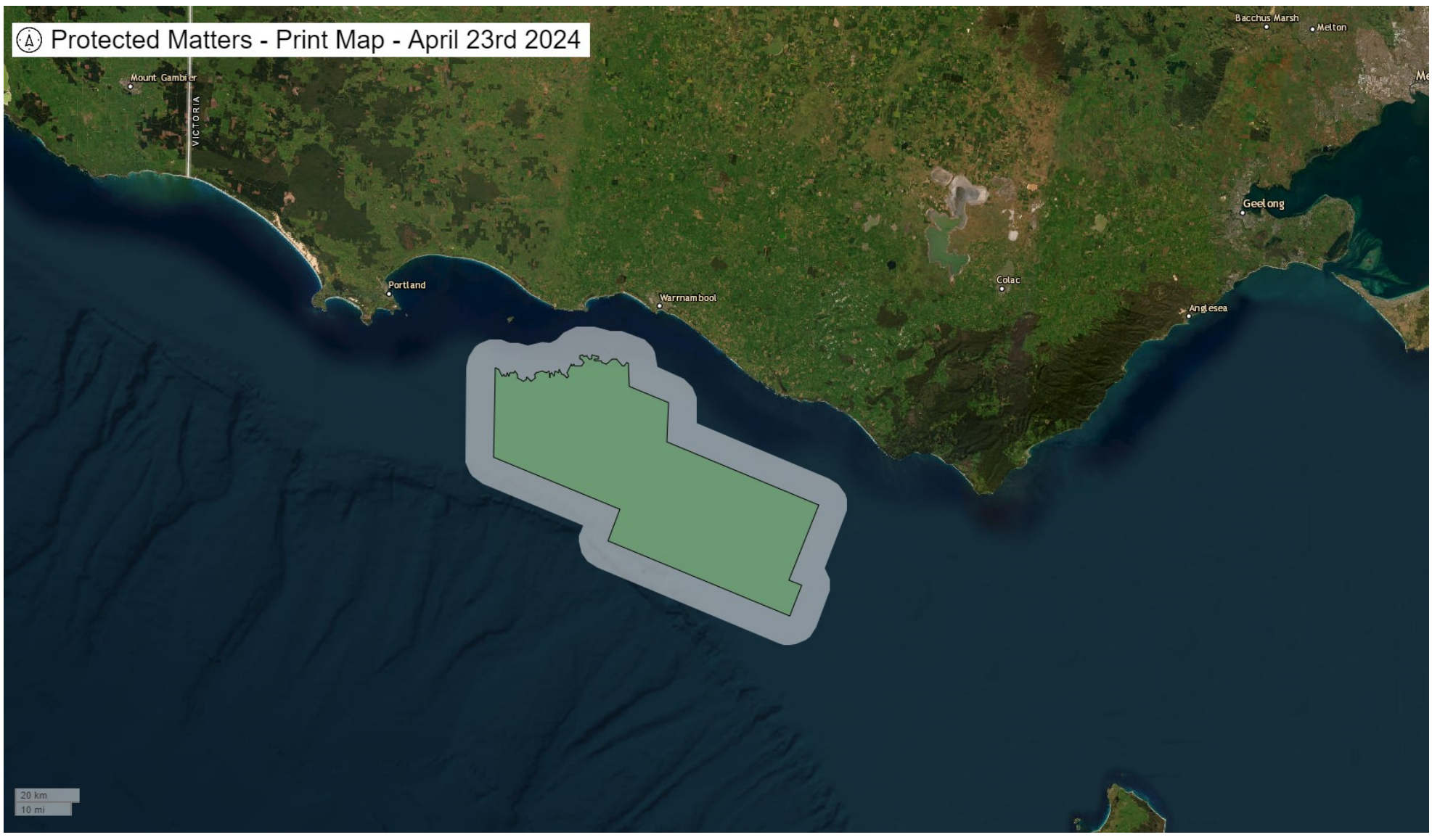

Figure 1: PMST Search Area - Underwater Sound for Fish (Active Source Area + 8km Buffer)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	44
Listed Migratory Species:	43

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	68
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	37
Key Ecological Features (Marine):	2
Biologically Important Areas:	19
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
FISH			
Hoplostethus atlanticus			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
MAMMAL			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
[Eubalaena australis as Balaena glacialis australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
[Isurus oxyrinchus](#) Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Lagenorhynchus obscurus](#) Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
[Physeter macrocephalus](#) Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus			
Osprey [952]		Species or species habitat known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat likely to occur within area overfly marine area	In buffer area only
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In buffer area only
Fish			
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Vanacampus phillipi](#) Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
[Vanacampus poecilolaemus](#) Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
[Balaenoptera acutorostrata](#) Minke Whale [33]		Species or species habitat may occur within area	In feature area
[Balaenoptera bonaerensis](#) Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Apr-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

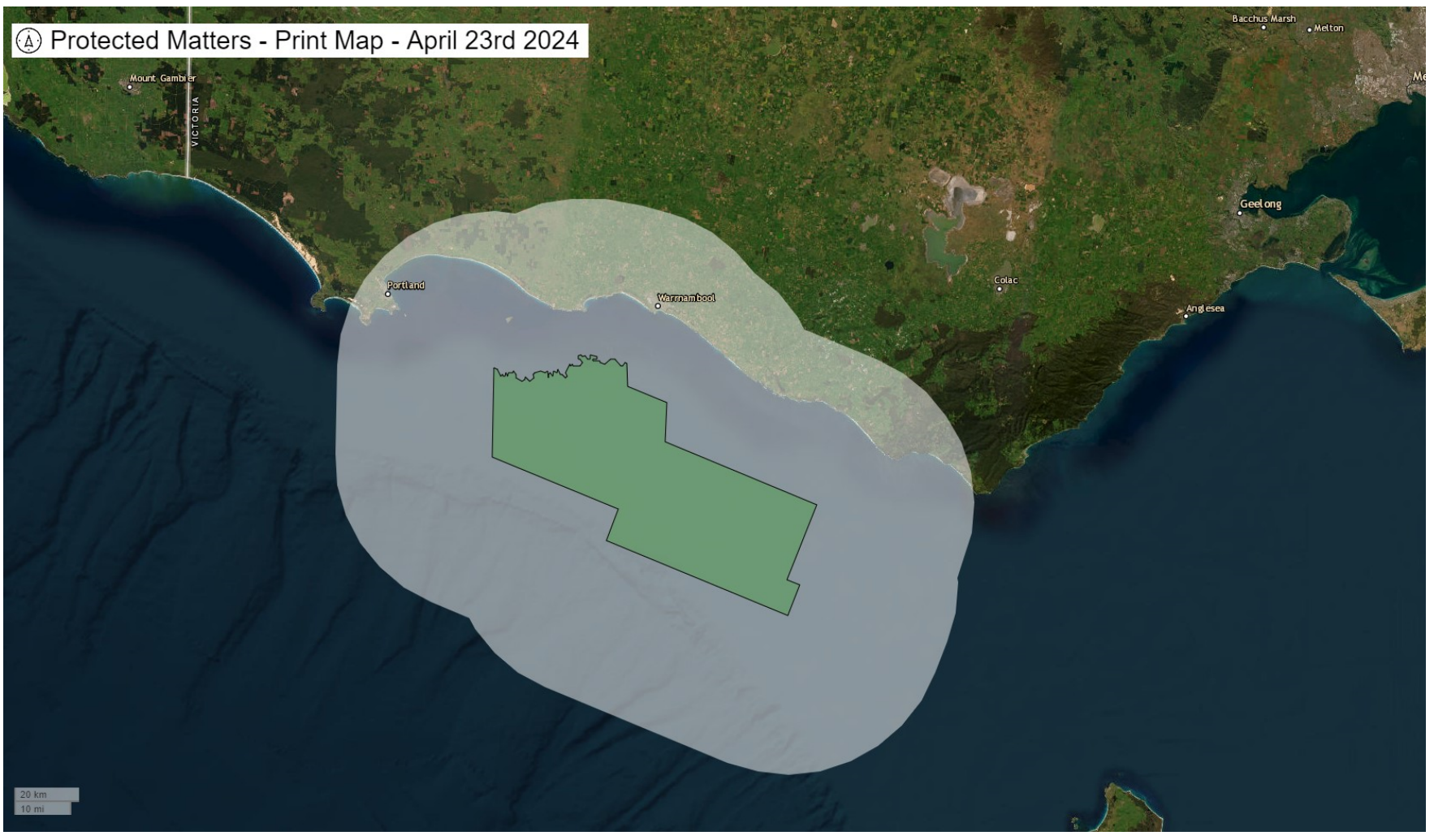

Figure 1: PMST Search Area - Underwater Sound for LF Cetaceans (Active Source Area + 44km Buffer)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	3
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	9
Listed Threatened Species:	109
Listed Migratory Species:	66

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	19
Commonwealth Heritage Places:	None
Listed Marine Species:	110
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	1
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	58
Regional Forest Agreements:	1
Nationally Important Wetlands:	5
EPBC Act Referrals:	92
Key Ecological Features (Marine):	2
Biologically Important Areas:	22
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status	Buffer Status
Budj Bim Cultural Landscape	VIC	Declared property	In buffer area only

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Great Ocean Road and Scenic Environs	VIC	Listed place	In buffer area only
Indigenous			
Budj Bim National Heritage Landscape - Mt Eccles Lake Condah Area	VIC	Listed place	In buffer area only
Budj Bim National Heritage Landscape - Tyrendarra Area	VIC	Listed place	In buffer area only

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area	In buffer area only
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In buffer area only
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In buffer area only
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain	Endangered	Community may occur within area	In buffer area only

Community Name	Threatened Category	Presence Text	Buffer Status
Bioregion			
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Aphelocephala leucopsis			
Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Arenaria interpres			
Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Botaurus poiciloptilus			
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calyptorhynchus banksii graptogyne South-eastern Red-tailed Black-Cockatoo [25982]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Neophema chrysostoma](#) Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Pachyptila turtur subantarctica](#) Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Pedionomus torquatus](#) Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Pterodroma leucoptera leucoptera](#) Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
[Pterodroma mollis](#) Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Stagonopleura guttata](#) Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Sternula nereis nereis](#) Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
CRUSTACEAN			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Euastacus bispinosus](#)			
Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat known to occur within area	In buffer area only
FISH			
[Hoplostethus atlanticus](#)			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
[Nannoperca obscura](#)			
Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Prototroctes maraena](#)			
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Seriolella brama](#)			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
[Thunnus maccoyii](#)			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
FROG			
[Litoria raniformis](#)			
Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
INSECT			
[Synemon plana](#)			
Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area	In buffer area only
MAMMAL			
[Antechinus minimus maritimus](#)			
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Balaenoptera borealis](#)			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isoodon obesulus obesulus			
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In buffer area only
Mastacomys fuscus mordicus			
Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area	In buffer area only
Miniopterus orianae bassanii			
Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area	In buffer area only
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area	In buffer area only
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Potorous tridactylus trisulcatus			
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pseudomys fumeus](#) Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area	In buffer area only
[Pseudomys novaehollandiae](#) New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Pseudomys shortridgei](#) Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Pteropus poliocephalus](#) Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In buffer area only
PLANT			
[Amphibromus fluitans](#) River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Caladenia concolor](#) Crimson Spider-orchid, Maroon Spider-orchid [5505]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Caladenia hastata](#) Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Caladenia ornata](#) Ornate Pink Fingers [76213]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Dianella amoena](#) Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Dipodium campanulatum](#) Bell Flower Hyacinth Orchid [55051]	Endangered	Species or species habitat may occur within area	In buffer area only
[Eucalyptus strzeleckii](#) Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Prasophyllum suaveolens Fragrant Leek-orchid [64956]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area	In buffer area only
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thelymitra orientalis Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Delma impar			
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Lissolepis coventryi			
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area	In buffer area only
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna tenuirostris			
Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In buffer area only
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - Training Depot, Darts RD 3305 Portland [21019]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21010]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21022]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21009]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21018]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21007]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21012]	VIC	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - Training Depot, Darts RD 3305 Portland [21013]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21011]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21016]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21017]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21014]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21015]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21024]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21023]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21008]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21021]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21020]	VIC	In buffer area only
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Breeding likely to occur within area overfly marine area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Morus capensis Cape Gannet [59569]		Breeding known to occur within area	In buffer area only
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area	In buffer area only
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Sternula albifrons as Sterna albifrons](#) Little Tern [82849]		Breeding known to occur within area	In buffer area only
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche bulleri platei as Thalassarche sp. nov.](#) Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche chrysostoma](#) Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalasseus bergii as Sterna bergii](#) Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
[Thinornis cucullatus as Thinornis rubricollis](#) Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only
[Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis](#) Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
[Tringa brevipes as Heteroscelus brevipes](#) Grey-tailed Tattler [851]		Roosting known to occur within area overfly marine area	In buffer area only
[Tringa glareola](#) Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
Fish			
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
[Hippocampus minotaur](#) Bullneck Seahorse [66705]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In buffer area only
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Vanacampus phillipi](#) Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
[Vanacampus poecilolaemus](#) Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
[Balaenoptera acutorostrata](#) Minke Whale [33]		Species or species habitat may occur within area	In feature area
[Balaenoptera bonaerensis](#) Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Australian Marine Parks		[Resource Information]
Park Name	Zone & IUCN Categories	Buffer Status
Apollo	Multiple Use Zone (IUCN VI)	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Aire River W.R.	Natural Features Reserve	VIC	In buffer area only
Bay of Islands Coastal Park	Conservation Park	VIC	In buffer area only
Bolwarra H43 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H44 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H45 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I90 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I91 B.R.	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Brucknell Creek F.F.R	Nature Conservation Reserve	VIC	In buffer area only
Budj Bim	National Park	VIC	In buffer area only
Cape Nelson	State Park	VIC	In buffer area only
Cooriemungle	Reference Area	VIC	In buffer area only
Cooriemungle Creek F.R	Nature Conservation Reserve	VIC	In buffer area only
Coradjil B.R.	Natural Features Reserve	VIC	In buffer area only
Coradjil N.C.R.	Natural Features Reserve	VIC	In buffer area only
Crinoline Creek	Reference Area	VIC	In buffer area only
Curdie Vale N.C.R.	Natural Features Reserve	VIC	In buffer area only
Deen Maar	Indigenous Protected Area	VIC	In buffer area only
Discovery Bay Coastal Park	Conservation Park	VIC	In buffer area only
Ecklin South Swamp N.C.R.	Natural Features Reserve	VIC	In buffer area only
Fitzroy River SS.R.	Natural Features Reserve	VIC	In buffer area only
Framlingham Forest	Indigenous Protected Area	VIC	In buffer area only
Goose Lagoon W.R	Natural Features Reserve	VIC	In buffer area only
Gorae B.R.	Natural Features Reserve	VIC	In buffer area only
Great Otway	National Park	VIC	In buffer area only
Hopkins Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Hopkins River, Framlingham SS.R.	Natural Features Reserve	VIC	In buffer area only
Johanna Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Kurtonitj	Indigenous Protected Area	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC	In buffer area only
Lake Aringa W.R	Nature Conservation Reserve	VIC	In buffer area only
Lake Gillear W.R	Natural Features Reserve	VIC	In buffer area only
Latrobe B.R.	Natural Features Reserve	VIC	In buffer area only
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC	In buffer area only
Merri	Marine Sanctuary	VIC	In buffer area only
Narrawong F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nine Mile F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nullawarre F.R.	Nature Conservation Reserve	VIC	In buffer area only
Port Campbell	National Park	VIC	In buffer area only
Portland H46 B.R.	Natural Features Reserve	VIC	In buffer area only
Portland H47 B.R.	Natural Features Reserve	VIC	In buffer area only
Pretty Hill F.R	Nature Conservation Reserve	VIC	In buffer area only
Princetown W.R	Natural Features Reserve	VIC	In buffer area only
St Helens F.R	Nature Conservation Reserve	VIC	In buffer area only
The Arches	Marine Sanctuary	VIC	In buffer area only
The Stones	Reference Area	VIC	In buffer area only
The Stones W.R.	Nature Conservation Reserve	VIC	In buffer area only
Timboon I1 B.R	Natural Features Reserve	VIC	In buffer area only
Tomahawk Creek	Reference Area	VIC	In buffer area only
Tower Hill W.R	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Trewalla H48 B.R.	Natural Features Reserve	VIC	In buffer area only
Twelve Apostles	Marine National Park	VIC	In buffer area only
Tyrendarra	Indigenous Protected Area	VIC	In buffer area only
Tyrendarra F.R	Nature Conservation Reserve	VIC	In buffer area only
Unnamed P0059	Private Nature Reserve	VIC	In buffer area only
Unnamed P0126	Private Nature Reserve	VIC	In buffer area only
Woolsthorpe N.C.R.	Natural Features Reserve	VIC	In buffer area only
Yambuk F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Cobden-Terang Volcanic Craters	VIC	In buffer area only
Lower Merri River Wetlands	VIC	In buffer area only
Princetown Wetlands	VIC	In buffer area only
Tower Hill	VIC	In buffer area only
Yambuk Wetlands	VIC	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Referral Decision	In buffer area only
Hexham Wind Farm	2022/09287		Assessment	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Southern Winds Offshore Wind Project	2022/09435		Assessment	In buffer area only
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed	In buffer area only
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Willatook Wind Farm, Vic	2019/8439		Post-Approval	In buffer area only
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval	In buffer area only
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In buffer area only
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval	In buffer area only
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed	In buffer area only
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Development of wind energy facility	2005/2224	Not Controlled Action	Completed	In buffer area only
Drilling of Callister-1 exploration well in VIC/P51	2004/1633	Not Controlled Action	Completed	In buffer area only
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed	In buffer area only
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Gas Fields Development	2011/5879	Not Controlled Action	Completed	In buffer area only
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed	In buffer area only
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed	In buffer area only
Hawkesdale Wind Farm	2005/2140	Not Controlled Action	Completed	In buffer area only
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In buffer area only
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed	In buffer area only
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed	In buffer area only
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed	In buffer area only
Newfield wind farm	2007/3226	Not Controlled Action	Completed	In buffer area only
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed	In buffer area only
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed	In buffer area only
Portland Landfill Borehole Installation, Vic	2017/7886	Not Controlled Action	Completed	In buffer area only
Pulp mill and associated infrastructure 3km north of Heywood	2005/2125	Not Controlled Action	Completed	In buffer area only
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed	In buffer area only
Redevelopment Project to Upgrade and Extend the Portland Trawler Wharf	2008/4317	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2006/2937	Not Controlled Action	Completed	In buffer area only
Shaw River Power Station Project	2009/5088	Not Controlled Action	Completed	In buffer area only
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
Tarrone Power Station Project	2010/5299	Not Controlled Action	Completed	In buffer area only
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In buffer area only
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed	In buffer area only
Wind farm development	2005/1960	Not Controlled Action	Completed	In buffer area only
Wind Farm Development	2004/1929	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Gas Pipeline Crossing at Mount Emu Creek	2009/4913	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
SEA Gas Project transmission pipeline	2001/513	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
8 Lot Industrial Subdivision	2008/4527	Referral Decision	Completed	In buffer area only
Portland Wave Energy Project	2008/3946	Referral Decision	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Referral decision				
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur	In buffer area only
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur	In buffer area only
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur	In buffer area only

Scientific Name	Behaviour	Presence	Buffer Status
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Apr-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

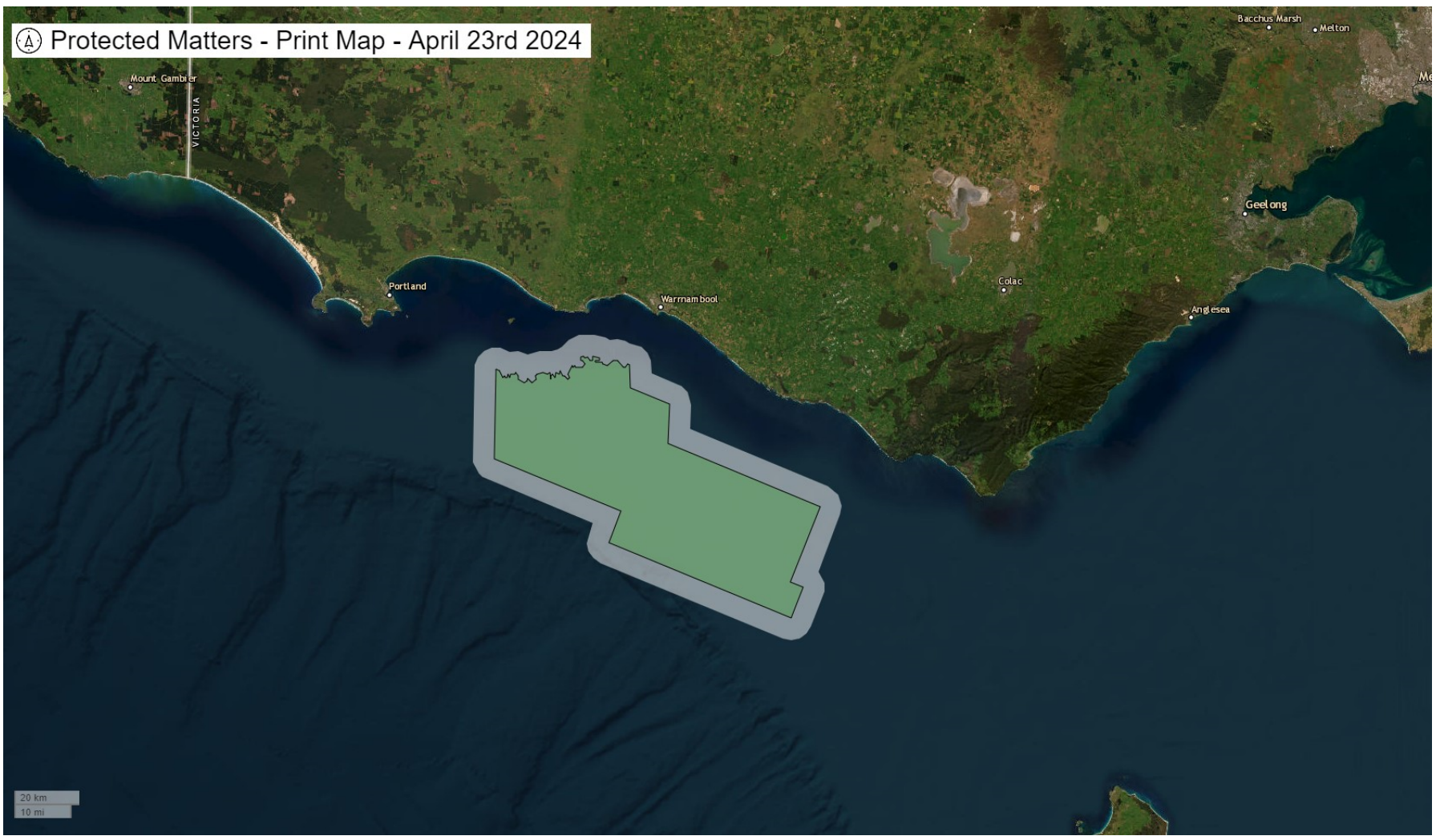

Figure 1: PMST Search Area - Underwater Sound for Turtles (Active Source Area + 6km Buffer)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	42
Listed Migratory Species:	40

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	63
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	36
Key Ecological Features (Marine):	2
Biologically Important Areas:	19
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
FISH			
Hoplostethus atlanticus			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area	In feature area
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
MAMMAL			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Fish			
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 01-May-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

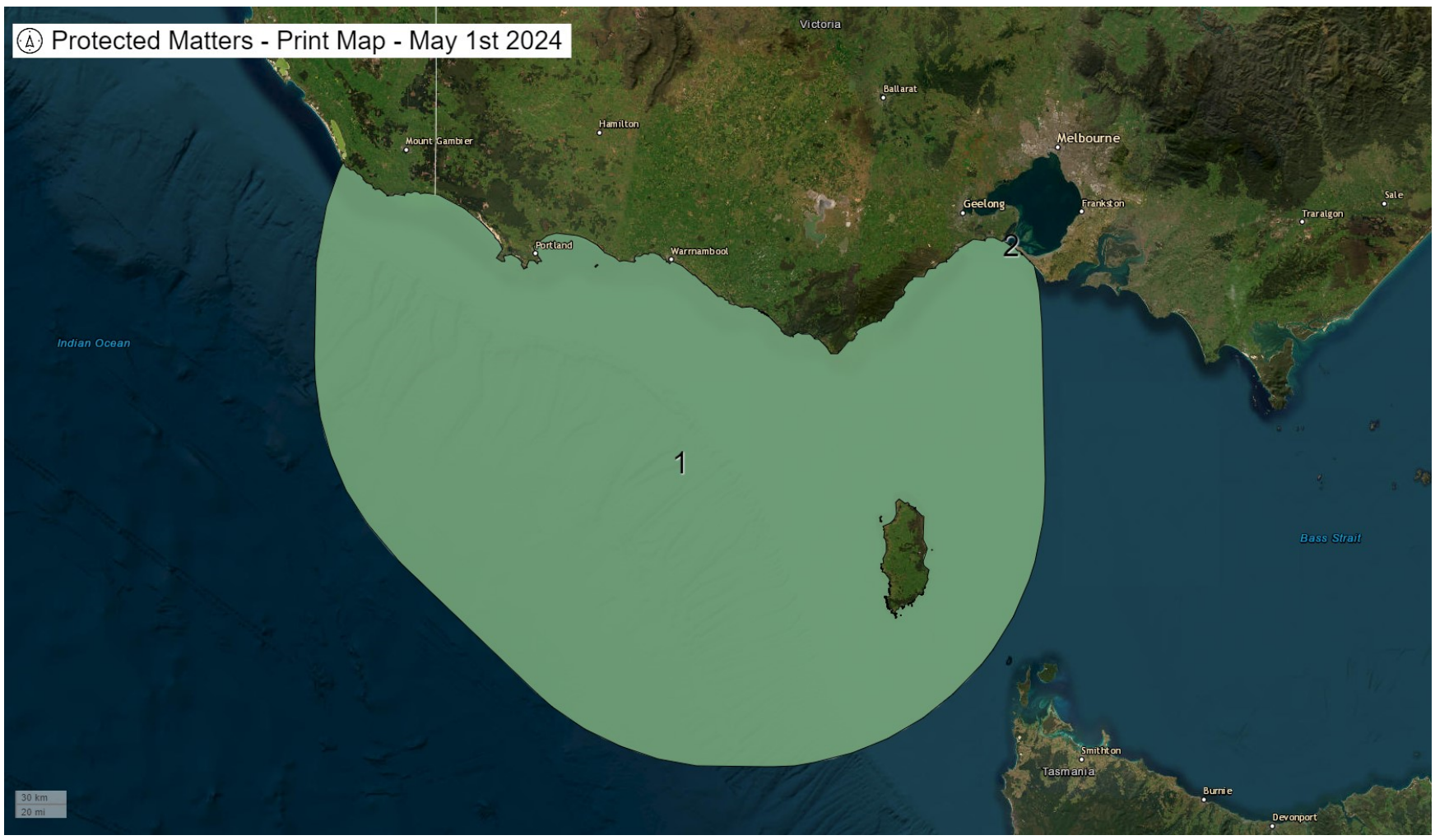

Figure 1: PMST Search Area - Environmental Planning Area

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	2
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	11
Listed Threatened Species:	135
Listed Migratory Species:	72

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	30
Commonwealth Heritage Places:	3
Listed Marine Species:	117
Whales and Other Cetaceans:	31
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	5
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	101
Regional Forest Agreements:	2
Nationally Important Wetlands:	18
EPBC Act Referrals:	156
Key Ecological Features (Marine):	2
Biologically Important Areas:	29
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status
Historic		
Great Ocean Road and Scenic Environs	VIC	Listed place
Point Nepean Defence Sites and Quarantine Station Area	VIC	Listed place

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Glenelg estuary and discovery bay wetlands	Within Ramsar site
Lavinia	Within Ramsar site
Piccaninnie ponds karst wetlands	Within Ramsar site
Port phillip bay (western shoreline) and bellarine peninsula	Within Ramsar site

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area

Community Name	Threatened Category	Presence Text
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	Endangered	Community likely to occur within area
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community likely to occur within area
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (Eucalyptus ovata / E. brookeriana)	Critically Endangered	Community likely to occur within area
Tasmanian white gum (Eucalyptus viminalis) wet forest	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Acanthiza pusilla magnirostris King Island Brown Thornbill, Brown Thornbill (King Island) [91709]	Endangered	Species or species habitat known to occur within area
Acanthornis magna greeniana King Island Scrubtit, Scrubtit (King Island) [82329]	Critically Endangered	Species or species habitat known to occur within area
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Aquila audax fleayi Tasmanian Wedge-tailed Eagle, Wedge-tailed Eagle (Tasmanian) [64435]	Endangered	Species or species habitat may occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii graptogyne South-eastern Red-tailed Black-Cockatoo [25982]	Endangered	Species or species habitat known to occur within area
Ceyx azureus diemenensis Tasmanian Azure Kingfisher [25977]	Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route known to occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Platycercus caledonicus brownii Green Rosella (King Island) [67041]	Vulnerable	Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Strepera fuliginosa colei Black Currawong (King Island) [67113]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
[Xenus cinereus](#) Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area
CRUSTACEAN		
[Euastacus bispinosus](#) Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat known to occur within area
FISH		
[Galaxiella pusilla](#) Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Endangered	Species or species habitat may occur within area
[Hoplostethus atlanticus](#) Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
[Nannoperca obscura](#) Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area
[Nannoperca variegata](#) Variegated Pygmy Perch, Ewens Pygmy Perch, Golden Pygmy Perch [26178]	Vulnerable	Species or species habitat known to occur within area
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
[Rexea solandri (eastern Australian population)](#) Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat may occur within area
[Seriolella brama](#) Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
[Thunnus maccoyii](#) Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area
FROG		
[Litoria raniformis](#) Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
INSECT		

Scientific Name	Threatened Category	Presence Text
Synemon plana		
Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area
MAMMAL		
Antechinus minimus maritimus		
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isoodon obesulus obesulus		
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
Mastacomys fuscus mordicus		
Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area
Miniopterus orianae bassanii		
Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Petauroides volans](#)		
Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
[Petaurus australis australis](#)		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area
[Potorous tridactylus trisulcatus](#)		
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area
[Pseudomys fumeus](#)		
Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area
[Pseudomys novaehollandiae](#)		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
[Pseudomys shortridgei](#)		
Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area
[Pteropus poliocephalus](#)		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
PLANT		
[Amphibromus fluitans](#)		
River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area
[Astelia australiana](#)		
Tall Astelia [10851]	Vulnerable	Species or species habitat may occur within area
[Caladenia calcicola](#)		
Limestone Spider-orchid [10065]	Vulnerable	Species or species habitat likely to occur within area
[Caladenia colorata](#)		
Coloured Spider-orchid, Small Western Spider-orchid, Painted Spider-orchid [54999]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Caladenia concolor Crimson Spider-orchid, Maroon Spider-orchid [5505]	Vulnerable	Species or species habitat may occur within area
Caladenia hastata Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area
Caladenia ornata Ornate Pink Fingers [76213]	Vulnerable	Species or species habitat likely to occur within area
Caladenia tensa Greencomb Spider-orchid, Rigid Spider-orchid [24390]	Endangered	Species or species habitat may occur within area
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat may occur within area
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area
Euphrasia collina subsp. muelleri Purple Eyebright, Mueller's Eyebright [16151]	Endangered	Species or species habitat known to occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area
Grevillea infecunda Anglesea Grevillea [22026]	Vulnerable	Species or species habitat known to occur within area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area
Hiya distans listed as Hypolepis distans Scrambling Ground-fern [92548]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area
Leiocarpa gatesii Wrinkled Buttons [76212]	Vulnerable	Species or species habitat known to occur within area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat known to occur within area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat may occur within area
Pimelea spinescens subsp. spinescens Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat likely to occur within area
Pomaderris halmaturina subsp. halmaturina Kangaroo Island Pomaderris [21964]	Vulnerable	Species or species habitat known to occur within area
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat likely to occur within area
Prasophyllum frenchii Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid, French's Leek-orchid, Swamp Leek-orchid [9704]	Endangered	Species or species habitat known to occur within area
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area
Prasophyllum suaveolens Fragrant Leek-orchid [64956]	Endangered	Species or species habitat may occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat known to occur within area
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat known to occur within area
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat may occur within area
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat likely to occur within area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area
Taraxacum cygnorum Coast Dandelion, Native Dandelion [2508]	Vulnerable	Species or species habitat may occur within area
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Thelymitra orientalis Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Lissolepis coventryi Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area
SHARK		
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
[Anous stolidus](#) Common Noddy [825]		Species or species habitat likely to occur within area
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
[Ardenna carneipes](#) Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area
[Ardenna grisea](#) Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
[Ardenna tenuirostris](#) Short-tailed Shearwater [82652]		Breeding known to occur within area
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
[Thalassarche steadi](#)		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
[Balaenoptera bonaerensis](#)		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
[Balaenoptera borealis](#)		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera musculus](#)		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera physalus](#)		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Caperea marginata](#)		
Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
[Carcharodon carcharias](#)		
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Caretta caretta](#)		
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Chelonia mydas](#)		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis as Balaena glacialis australis		
Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus		
Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus		
Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus		
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca		
Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus		
Sperm Whale [59]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Breeding known to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area
[Arenaria interpres](#) Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
[Calidris alba](#) Sanderling [875]		Roosting known to occur within area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area
[Calidris tenuirostris](#) Great Knot [862]	Vulnerable	Roosting known to occur within area
[Charadrius bicinctus](#) Double-banded Plover [895]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Defence	
Defence - Training Depot, Darts RD 3305 Portland [21018]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21019]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21016]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21014]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21010]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21011]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21015]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21013]	VIC

Commonwealth Land Name	State
Defence - Training Depot, Darts RD 3305 Portland [21020]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21024]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21017]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21022]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21023]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21021]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21007]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21009]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21008]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21012]	VIC
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC
Transport and Regional Services - Australian Maritime Safety Authority	
Commonwealth Land - Australian Maritime Safety Authority [41289]	SA
Commonwealth Land - Australian Maritime Safety Authority [41288]	SA
Unknown	
Commonwealth Land - [21583]	VIC
Commonwealth Land - [60115]	TAS
Commonwealth Land - [21492]	VIC
Commonwealth Land - [60112]	TAS
Commonwealth Land - [60114]	TAS
Commonwealth Land - [60111]	TAS
Commonwealth Land - [22391]	VIC
Commonwealth Land - [60113]	TAS
Commonwealth Land - [21570]	VIC

Commonwealth Heritage Places		[Resource Information]
Name	State	Status
Historic		
Cape Northumberland Lighthouse	SA	Listed place
Cape Wickham Lighthouse	TAS	Listed place

Name	State	Status
Sorrento Post Office	VIC	Listed place

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Chroicocephalus novaehollandiae as Larus novaehollandiae		
Silver Gull [82326]		Breeding known to occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora		
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans		
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor		
Little Penguin [1085]		Breeding known to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Gallinago megala		
Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura		
Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Breeding known to occur within area
Halobaena caerulea		
Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Morus capensis Cape Gannet [59569]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Sternula albifrons as Sterna albifrons		
Little Tern [82849]		Breeding known to occur within area
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov.		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Thalasseus bergii as Sterna bergii		
Greater Crested Tern [83000]		Breeding known to occur within area
Thinornis cucullatus as Thinornis rubricollis		
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Tringa brevipes as Heteroscelus brevipes		
Grey-tailed Tattler [851]		Roosting known to occur within area overfly marine area
Tringa glareola		
Wood Sandpiper [829]		Roosting known to occur within area overfly marine area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area
Xenus cinereus		
Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area
Fish		
Heraldia nocturna		
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis		
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps		
Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys mollisoni Mollison's Pipefish [66260]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		

Current Scientific Name	Status	Type of Presence
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Hyperoodon planifrons Southern Bottlenose Whale [71]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tasmacetus shepherdi Shepherd's Beaked Whale, Tasman Beaked Whale [55]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories
Apollo	Multiple Use Zone (IUCN VI)
Franklin	Multiple Use Zone (IUCN VI)
Zeehan	Multiple Use Zone (IUCN VI)

Park Name	Zone & IUCN Categories
Nelson	Special Purpose Zone (IUCN VI)
Zeehan	Special Purpose Zone (IUCN VI)

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Aire River	Heritage River	VIC
Aire River W.R.	Natural Features Reserve	VIC
Aireys Inlet B.R.	Natural Features Reserve	VIC
Anglesea B.R.	Natural Features Reserve	VIC
Badger Box Creek	Nature Reserve	TAS
Barham Paradise S.R.	Natural Features Reserve	VIC
Barwon Bluff	Marine Sanctuary	VIC
Bats Ridge W.R	Nature Conservation Reserve	VIC
Bay of Islands Coastal Park	Conservation Park	VIC
Black Pyramid Rock	Nature Reserve	TAS
Bolwarra H43 B.R.	Natural Features Reserve	VIC
Bolwarra H44 B.R.	Natural Features Reserve	VIC
Bolwarra H45 B.R.	Natural Features Reserve	VIC
Breamlea F.F.R.	Nature Conservation Reserve	VIC
Bucks Lake	Game Reserve	SA
Canunda	National Park	SA

Protected Area Name	Reserve Type	State
Cape Nelson	State Park	VIC
Cape Wickham	Conservation Area	TAS
Cape Wickham	State Reserve	TAS
Carpenter Rocks	Conservation Park	SA
Cataraqui Point	Conservation Area	TAS
Christmas Island	Nature Reserve	TAS
City of Melbourne Bay	Conservation Area	TAS
Colliers Forest Reserve	Conservation Covenant	TAS
Colliers Swamp	Conservation Area	TAS
Councillor Island	Nature Reserve	TAS
Counsel Hill	Conservation Area	TAS
Currie Lightkeepers Residence	Historic Site	TAS
Deen Maar	Indigenous Protected Area	VIC
Dingley Dell	Conservation Park	SA
Disappointment Bay	State Reserve	TAS
Discovery Bay	Marine National Park	VIC
Discovery Bay Coastal Park	Conservation Park	VIC
Douglas Point	Conservation Park	SA
Eagle Rock	Marine Sanctuary	VIC
Edna Bowman N.C.R.	Natural Features Reserve	VIC
Eldorado	Conservation Area	TAS
Gentle Annie	Conservation Area	TAS
Glenelg River	Heritage River	VIC
Goose Lagoon W.R	Natural Features Reserve	VIC
Great Otway	National Park	VIC

Protected Area Name	Reserve Type	State
Hedditch Hill S.R.	Natural Features Reserve	VIC
Johanna Falls S.R.	Natural Features Reserve	VIC
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC
Lake Connewarre W.R	Natural Features Reserve	VIC
Lake Gillear W.R	Natural Features Reserve	VIC
Latrobe B.R.	Natural Features Reserve	VIC
Lavinia	State Reserve	TAS
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC
Lily Pond B.R.	Natural Features Reserve	VIC
Lonsdale Lakes W.R	Nature Conservation Reserve	VIC
Lower Glenelg	National Park	VIC
Lower South East	Marine Park	SA
Marengo N.C.R.	Nature Conservation Reserve	VIC
Marengo Reefs	Marine Sanctuary	VIC
Merri	Marine Sanctuary	VIC
Mornington Peninsula	National Park	VIC
Mount Richmond	National Park	VIC
Muddy Lagoon	Nature Reserve	TAS
Narrawong F.R.	Nature Conservation Reserve	VIC
Nelson SS.R.	Natural Features Reserve	VIC
Nene Valley	Conservation Park	SA
New Year Island	Game Reserve	TAS

Protected Area Name	Reserve Type	State
Painkalac Creek	Reference Area	VIC
Piccaninnie Ponds	Conservation Park	SA
Point Addis	Marine National Park	VIC
Point Danger	Marine Sanctuary	VIC
Point Nepean	National Park	VIC
Porky Beach	Conservation Area	TAS
Port Campbell	National Park	VIC
Portland H46 B.R.	Natural Features Reserve	VIC
Portland H47 B.R.	Natural Features Reserve	VIC
Port Phillip Heads	Marine National Park	VIC
Princetown W.R	Natural Features Reserve	VIC
Red Hut Point	Conservation Area	TAS
Red Hut Road #1	Conservation Covenant	TAS
Red Hut Road #2	Conservation Covenant	TAS
Reid Rocks	Nature Reserve	TAS
Sea Elephant	Conservation Area	TAS
Sea Elephant River	Conservation Covenant	TAS
Seal Rocks	State Reserve	TAS
Seal Rocks	Conservation Area	TAS
South Rd Nugara	Conservation Covenant	TAS
Stokes Point	Conservation Area	TAS
Stony Creek (Otways)	Reference Area	VIC
The Arches	Marine Sanctuary	VIC
Tower Hill W.R	Natural Features Reserve	VIC
Twelve Apostles	Marine National Park	VIC

Protected Area Name	Reserve Type	State
Tyrendarra F.R	Nature Conservation Reserve	VIC
Unnamed (No.HA1038)	Heritage Agreement	SA
Unnamed (No.HA1404)	Heritage Agreement	SA
Unnamed (No.HA1457)	Heritage Agreement	SA
Unnamed (No.HA1560)	Heritage Agreement	SA
Unnamed (No.HA26)	Heritage Agreement	SA
Unnamed (No.HA42)	Heritage Agreement	SA
Unnamed P0176	Private Nature Reserve	VIC
Wild Dog B.R.	Natural Features Reserve	VIC
Wild Dog Creek SS.R.	Natural Features Reserve	VIC
Yambacoona	Conservation Covenant	TAS
Yambuk F.F.R.	Nature Conservation Reserve	VIC
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State
Tasmania RFA	Tasmania
West Victoria RFA	Victoria

Nationally Important Wetlands [Resource Information]

Wetland Name	State
Aire River	VIC
Bungaree Lagoon	TAS
Glenelg Estuary	VIC
Glenelg River	VIC
Lake Connewarre State Wildlife Reserve	VIC

Wetland Name	State
Lake Flannigan	TAS
Lavinia Nature Reserve	TAS
Long Swamp	VIC
Lower Aire River Wetlands	VIC
Lower Merri River Wetlands	VIC
Pearshape Lagoon 1	TAS
Pearshape Lagoon 2	TAS
Pearshape Lagoon 3	TAS
Pearshape Lagoon 4	TAS
Piccaninnie Ponds	SA
Princetown Wetlands	VIC
Tower Hill	VIC
Yambuk Wetlands	VIC

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Apollo Bay to Skenes Creek Coastal Trail	2022/09274		Assessment
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Referral Decision
Dolphin Tungsten Mine Grassy King Island	2023/09653		Referral Decision
Offshore Tidal Energy Facility and Submarine Cable	2008/4480		Completed
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Southern Winds Offshore Wind Project	2022/09435		Assessment
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed
Spinifex Offshore Surveys	2022/09359		Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
City Of Greater Geelong Mosquito Control Program 2021-2030, Vic	2020/8782	Controlled Action	Further Information Request
Establishment of plantation for use of effluent water	2003/1063	Controlled Action	Completed
Green Point Wind Farm	2001/529	Controlled Action	Post-Approval
Kentbruck Green Power Hub, Vic	2019/8510	Controlled Action	Assessment Approach
Lonsdale Golf Club Redevelopment	2003/969	Controlled Action	Post-Approval
Lorne Golf Course redevelopment	2004/1513	Controlled Action	Post-Approval
Mosquito Control	2005/2132	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval
Pelican Point residential subdivision	2006/2529	Controlled Action	Completed
Port Phillip Bay Channel Deepening	2002/576	Controlled Action	Post-Approval
Redevelopment of post office and construction of dwellings	2007/3639	Controlled Action	Completed
Residential and Golf Course Development Project	2003/1144	Controlled Action	Post-Approval
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Not controlled action			
Airey Inlet water reclamation plant to Anglesea sewerage system	2006/2539	Not Controlled Action	Completed
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed
Anglesea Mine South Wall Vegetation removal, Anglesea, Vic	2017/8060	Not Controlled Action	Completed
Apollo Bay Water Storage Basin, VIC	2012/6484	Not Controlled Action	Completed
Barwon Heads Rd gas pipeline installation	2006/2769	Not Controlled Action	Completed
Barwon Heads Stormwater Outfall upgrade, Victoria	2016/7650	Not Controlled Action	Completed
Bluff Heights Estate Stages 2 to 4	2003/1047	Not Controlled Action	Completed
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed
Construction and operation of Barwon Water biosolids treatment facility	2008/4345	Not Controlled Action	Completed
Construction of Barwon Heads Bridge	2005/2375	Not Controlled Action	Completed
Construction of Infrastructure to Extract, Treat & Transfer Groundwater to Wurde	2008/4104	Not Controlled Action	Completed
Construction of Overtaking Lanes on Great Ocean Rd	2008/4044	Not Controlled Action	Completed
construction of pump station for pump diversion from the Barham River	2003/1242	Not Controlled Action	Completed
Construction of the Edgars Road Extension, from Childs Road, Lalor to Cooper Street, Epping	2003/1135	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Divestment of Norris Barracks	2003/963	Not Controlled Action	Completed
Drilling of Callister-1 exploration well in VIC/P51	2004/1633	Not Controlled Action	Completed
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed
Gas Fields Development	2011/5879	Not Controlled Action	Completed
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed
Gleneig Spiny Crayfish Habitat Rehabilitation	2011/6164	Not Controlled Action	Completed
Golflinks Road Residential Development & Water Storage Facility at Barwon Heads	2004/1793	Not Controlled Action	Completed
Grevillea infecunda tip cuttings and soil samples	2005/1979	Not Controlled Action	Completed
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Installation of a 35 metre telecommunications facility at Jirrahlinga Animal San	2003/1151	Not Controlled Action	Completed
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed
Kongorong Wind Farm	2002/568	Not Controlled Action	Completed
Lot 5 Pelican Point Road, Pelican Point SA - Proposed New Dwelling	2021/9011	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Maintenance and priority works to heritage buildings at Point Nepean Quarantine	2006/3151	Not Controlled Action	Completed
Maintenance Dredging South Channel 2012	2011/6198	Not Controlled Action	Completed
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed
Maintenance works at Barwon Heads Bridge	2003/1199	Not Controlled Action	Completed
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed
New Water Infrastructure Upgrade, Grassy Dam, King Island	2013/6882	Not Controlled Action	Completed
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed
Ocean Grove rising main 2 upgrade	2009/4978	Not Controlled Action	Completed
Ocean Grove Rising Main 2 Upgrade (OGRM2) - East Section & River Crossing	2010/5508	Not Controlled Action	Completed
Oceanlinx South Australia 1mW Greenwave Project	2012/6528	Not Controlled Action	Completed
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed
Piccaninnie Ponds flow path restoration project, SA	2013/6711	Not Controlled Action	Completed
Point Nepean Quarantine Station (former)/Restoration of Medical Superintendent's	2006/3149	Not Controlled Action	Completed
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed
Portland Landfill Borehole Installation, Vic	2017/7886	Not Controlled Action	Completed
Port Phillip Channel Deepening Project - Trial Dredge Program	2005/2164	Not Controlled Action	Completed
Proposed replacement of existing road culvert	2013/7077	Not Controlled Action	Completed
Queenscliff Harbour Redevelopment	2004/1352	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Redevelopment Project to Upgrade and Extend the Portland Trawler Wharf	2008/4317	Not Controlled Action	Completed
Rehabilitation of Lake Connewarre State Game Reserve	2002/708	Not Controlled Action	Completed
Remedial Works to the Swan Island Bridge	2003/1129	Not Controlled Action	Completed
Replacement of sewer pipelines	2002/623	Not Controlled Action	Completed
Residential/Resort/Golf Course development	2002/907	Not Controlled Action	Completed
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed
St Quentin Consulting Pty Ltd /Residential development/305 Great Ocean Road, Jan Juc/VIC/Development	2014/7184	Not Controlled Action	Completed
Torquay Sewerage Strategy - pipe replacement between Torquay and the Black Rock	2004/1704	Not Controlled Action	Completed
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Victorian Generator Project	2005/1984	Not Controlled Action	Completed
West Triton Drilling Program - Otway Basin	2007/3909	Not Controlled Action	Completed
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey in Permit Areas T/32P and T/33P	2002/845	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
2D Seismic Survey	2008/3962	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey, Petroleum Exploration Permit Area EPP27	2006/2776	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey in VIC/P50 and VIC/P46	2004/1810	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval
2D Siesmic Marine Survey	2008/4074	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey within Torquay Sub-basin off sthn Victoria	2012/6256	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
Benbows Paddock residential development, Cape Bridgewater	2007/3247	Not Controlled Action (Particular Manner)	Post-Approval
Bernoulli 3D Seismic Survey	2006/3053	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Construction of bridge across Barwon River	2006/2947	Not Controlled Action (Particular Manner)	Post-Approval
Construct private dwelling	2008/4234	Not Controlled Action (Particular Manner)	Post-Approval
Controlled Burn, Understorey Clearance and Removal of UXO	2003/1030	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval
Fuelbreak construction	2009/4915	Not Controlled Action (Particular Manner)	Post-Approval
Geelong Bypass Section 3	2005/2099	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Maintenance Dredging Program 2012-21 in Port of Melbourne	2012/6332	Not Controlled Action (Particular Manner)	Post-Approval
OTE10 2D Marine Seismic Survey	2009/5223	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Seismic Survey in Petroleum Permit Area EPP27	2002/648	Not Controlled Action (Particular Manner)	Post-Approval
Seismic Survey VIC-P46	2002/826	Not Controlled Action (Particular Manner)	Post-Approval
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Shearwater 2D and 3D marine seismic survey	2005/2180	Not Controlled Action (Particular Manner)	Post-Approval
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins T/35P and T/36P 3D Seismic Surveys	2007/3817	Not Controlled Action (Particular Manner)	Post-Approval
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Surface Geochemical Exploration Program, TAS	2010/5780	Not Controlled Action (Particular Manner)	Post-Approval
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Torquay Sub-basin (VIC/P62) OTE12-3D Seismic Survey	2012/6655	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vegetation clearance and residential subdivision near Mt Gambier	2004/1370	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval
Wolseley 3D seismic acquisition survey	2010/5703	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
2D & 3D Seismic Surveys - Permit Area - VIC/P50	2008/4517	Referral Decision	Completed
3D Marine Seismic Survey	2011/6156	Referral Decision	Completed
3D Seismic Survey	2008/4014	Referral Decision	Completed
8 Lot Industrial Subdivision	2008/4527	Referral Decision	Completed
Portland Wave Energy Project	2008/3946	Referral Decision	Completed
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed
Wind Farm	2001/139	Referral Decision	Completed
Wolseley 3D Seismic Acquisition Survey in Permit T/32P	2010/5291	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Bonney Coast Upwelling	South-east
West Tasmania Canyons	South-east

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence
Seabirds		
Ardenna pacifica		
Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Ardenna pacifica		
Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris		
Short-tailed Shearwater [82652]	Breeding	Known to occur
Ardenna tenuirostris		
Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis		
Antipodean Albatross [82269]	Foraging	Known to occur
Eudyptula minor		
Little Penguin [1085]	Breeding	Known to occur
Eudyptula minor		
Little Penguin [1085]	Foraging	Known to occur
Morus serrator		
Australasian Gannet [1020]	Aggregation	Known to occur
Morus serrator		
Australasian Gannet [1020]	Foraging	Known to occur
Pelagodroma marina		
White-faced Storm-petrel [1016]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Breeding	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		

Scientific Name	Behaviour	Presence
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Known Foraging Area	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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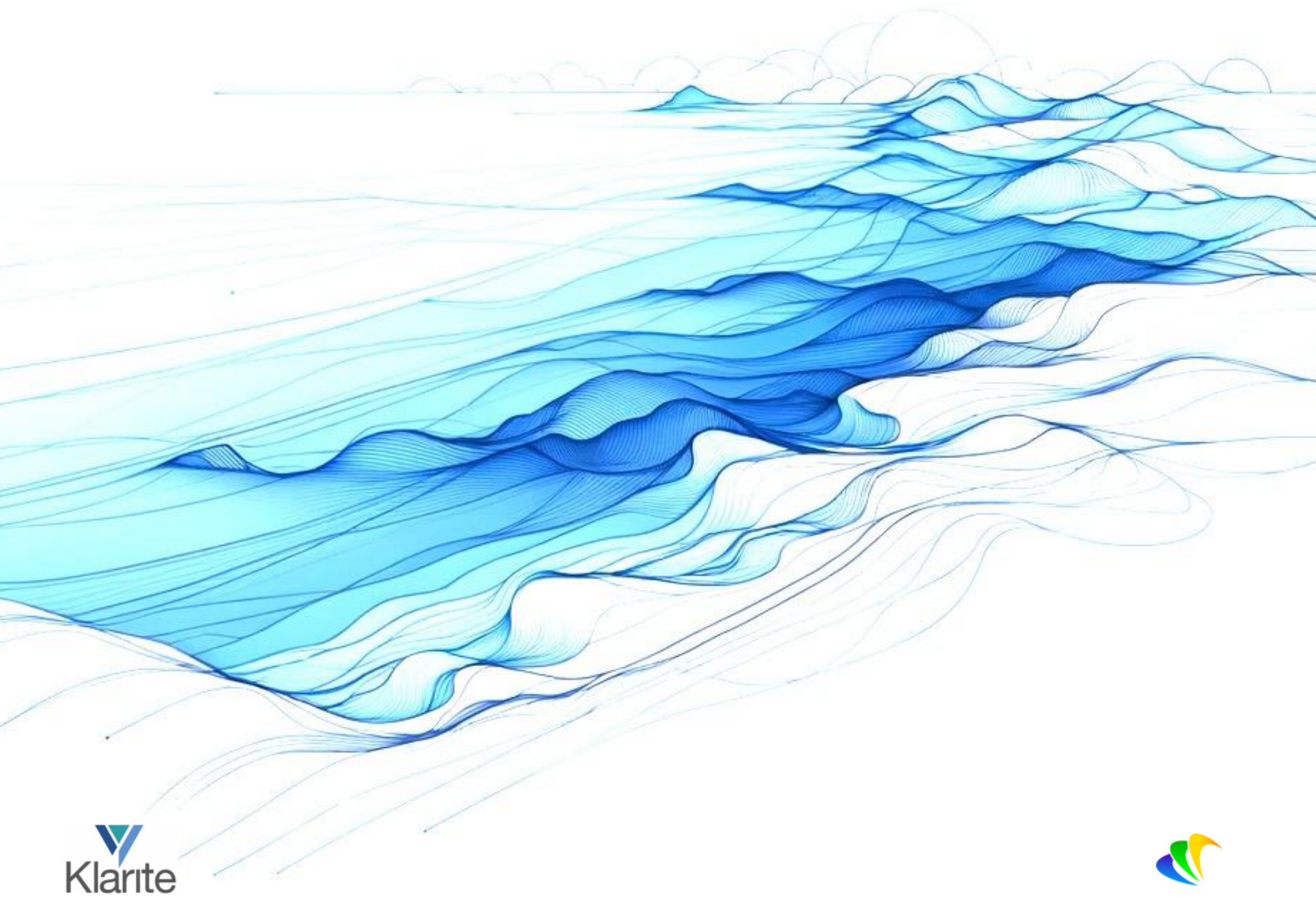
REGIA
Marine Seismic Survey

January 2024 PMST Search



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Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 02-Jan-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	39
Listed Migratory Species:	40

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	62
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	32
Key Ecological Features (Marine):	2
Biologically Important Areas:	19
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
FISH		
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
[Seriolella brama](#) Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
[Thunnus maccoyii](#) Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
MAMMAL		
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
REPTILE		
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus		
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea		
Sooty Shearwater [82651]		Species or species habitat may occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora		
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		

Scientific Name	Threatened Category	Presence Text
Arctocephalus forsteri		
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus		
Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata		
Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area

Current Scientific Name	Status	Type of Presence
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
[Lissodelphis peronii](#) Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat likely to occur within area
[Mesoplodon bowdoini](#) Andrew's Beaked Whale [73]		Species or species habitat may occur within area
[Mesoplodon densirostris](#) Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
[Mesoplodon grayi](#) Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
[Mesoplodon hectori](#) Hector's Beaked Whale [76]		Species or species habitat may occur within area
[Mesoplodon layardii](#) Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
[Mesoplodon mirus](#) True's Beaked Whale [54]		Species or species habitat may occur within area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area
[Physeter macrocephalus](#) Sperm Whale [59]		Species or species habitat may occur within area
[Pseudorca crassidens](#) False Killer Whale [48]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Spinifex Offshore Surveys	2022/09359		Completed
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Not controlled action			
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Not controlled action (particular manner)			
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Bonney Coast Upwelling	South-east
West Tasmania Canyons	South-east

Biologically Important Areas		
Scientific Name	Behaviour	Presence
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur

Scientific Name	Behaviour	Presence
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 02-Jan-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	92
Listed Migratory Species:	66

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	108
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	19
Regional Forest Agreements:	1
Nationally Important Wetlands:	4
EPBC Act Referrals:	77
Key Ecological Features (Marine):	2
Biologically Important Areas:	22
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Great Ocean Road and Scenic Environs	VIC	Listed place	In buffer area only

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area	In buffer area only
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In feature area
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community may occur within area	In buffer area only
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Neophema chrysogaster](#) Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Neophema chrysostoma](#) Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Pachyptila turtur subantarctica](#) Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Pterodroma leucoptera leucoptera](#) Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
[Pterodroma mollis](#) Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Stagonopleura guttata](#) Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Sternula nereis nereis](#) Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
CRUSTACEAN			
Euastacus bispinosus Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat likely to occur within area	In buffer area only
FISH			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hoplostethus atlanticus			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Nannoperca obscura			
Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
FROG			
Litoria raniformis			
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
INSECT			
Synemon plana			
Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Antechinus minimus maritimus			
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isoodon obesulus obesulus			
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In buffer area only
Mastacomys fuscus mordicus			
Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area	In buffer area only
Miniopterus orianae bassanii			
Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area	In buffer area only
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Potorous tridactylus trisulcatus			
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pseudomys fumeus			
Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area	In buffer area only
Pseudomys novaehollandiae			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pseudomys shortridgei](#) Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Pteropus poliocephalus](#) Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In buffer area only
PLANT			
[Amphibromus fluitans](#) River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Caladenia hastata](#) Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Eucalyptus strzeleckii](#) Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Glycine latrobeana](#) Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Haloragis exalata subsp. exalata](#) Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Ixodia achillaeoides subsp. arenicola](#) Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Lepidium aschersonii](#) Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Lepidium hyssopifolium](#) Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Prasophyllum diversiflorum](#) Gorae Leek-orchid [13210]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Prasophyllum litorale listed as Prasophyllum littorale			
Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Prasophyllum spicatum			
Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis chlorogramma			
Green-striped Greenhood [56510]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterostylis cucullata			
Leafy Greenhood [15459]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pterostylis tenuissima			
Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Senecio psilocarpus			
Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Thelymitra epipactoides			
Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area	In buffer area only
Thelymitra matthewsii			
Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thelymitra orientalis			
Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Xerochrysum palustre			
Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Delma impar			
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Lissolepis coventryi			
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area	In buffer area only
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma			
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis			
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
[Physeter macrocephalus](#) Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat may occur within area	In buffer area only
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Breeding known to occur within area	In buffer area only
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In buffer area only
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]		Roosting known to occur within area	In buffer area only
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
[Calidris alba](#) Sanderling [875]		Roosting known to occur within area	In buffer area only
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
[Charadrius bicinctus](#) Double-banded Plover [895]		Roosting known to occur within area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In buffer area only
[Gallinago megala](#) Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
[Gallinago stenura](#) Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Numenius minutus](#) Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
[Numenius phaeopus](#) Whimbrel [849]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In buffer area only
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In buffer area only
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Morus capensis Cape Gannet [59569]		Breeding known to occur within area	In buffer area only
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area	In buffer area only
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Stercorarius antarcticus as Catharacta skua			
Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata			
White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons			
Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri			
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov.			
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma			
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
Fish			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Bay of Islands Coastal Park	Conservation Park	VIC	In buffer area only
Curdie Vale N.C.R.	Natural Features Reserve	VIC	In buffer area only
Deen Maar	Indigenous Protected Area	VIC	In buffer area only
Goose Lagoon W.R	Natural Features Reserve	VIC	In buffer area only
Great Otway	National Park	VIC	In buffer area only
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC	In buffer area only
Lake Aringa W.R	Nature Conservation Reserve	VIC	In buffer area only
Latrobe B.R.	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC	In buffer area only
Merri	Marine Sanctuary	VIC	In buffer area only
Port Campbell	National Park	VIC	In buffer area only
Pretty Hill F.R	Nature Conservation Reserve	VIC	In buffer area only
Princetown W.R	Natural Features Reserve	VIC	In buffer area only
St Helens F.R	Nature Conservation Reserve	VIC	In buffer area only
The Arches	Marine Sanctuary	VIC	In buffer area only
Tower Hill W.R	Natural Features Reserve	VIC	In buffer area only
Twelve Apostles	Marine National Park	VIC	In buffer area only
Yambuk F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Lower Merri River Wetlands	VIC	In buffer area only
Princetown Wetlands	VIC	In buffer area only
Tower Hill	VIC	In buffer area only
Yambuk Wetlands	VIC	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Referral Decision	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Southern Winds Offshore Wind Project	2022/09435		Assessment	In buffer area only
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed	In buffer area only
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval	In buffer area only
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In feature area
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In feature area
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval	In buffer area only
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed	In buffer area only
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed	In buffer area only
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Gas Fields Development	2011/5879	Not Controlled Action	Completed	In buffer area only
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed	In buffer area only
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed	In buffer area only
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In buffer area only
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed	In buffer area only
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed	In buffer area only
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed	In buffer area only
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed	In buffer area only
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed	In feature area
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed	In buffer area only
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2006/2937	Not Controlled Action	Completed	In buffer area only
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In buffer area only
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
SEA Gas Project transmission pipeline	2001/513	Not Controlled Action (Particular	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
Portland Wave Energy Project	2008/3946	Referral Decision	Completed	In buffer area only
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur	In buffer area only
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur	In buffer area only

Scientific Name	Behaviour	Presence	Buffer Status
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur	In buffer area only
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 02-Jan-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	40
Listed Migratory Species:	40

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	63
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	40
Key Ecological Features (Marine):	2
Biologically Important Areas:	19
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
FISH		
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
MAMMAL		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
REPTILE		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus		
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea		
Sooty Shearwater [82651]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Physeter macrocephalus		
Sperm Whale [59]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Spinifex Offshore Surveys	2022/09359		Completed
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Not controlled action			
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Bonney Coast Upwelling	South-east
West Tasmania Canyons	South-east

Biologically Important Areas

Scientific Name	Behaviour	Presence
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		

Scientific Name	Behaviour	Presence
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 02-Jan-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	3
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	9
Listed Threatened Species:	108
Listed Migratory Species:	66

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	20
Commonwealth Heritage Places:	None
Listed Marine Species:	110
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	1
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	67
Regional Forest Agreements:	1
Nationally Important Wetlands:	8
EPBC Act Referrals:	97
Key Ecological Features (Marine):	2
Biologically Important Areas:	22
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status	Buffer Status
Budj Bim Cultural Landscape	VIC	Declared property	In buffer area only

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Great Ocean Road and Scenic Environs	VIC	Listed place	In buffer area only
Indigenous			
Budj Bim National Heritage Landscape - Mt Eccles Lake Condah Area	VIC	Listed place	In buffer area only
Budj Bim National Heritage Landscape - Tyrendarra Area	VIC	Listed place	In buffer area only

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Glenelg estuary and discovery bay wetlands	Within 10km of Ramsar site	In buffer area only
Western district lakes	10 - 20km upstream from Ramsar site	In buffer area only

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area	In buffer area only

Community Name	Threatened Category	Presence Text	Buffer Status
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In buffer area only
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In buffer area only
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	Endangered	Community may occur within area	In buffer area only
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calyptorhynchus banksii graptogyne South-eastern Red-tailed Black-Cockatoo [25982]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Halobaena caerulea](#) Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
[Limosa lapponica baueri](#) Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Melanodryas cucullata cucullata](#) South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only
[Neophema chrysogaster](#) Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
[Neophema chrysostoma](#) Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Pachyptila turtur subantarctica](#) Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In buffer area only
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche chrysostoma			
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
CRUSTACEAN			
Euastacus bispinosus			
Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat known to occur within area	In buffer area only
FISH			
Hoplostethus atlanticus			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Nannoperca obscura			
Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
FROG			
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
INSECT			
Synemon plana Golden Sun Moth [25234]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
MAMMAL			
Antechinus minimus maritimus Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In buffer area only
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area	In buffer area only
Miniopterus orianae bassanii Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area	In buffer area only
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area	In buffer area only
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Potorous tridactylus trisulcatus Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area	In buffer area only
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pseudomys shortridgei Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area	In buffer area only
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In buffer area only
PLANT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Astelia australiana Tall Astelia [10851]	Vulnerable	Translocated population known to occur within area	In buffer area only
Caladenia calcicola Limestone Spider-orchid [10065]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Caladenia hastata Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caladenia ornata Ornate Pink Fingers [76213]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Cassinia rugata Wrinkled Cassinia, Wrinkled Dollybush [21885]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area	In buffer area only
Dipodium campanulatum Bell Flower Hyacinth Orchid [55051]	Endangered	Species or species habitat may occur within area	In buffer area only
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area	In buffer area only
Pimelea spinescens subsp. spinescens Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Poa sallacustris Salt-lake Tussock-grass [24424]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area	In buffer area only
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thelymitra orientalis Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Delma impar](#)			
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Dermochelys coriacea](#)			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
[Lissolepis coventryi](#)			
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area	In buffer area only
SHARK			
[Carcharodon carcharias](#)			
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Centrophorus uyato](#)			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
[Galeorhinus galeus](#)			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
[Apus pacificus](#)			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
[Ardenna carneipes](#)			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
[Ardenna grisea](#)			
Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
[Ardenna tenuirostris](#)			
Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
[Physeter macrocephalus](#) Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat may occur within area	In buffer area only
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Breeding known to occur within area	In buffer area only
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In buffer area only
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]		Roosting known to occur within area	In buffer area only
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
[Calidris alba](#) Sanderling [875]		Roosting known to occur within area	In buffer area only
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
[Charadrius bicinctus](#) Double-banded Plover [895]		Roosting known to occur within area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In buffer area only
[Gallinago megala](#) Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
[Gallinago stenura](#) Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Numenius minutus](#) Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
[Numenius phaeopus](#) Whimbrel [849]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In buffer area only
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - Training Depot, Darts RD 3305 Portland [21018]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21019]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21023]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21010]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21022]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21012]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21013]	VIC	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - Training Depot, Darts RD 3305 Portland [21007]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21011]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21016]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21017]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21014]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21015]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21024]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21008]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21009]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21020]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21021]	VIC	In buffer area only
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC	In buffer area only
Unknown		
Commonwealth Land - [21583]	VIC	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata			
Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In buffer area only
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Breeding likely to occur within area overfly marine area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Morus capensis Cape Gannet [59569]		Breeding known to occur within area	In buffer area only
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area	In buffer area only
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Sternula albifrons as Sterna albifrons](#) Little Tern [82849]		Breeding known to occur within area	In buffer area only
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche bulleri platei as Thalassarche sp. nov.](#) Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche chrysostoma](#) Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalasseus bergii as Sterna bergii](#) Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
[Thinornis cucullatus as Thinornis rubricollis](#) Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only
[Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis](#) Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
[Tringa brevipes as Heteroscelus brevipes](#) Grey-tailed Tattler [851]		Roosting known to occur within area overfly marine area	In buffer area only
[Tringa glareola](#) Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In buffer area only
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
Fish			
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
[Hippocampus minotaur](#) Bullneck Seahorse [66705]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In buffer area only
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Vanacampus phillipi](#) Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
[Vanacampus poecilolaemus](#) Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
[Balaenoptera acutorostrata](#) Minke Whale [33]		Species or species habitat may occur within area	In feature area
[Balaenoptera bonaerensis](#) Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Australian Marine Parks		[Resource Information]
Park Name	Zone & IUCN Categories	Buffer Status
Apollo	Multiple Use Zone (IUCN VI)	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Aire River	Heritage River	VIC	In buffer area only
Aire River W.R.	Natural Features Reserve	VIC	In buffer area only
Bats Ridge W.R	Nature Conservation Reserve	VIC	In buffer area only
Bay of Islands Coastal Park	Conservation Park	VIC	In buffer area only
Bolwarra H43 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H44 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H45 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I90 B.R.	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Broadwater I91 B.R.	Natural Features Reserve	VIC	In buffer area only
Brucknell Creek F.F.R	Nature Conservation Reserve	VIC	In buffer area only
Budj Bim	National Park	VIC	In buffer area only
Cape Nelson	State Park	VIC	In buffer area only
Carpendeit	Reference Area	VIC	In buffer area only
Cooriemungle	Reference Area	VIC	In buffer area only
Cooriemungle Creek F.R	Nature Conservation Reserve	VIC	In buffer area only
Coradjil B.R.	Natural Features Reserve	VIC	In buffer area only
Coradjil N.C.R.	Natural Features Reserve	VIC	In buffer area only
Crinoline Creek	Reference Area	VIC	In buffer area only
Curdie Vale N.C.R.	Natural Features Reserve	VIC	In buffer area only
Deen Maar	Indigenous Protected Area	VIC	In buffer area only
Discovery Bay Coastal Park	Conservation Park	VIC	In buffer area only
Dunmore B.R.	Natural Features Reserve	VIC	In buffer area only
Ecklin South Swamp N.C.R.	Natural Features Reserve	VIC	In buffer area only
Fitzroy River SS.R.	Natural Features Reserve	VIC	In buffer area only
Framlingham Forest	Indigenous Protected Area	VIC	In buffer area only
Goose Lagoon W.R	Natural Features Reserve	VIC	In buffer area only
Gorae B.R.	Natural Features Reserve	VIC	In buffer area only
Great Otway	National Park	VIC	In buffer area only
Heywood B.R.	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Hopkins Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Hopkins River, Framlingham SS.R.	Natural Features Reserve	VIC	In buffer area only
Jancourt N.C.R.	Natural Features Reserve	VIC	In buffer area only
Johanna Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Kurtonitj	Indigenous Protected Area	VIC	In buffer area only
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC	In buffer area only
Lake Aringa W.R	Nature Conservation Reserve	VIC	In buffer area only
Lake Condah	Indigenous Protected Area	VIC	In buffer area only
Lake Gillear W.R	Natural Features Reserve	VIC	In buffer area only
Latrobe B.R.	Natural Features Reserve	VIC	In buffer area only
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC	In buffer area only
Merri	Marine Sanctuary	VIC	In buffer area only
Myamyn B.R.	Natural Features Reserve	VIC	In buffer area only
Narrawong F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nine Mile F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nullawarre F.R.	Nature Conservation Reserve	VIC	In buffer area only
Port Campbell	National Park	VIC	In buffer area only
Portland H46 B.R.	Natural Features Reserve	VIC	In buffer area only
Portland H47 B.R.	Natural Features Reserve	VIC	In buffer area only
Pretty Hill F.R	Nature Conservation Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Princetown W.R	Natural Features Reserve	VIC	In buffer area only
St Helens F.R	Nature Conservation Reserve	VIC	In buffer area only
The Arches	Marine Sanctuary	VIC	In buffer area only
The Stones	Reference Area	VIC	In buffer area only
The Stones W.R.	Nature Conservation Reserve	VIC	In buffer area only
Timboon I1 B.R	Natural Features Reserve	VIC	In buffer area only
Tomahawk Creek	Reference Area	VIC	In buffer area only
Tower Hill W.R	Natural Features Reserve	VIC	In buffer area only
Trewalla H48 B.R.	Natural Features Reserve	VIC	In buffer area only
Trewalla H49 B.R.	Natural Features Reserve	VIC	In buffer area only
Twelve Apostles	Marine National Park	VIC	In buffer area only
Tyrendarra	Indigenous Protected Area	VIC	In buffer area only
Tyrendarra F.R	Nature Conservation Reserve	VIC	In buffer area only
Unnamed P0059	Private Nature Reserve	VIC	In buffer area only
Unnamed P0126	Private Nature Reserve	VIC	In buffer area only
Woolsthorpe N.C.R.	Natural Features Reserve	VIC	In buffer area only
Yambuk F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements

[Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Aire River	VIC	In buffer area only
Cobden-Terang Volcanic Craters	VIC	In buffer area only
Lake Condah	VIC	In buffer area only
Lower Aire River Wetlands	VIC	In buffer area only
Lower Merri River Wetlands	VIC	In buffer area only
Princetown Wetlands	VIC	In buffer area only
Tower Hill	VIC	In buffer area only
Yambuk Wetlands	VIC	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Referral Decision	In buffer area only
Hexham Wind Farm	2022/09287		Assessment	In buffer area only
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Southern Winds Offshore Wind Project	2022/09435		Assessment	In buffer area only
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed	In buffer area only
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Willatook Wind Farm, Vic	2019/8439		Post-Approval	In buffer area only
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Kentbruck Green Power Hub, Vic	2019/8510	Controlled Action	Assessment Approach	In buffer area only
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval	In buffer area only
Penshurst Wind Energy Facility	2011/5991	Controlled Action	Completed	In buffer area only
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In buffer area only
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval	In buffer area only
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed	In buffer area only
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed	In buffer area only
Development of wind energy facility	2005/2224	Not Controlled Action	Completed	In buffer area only
Drilling of Callister-1 exploration well in VIC/P51	2004/1633	Not Controlled Action	Completed	In buffer area only
Ellerslie Timber Bridge Partial Restoration	2009/4734	Not Controlled Action	Completed	In buffer area only
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed	In buffer area only
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Gas Fields Development	2011/5879	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed	In buffer area only
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed	In buffer area only
Hawkesdale Wind Farm	2005/2140	Not Controlled Action	Completed	In buffer area only
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In buffer area only
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed	In buffer area only
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed	In buffer area only
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed	In buffer area only
Newfield wind farm	2007/3226	Not Controlled Action	Completed	In buffer area only
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed	In buffer area only
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed	In buffer area only
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed	In buffer area only
Portland Landfill Borehole Installation, Vic	2017/7886	Not Controlled Action	Completed	In buffer area only
Pulp mill and associated infrastructure 3km north of Heywood	2005/2125	Not Controlled Action	Completed	In buffer area only
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed	In buffer area only
Redevelopment Project to Upgrade and Extend the Portland Trawler Wharf	2008/4317	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Ryan Corner Wind Farm	2006/2937	Not Controlled Action	Completed	In buffer area only
Shaw River Power Station Project	2009/5088	Not Controlled Action	Completed	In buffer area only
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
Tarrone Power Station Project	2010/5299	Not Controlled Action	Completed	In buffer area only
The Sisters Wind Farm	2008/4268	Not Controlled Action	Completed	In buffer area only
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In buffer area only
Water pipelines, Mortlake Power Station	2006/2881	Not Controlled Action	Completed	In buffer area only
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed	In buffer area only
Wind farm development	2005/1960	Not Controlled Action	Completed	In buffer area only
Wind Farm Development	2004/1929	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Gas Pipeline Crossing at Mount Emu Creek	2009/4913	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
SEA Gas Project transmission pipeline	2001/513	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
8 Lot Industrial Subdivision	2008/4527	Referral Decision	Completed	In buffer area only
Portland Wave Energy Project	2008/3946	Referral Decision	Completed	In buffer area only
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur	In buffer area only
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur	In buffer area only
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur	In buffer area only
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 02-Jan-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	42
Listed Migratory Species:	43

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	68
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	37
Key Ecological Features (Marine):	2
Biologically Important Areas:	19
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris canutus			
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
FISH			
Hoplostethus atlanticus			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
MAMMAL			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato			
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
[Physeter macrocephalus](#) Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In buffer area only
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Pterodroma mollis](#) Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
[Stercorarius antarcticus as Catharacta skua](#) Brown Skua [85039]		Species or species habitat may occur within area	In feature area
[Sterna striata](#) White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
[Sternula albifrons as Sterna albifrons](#) Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche bulleri platei as Thalassarche sp. nov.](#) Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche chrysostoma			
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus as Thinornis rubricollis			
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat likely to occur within area overfly marine area	In buffer area only
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In buffer area only
Fish			
Heraldia nocturna			
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis			
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps			
Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Vanacampus poecilolaemus](#) Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area

Whales and Other Cetaceans [Resource Information]

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
[Balaenoptera acutorostrata](#) Minke Whale [33]		Species or species habitat may occur within area	In feature area
[Balaenoptera bonaerensis](#) Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Berardius arnuxii](#) Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
[Delphinus delphis](#) Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
[Globicephala macrorhynchus](#) Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
[Globicephala melas](#) Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
[Grampus griseus](#) Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
[Kogia breviceps](#) Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
[Kogia sima](#) Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 02-Jan-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	3
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	9
Listed Threatened Species:	102
Listed Migratory Species:	66

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	19
Commonwealth Heritage Places:	None
Listed Marine Species:	110
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	1
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	58
Regional Forest Agreements:	1
Nationally Important Wetlands:	5
EPBC Act Referrals:	92
Key Ecological Features (Marine):	2
Biologically Important Areas:	22
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status	Buffer Status
Budj Bim Cultural Landscape	VIC	Declared property	In buffer area only

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Great Ocean Road and Scenic Environs	VIC	Listed place	In buffer area only
Indigenous			
Budj Bim National Heritage Landscape - Mt Eccles Lake Condah Area	VIC	Listed place	In buffer area only
Budj Bim National Heritage Landscape - Tyrendarra Area	VIC	Listed place	In buffer area only

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area	In buffer area only
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area	In buffer area only
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In buffer area only
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain	Endangered	Community may occur within area	In buffer area only

Community Name	Threatened Category	Presence Text	Buffer Status
Bioregion			
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Aphelocephala leucopsis			
Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Botaurus poiciloptilus			
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris canutus			
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum			
Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calyptorhynchus banksii graptogyne South-eastern Red-tailed Black-Cockatoo [25982]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In buffer area only
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
CRUSTACEAN			
Euastacus bispinosus			
Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat known to occur within area	In buffer area only
FISH			
Hoplostethus atlanticus			
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Nannoperca obscura			
Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
FROG			
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
INSECT			
Synemon plana Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Antechinus minimus maritimus Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area	In buffer area only
Miniopterus orianae bassanii Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area	In buffer area only
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area	In buffer area only
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Potorous tridactylus trisulcatus Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area	In buffer area only
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pseudomys shortridgei Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area	In buffer area only
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In buffer area only
PLANT			
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caladenia hastata Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caladenia ornata Ornate Pink Fingers [76213]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area	In buffer area only
Dipodium campanulatum Bell Flower Hyacinth Orchid [55051]	Endangered	Species or species habitat may occur within area	In buffer area only
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area	In buffer area only
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thelymitra orientalis Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Lissolepis coventryi Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area	In buffer area only
SHARK			
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In buffer area only
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In buffer area only
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - Training Depot, Darts RD 3305 Portland [21009]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21018]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21019]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21012]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21013]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21010]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21022]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21016]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21007]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21011]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21017]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21014]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21015]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21024]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21023]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21008]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21021]	VIC	In buffer area only
Defence - Training Depot, Darts RD 3305 Portland [21020]	VIC	In buffer area only
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Breeding likely to occur within area overfly marine area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
[Chalcites osculans as Chrysococcyx osculans](#) Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In buffer area only
[Charadrius bicinctus](#) Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
[Charadrius ruficapillus](#) Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
[Chroicocephalus novaehollandiae as Larus novaehollandiae](#) Silver Gull [82326]		Breeding known to occur within area	In buffer area only
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In buffer area only
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Morus capensis Cape Gannet [59569]		Breeding known to occur within area	In buffer area only
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In buffer area only
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area	In buffer area only
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche impavida](#)			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche melanophris](#)			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche salvini](#)			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#)			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Thalasseus bergii as Sterna bergii](#)			
Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
[Thinornis cucullatus as Thinornis rubricollis](#)			
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only
[Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis](#)			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
[Tringa brevipes as Heteroscelus brevipes](#)			
Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
[Tringa glareola](#)			
Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In buffer area only
[Tringa nebularia](#)			
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
Fish			
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area	In buffer area only
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In buffer area only
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories	Buffer Status
Apollo	Multiple Use Zone (IUCN VI)	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Aire River W.R.	Natural Features Reserve	VIC	In buffer area only
Bay of Islands Coastal Park	Conservation Park	VIC	In buffer area only
Bolwarra H43 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H44 B.R.	Natural Features Reserve	VIC	In buffer area only
Bolwarra H45 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I90 B.R.	Natural Features Reserve	VIC	In buffer area only
Broadwater I91 B.R.	Natural Features Reserve	VIC	In buffer area only
Brucknell Creek F.F.R	Nature Conservation Reserve	VIC	In buffer area only
Budj Bim	National Park	VIC	In buffer area only
Cape Nelson	State Park	VIC	In buffer area only
Cooriemungle	Reference Area	VIC	In buffer area only
Cooriemungle Creek F.R	Nature Conservation Reserve	VIC	In buffer area only
Coradjil B.R.	Natural Features Reserve	VIC	In buffer area only
Coradjil N.C.R.	Natural Features Reserve	VIC	In buffer area only
Crinoline Creek	Reference Area	VIC	In buffer area only
Curdie Vale N.C.R.	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Deen Maar	Indigenous Protected Area	VIC	In buffer area only
Discovery Bay Coastal Park	Conservation Park	VIC	In buffer area only
Ecklin South Swamp N.C.R.	Natural Features Reserve	VIC	In buffer area only
Fitzroy River SS.R.	Natural Features Reserve	VIC	In buffer area only
Framlingham Forest	Indigenous Protected Area	VIC	In buffer area only
Goose Lagoon W.R	Natural Features Reserve	VIC	In buffer area only
Gorae B.R.	Natural Features Reserve	VIC	In buffer area only
Great Otway	National Park	VIC	In buffer area only
Hopkins Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Hopkins River, Framlingham SS.R.	Natural Features Reserve	VIC	In buffer area only
Johanna Falls S.R.	Natural Features Reserve	VIC	In buffer area only
Kurtonitj	Indigenous Protected Area	VIC	In buffer area only
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC	In buffer area only
Lake Aringa W.R	Nature Conservation Reserve	VIC	In buffer area only
Lake Gillear W.R	Natural Features Reserve	VIC	In buffer area only
Latrobe B.R.	Natural Features Reserve	VIC	In buffer area only
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC	In buffer area only
Merri	Marine Sanctuary	VIC	In buffer area only
Narrawong F.R.	Nature Conservation Reserve	VIC	In buffer area only
Nine Mile F.F.R.	Nature Conservation Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Nullawarre F.R.	Nature Conservation Reserve	VIC	In buffer area only
Port Campbell	National Park	VIC	In buffer area only
Portland H46 B.R.	Natural Features Reserve	VIC	In buffer area only
Portland H47 B.R.	Natural Features Reserve	VIC	In buffer area only
Pretty Hill F.R	Nature Conservation Reserve	VIC	In buffer area only
Princetown W.R	Natural Features Reserve	VIC	In buffer area only
St Helens F.R	Nature Conservation Reserve	VIC	In buffer area only
The Arches	Marine Sanctuary	VIC	In buffer area only
The Stones	Reference Area	VIC	In buffer area only
The Stones W.R.	Nature Conservation Reserve	VIC	In buffer area only
Timboon I1 B.R	Natural Features Reserve	VIC	In buffer area only
Tomahawk Creek	Reference Area	VIC	In buffer area only
Tower Hill W.R	Natural Features Reserve	VIC	In buffer area only
Trewalla H48 B.R.	Natural Features Reserve	VIC	In buffer area only
Twelve Apostles	Marine National Park	VIC	In buffer area only
Tyrendarra	Indigenous Protected Area	VIC	In buffer area only
Tyrendarra F.R	Nature Conservation Reserve	VIC	In buffer area only
Unnamed P0059	Private Nature Reserve	VIC	In buffer area only
Unnamed P0126	Private Nature Reserve	VIC	In buffer area only
Woolsthorpe N.C.R.	Natural Features Reserve	VIC	In buffer area only
Yambuk F.F.R.	Nature Conservation Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Cobden-Terang Volcanic Craters	VIC	In buffer area only
Lower Merri River Wetlands	VIC	In buffer area only
Princetown Wetlands	VIC	In buffer area only
Tower Hill	VIC	In buffer area only
Yambuk Wetlands	VIC	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Referral Decision	In buffer area only
Hexham Wind Farm	2022/09287		Assessment	In buffer area only
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Southern Winds Offshore Wind Project	2022/09435		Assessment	In buffer area only
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed	In buffer area only
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Willatook Wind Farm, Vic	2019/8439		Post-Approval	In buffer area only
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval	In buffer area only
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed	In buffer area only
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval	In buffer area only
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach	In buffer area only
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed	In buffer area only
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed	In buffer area only
Development of wind energy facility	2005/2224	Not Controlled Action	Completed	In buffer area only
Drilling of Callister-1 exploration well in VIC/P51	2004/1633	Not Controlled Action	Completed	In buffer area only
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed	In buffer area only
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Gas Fields Development	2011/5879	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed	In buffer area only
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed	In buffer area only
Hawkesdale Wind Farm	2005/2140	Not Controlled Action	Completed	In buffer area only
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In buffer area only
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed	In buffer area only
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed	In buffer area only
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed	In buffer area only
Newfield wind farm	2007/3226	Not Controlled Action	Completed	In buffer area only
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed	In buffer area only
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed	In buffer area only
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed	In buffer area only
Portland Landfill Borehole Installation, Vic	2017/7886	Not Controlled Action	Completed	In buffer area only
Pulp mill and associated infrastructure 3km north of Heywood	2005/2125	Not Controlled Action	Completed	In buffer area only
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed	In buffer area only
Redevelopment Project to Upgrade and Extend the Portland Trawler Wharf	2008/4317	Not Controlled Action	Completed	In buffer area only
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Ryan Corner Wind Farm	2006/2937	Not Controlled Action	Completed	In buffer area only
Shaw River Power Station Project	2009/5088	Not Controlled Action	Completed	In buffer area only
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
Tarrone Power Station Project	2010/5299	Not Controlled Action	Completed	In buffer area only
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In buffer area only
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed	In buffer area only
Wind farm development	2005/1960	Not Controlled Action	Completed	In buffer area only
Wind Farm Development	2004/1929	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		(Particular Manner)		
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Gas Pipeline Crossing at Mount Emu Creek	2009/4913	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
SEA Gas Project transmission pipeline	2001/513	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
8 Lot Industrial Subdivision	2008/4527	Referral Decision	Completed	In buffer area only
Portland Wave Energy Project	2008/3946	Referral Decision	Completed	In buffer area only
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed	In buffer area only
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			

Scientific Name	Behaviour	Presence	Buffer Status
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur	In buffer area only
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur	In buffer area only
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur	In buffer area only
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			

Scientific Name	Behaviour	Presence	Buffer Status
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 02-Jan-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	40
Listed Migratory Species:	40

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	63
Whales and Other Cetaceans:	29
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	36
Key Ecological Features (Marine):	2
Biologically Important Areas:	19
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
FISH			
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area	In feature area
[Seriolella brama](#) Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
[Thunnus maccoyii](#) Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
MAMMAL			
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
SHARK			
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Centrophorus uyato Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
[Balaenoptera bonaerensis](#) Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche chrysostoma](#) Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Fish			
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Vanacampus poecilolaemus](#) Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area

Whales and Other Cetaceans [Resource Information]

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
[Balaenoptera acutorostrata](#) Minke Whale [33]		Species or species habitat may occur within area	In feature area
[Balaenoptera bonaerensis](#) Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area	In feature area
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Berardius arnuxii](#) Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In feature area
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
[Delphinus delphis](#) Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
[Globicephala macrorhynchus](#) Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
[Globicephala melas](#) Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In feature area
[Grampus griseus](#) Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
[Kogia breviceps](#) Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In feature area
[Kogia sima](#) Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area	In feature area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area	In feature area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In feature area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In feature area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In feature area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In feature area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In feature area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed	In feature area
Spinifex Offshore Surveys	2022/09359		Completed	In feature area
Controlled action				
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval	In feature area
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In feature area
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed	In buffer area only
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed	In feature area
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed	In feature area
Not controlled action				
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed	In feature area
Gas Field Development	2006/2635	Not Controlled Action	Completed	In feature area
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed	In buffer area only
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Referral decision				
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Bonney Coast Upwelling	South-east	In feature area
West Tasmania Canyons	South-east	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica			
Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In feature area
Ardenna tenuirostris			
Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato)			
Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Diomedea exulans antipodensis			
Antipodean Albatross [82269]	Foraging	Known to occur	In feature area
Morus serrator			
Australasian Gannet [1020]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix			
Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri			
Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta			
Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi			
Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 04-Jan-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	3
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	11
Listed Threatened Species:	128
Listed Migratory Species:	73

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	43
Commonwealth Heritage Places:	6
Listed Marine Species:	118
Whales and Other Cetaceans:	31
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	5
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	99
Regional Forest Agreements:	2
Nationally Important Wetlands:	19
EPBC Act Referrals:	161
Key Ecological Features (Marine):	2
Biologically Important Areas:	29
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places		[Resource Information]
Name	State	Legal Status
Historic		
Great Ocean Road and Scenic Environs	VIC	Listed place
Point Nepean Defence Sites and Quarantine Station Area	VIC	Listed place
Quarantine Station and Surrounds	VIC	Within listed place

Wetlands of International Importance (Ramsar Wetlands)	[Resource Information]
Ramsar Site Name	Proximity
Glenelg estuary and discovery bay wetlands	Within Ramsar site
Lavinia	Within Ramsar site
Piccaninnie ponds karst wetlands	Within Ramsar site
Port phillip bay (western shoreline) and bellarine peninsula	Within Ramsar site

Commonwealth Marine Area	[Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities		[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area

Community Name	Threatened Category	Presence Text
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	Endangered	Community likely to occur within area
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community likely to occur within area
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (Eucalyptus ovata / E. brookeriana)	Critically Endangered	Community likely to occur within area
Tasmanian white gum (Eucalyptus viminalis) wet forest	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Acanthiza pusilla magnirostris King Island Brown Thornbill, Brown Thornbill (King Island) [91709]	Endangered	Species or species habitat known to occur within area
Acanthornis magna greeniana King Island Scrubtit, Scrubtit (King Island) [82329]	Critically Endangered	Species or species habitat known to occur within area
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area
Aquila audax fleayi Tasmanian Wedge-tailed Eagle, Wedge-tailed Eagle (Tasmanian) [64435]	Endangered	Species or species habitat may occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii graptogyne South-eastern Red-tailed Black-Cockatoo [25982]	Endangered	Species or species habitat known to occur within area
Ceyx azureus diemenensis Tasmanian Azure Kingfisher [25977]	Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route known to occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Platycercus caledonicus brownii Green Rosella (King Island) [67041]	Vulnerable	Species or species habitat known to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Strepera fuliginosa colei Black Currawong (King Island) [67113]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
CRUSTACEAN		
Euastacus bispinosus		
Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat known to occur within area
FISH		
Galaxiella pusilla		
Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Endangered	Species or species habitat may occur within area
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Nannoperca obscura		
Yarra Pygmy Perch [26177]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Nannoperca variegata		
Variegated Pygmy Perch, Ewens Pygmy Perch, Golden Pygmy Perch [26178]	Vulnerable	Species or species habitat known to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
Rexea solandri (eastern Australian population)		
Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat may occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii		
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
FROG		
Litoria raniformis		
Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
INSECT		
Synemon plana		
Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area
MAMMAL		
Antechinus minimus maritimus		
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area
Miniopterus orianae bassanii Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus trisulcatus Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Pseudomys novaehollandiae](#) New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
[Pseudomys shortridgei](#) Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area
[Pteropus poliocephalus](#) Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
PLANT		
[Amphibromus fluitans](#) River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area
[Astelia australiana](#) Tall Astelia [10851]	Vulnerable	Species or species habitat may occur within area
[Caladenia calcicola](#) Limestone Spider-orchid [10065]	Vulnerable	Species or species habitat likely to occur within area
[Caladenia colorata](#) Coloured Spider-orchid, Small Western Spider-orchid, Painted Spider-orchid [54999]	Endangered	Species or species habitat known to occur within area
[Caladenia hastata](#) Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area
[Caladenia ornata](#) Ornate Pink Fingers [76213]	Vulnerable	Species or species habitat likely to occur within area
[Caladenia tensa](#) Greencomb Spider-orchid, Rigid Spider-orchid [24390]	Endangered	Species or species habitat may occur within area
[Dodonaea procumbens](#) Trailing Hop-bush [12149]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area
Euphrasia collina subsp. muelleri Purple Eyebright, Mueller's Eyebright [16151]	Endangered	Species or species habitat may occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area
Grevillea infecunda Anglesea Grevillea [22026]	Vulnerable	Species or species habitat known to occur within area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area
Hiya distans listed as Hypolepis distans Scrambling Ground-fern [92548]	Endangered	Species or species habitat known to occur within area
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area
Leiocarpa gatesii Wrinkled Buttons [76212]	Vulnerable	Species or species habitat known to occur within area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat known to occur within area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat may occur within area
Pimelea spinescens subsp. spinescens Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat likely to occur within area
Pomaderris halmaturina subsp. halmaturina Kangaroo Island Pomaderris [21964]	Vulnerable	Species or species habitat known to occur within area
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat likely to occur within area
Prasophyllum frenchii Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid, French's Leek-orchid, Swamp Leek-orchid [9704]	Endangered	Species or species habitat known to occur within area
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat known to occur within area
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat known to occur within area
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area
Pterostylis ziegeleri Grassland Greenhood, Cape Portland Greenhood [64971]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat may occur within area
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat likely to occur within area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area
Taraxacum cygnorum Coast Dandelion, Native Dandelion [2508]	Vulnerable	Species or species habitat may occur within area
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat known to occur within area
Thelymitra orientalis Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Lissolepis coventryi		
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area
Tympanocryptis pinguicolla		
Victorian Grassland Earless Dragon [66727]	Critically Endangered	Species or species habitat likely to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus		
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus		
Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area
Ardenna grisea		
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat known to occur within area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area
[Physeter macrocephalus](#) Sperm Whale [59]		Species or species habitat may occur within area
Migratory Terrestrial Species		
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat known to occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Breeding known to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area
[Arenaria interpres](#) Ruddy Turnstone [872]		Roosting known to occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Roosting known to occur within area
[Calidris alba](#) Sanderling [875]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area
[Calidris tenuirostris](#) Great Knot [862]	Critically Endangered	Roosting known to occur within area
[Charadrius bicinctus](#) Double-banded Plover [895]		Roosting known to occur within area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
[Gallinago megala](#) Swinhoe's Snipe [864]		Roosting likely to occur within area
[Gallinago stenura](#) Pin-tailed Snipe [841]		Roosting likely to occur within area
[Limicola falcinellus](#) Broad-billed Sandpiper [842]		Roosting known to occur within area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Xenus cinereus		
Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Defence	
Defence - CROWS NEST CAMP - QUEENSCLIFF [21029]	VIC
Defence - CROWS NEST CAMP - QUEENSCLIFF [21028]	VIC
Defence - CROWS NEST CAMP - QUEENSCLIFF [21027]	VIC
Defence - CROWS NEST CAMP - QUEENSCLIFF [21026]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21031]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21030]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21032]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21034]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21033]	VIC
Defence - SWAN ISLAND TRAINING AREA [21446]	VIC
Defence - SWAN ISLAND TRAINING AREA [21447]	VIC
Defence - SWAN ISLAND TRAINING AREA [21448]	VIC
Defence - TRAINING CENTRE (Norris Barracks) - Portsea [21025]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21016]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21014]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21010]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21011]	VIC

Commonwealth Land Name	State
Defence - Training Depot, Darts RD 3305 Portland [21018]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21019]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21013]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21023]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21022]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21021]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21020]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21024]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21012]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21015]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21017]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21008]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21007]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21009]	VIC
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC
Transport and Regional Services - Australian Maritime Safety Authority	
Commonwealth Land - Australian Maritime Safety Authority [41289]	SA
Commonwealth Land - Australian Maritime Safety Authority [41288]	SA
Unknown	
Commonwealth Land - [21583]	VIC
Commonwealth Land - [21492]	VIC
Commonwealth Land - [60115]	TAS
Commonwealth Land - [60112]	TAS
Commonwealth Land - [22391]	VIC
Commonwealth Land - [60111]	TAS
Commonwealth Land - [60113]	TAS
Commonwealth Land - [21570]	VIC
Commonwealth Land - [60114]	TAS

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Cape Northumberland Lighthouse	SA	Listed place
Cape Wickham Lighthouse	TAS	Listed place
Fort Queenscliff	VIC	Listed place
Sorrento Post Office	VIC	Listed place
Swan Island Defence Precinct	VIC	Listed place
Natural		
Swan Island and Naval Waters	VIC	Listed place

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Morus capensis Cape Gannet [59569]		Breeding known to occur within area
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area overfly marine area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area overfly marine area
Fish		

Scientific Name	Threatened Category	Presence Text
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys mollisoni Mollison's Pipefish [66260]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata		
Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Berardius arnuxii		
Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata		
Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area

Current Scientific Name	Status	Type of Presence
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Hyperoodon planifrons Southern Bottlenose Whale [71]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area

Current Scientific Name	Status	Type of Presence
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tasmacetus shepherdi Shepherd's Beaked Whale, Tasman Beaked Whale [55]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories
Apollo	Multiple Use Zone (IUCN VI)
Franklin	Multiple Use Zone (IUCN VI)
Zeehan	Multiple Use Zone (IUCN VI)
Nelson	Special Purpose Zone (IUCN VI)
Zeehan	Special Purpose Zone (IUCN VI)

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Aire River	Heritage River	VIC
Aire River W.R.	Natural Features Reserve	VIC
Aireys Inlet B.R.	Natural Features Reserve	VIC
Anglesea B.R.	Natural Features Reserve	VIC
Badger Box Creek	Nature Reserve	TAS
Barham Paradise S.R.	Natural Features Reserve	VIC
Barwon Bluff	Marine Sanctuary	VIC
Bats Ridge W.R	Nature Conservation Reserve	VIC
Bay of Islands Coastal Park	Conservation Park	VIC
Black Pyramid Rock	Nature Reserve	TAS

Protected Area Name	Reserve Type	State
Bolwarra H43 B.R.	Natural Features Reserve	VIC
Bolwarra H44 B.R.	Natural Features Reserve	VIC
Bolwarra H45 B.R.	Natural Features Reserve	VIC
Breamlea F.F.R.	Nature Conservation Reserve	VIC
Cape Nelson	State Park	VIC
Cape Wickham	Conservation Area	TAS
Cape Wickham	State Reserve	TAS
Carpenter Rocks	Conservation Park	SA
Cataraqui Point	Conservation Area	TAS
Christmas Island	Nature Reserve	TAS
City of Melbourne Bay	Conservation Area	TAS
Colliers Forest Reserve	Conservation Covenant	TAS
Colliers Swamp	Conservation Area	TAS
Councillor Island	Nature Reserve	TAS
Counsel Hill	Conservation Area	TAS
Currie Lightkeepers Residence	Historic Site	TAS
Deen Maar	Indigenous Protected Area	VIC
Dingley Dell	Conservation Park	SA
Disappointment Bay	State Reserve	TAS
Discovery Bay	Marine National Park	VIC
Discovery Bay Coastal Park	Conservation Park	VIC
Douglas Point	Conservation Park	SA
Eagle Rock	Marine Sanctuary	VIC
Edna Bowman N.C.R.	Natural Features Reserve	VIC

Protected Area Name	Reserve Type	State
Eldorado	Conservation Area	TAS
Gentle Annie	Conservation Area	TAS
Glenelg River	Heritage River	VIC
Goose Lagoon W.R	Natural Features Reserve	VIC
Great Otway	National Park	VIC
Hedditch Hill S.R.	Natural Features Reserve	VIC
Johanna Falls S.R.	Natural Features Reserve	VIC
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC
Lake Connewarre W.R	Natural Features Reserve	VIC
Lake Gillear W.R	Natural Features Reserve	VIC
Latrobe B.R.	Natural Features Reserve	VIC
Lavinia	State Reserve	TAS
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC
Lily Pond B.R.	Natural Features Reserve	VIC
Lonsdale Lakes W.R	Nature Conservation Reserve	VIC
Lower Glenelg	National Park	VIC
Lower South East	Marine Park	SA
Marengo N.C.R.	Nature Conservation Reserve	VIC
Marengo Reefs	Marine Sanctuary	VIC
Merri	Marine Sanctuary	VIC
Mornington Peninsula	National Park	VIC
Mount Richmond	National Park	VIC

Protected Area Name	Reserve Type	State
Muddy Lagoon	Nature Reserve	TAS
Narrawong F.R.	Nature Conservation Reserve	VIC
Nelson SS.R.	Natural Features Reserve	VIC
Nene Valley	Conservation Park	SA
New Year Island	Game Reserve	TAS
Painkalac Creek	Reference Area	VIC
Piccaninnie Ponds	Conservation Park	SA
Point Addis	Marine National Park	VIC
Point Danger	Marine Sanctuary	VIC
Point Nepean	National Park	VIC
Porky Beach	Conservation Area	TAS
Port Campbell	National Park	VIC
Portland H46 B.R.	Natural Features Reserve	VIC
Portland H47 B.R.	Natural Features Reserve	VIC
Port Phillip Heads	Marine National Park	VIC
Princetown W.R	Natural Features Reserve	VIC
Queenscliff N.F.R	Natural Features Reserve	VIC
Red Hut Point	Conservation Area	TAS
Red Hut Road #1	Conservation Covenant	TAS
Red Hut Road #2	Conservation Covenant	TAS
Reid Rocks	Nature Reserve	TAS
Sea Elephant	Conservation Area	TAS
Sea Elephant River	Conservation Covenant	TAS
Seal Rocks	State Reserve	TAS

Protected Area Name	Reserve Type	State
Seal Rocks	Conservation Area	TAS
South Rd Nugara	Conservation Covenant	TAS
Stokes Point	Conservation Area	TAS
Stony Creek (Otways)	Reference Area	VIC
Swan Bay - Edwards Point W.R	Nature Conservation Reserve	VIC
The Arches	Marine Sanctuary	VIC
Tower Hill W.R	Natural Features Reserve	VIC
Twelve Apostles	Marine National Park	VIC
Tyrendarra F.R	Nature Conservation Reserve	VIC
Unnamed (No.HA1038)	Heritage Agreement	SA
Unnamed (No.HA1404)	Heritage Agreement	SA
Unnamed (No.HA1457)	Heritage Agreement	SA
Unnamed (No.HA42)	Heritage Agreement	SA
Unnamed P0176	Private Nature Reserve	VIC
Wild Dog B.R.	Natural Features Reserve	VIC
Wild Dog Creek SS.R.	Natural Features Reserve	VIC
Yambacoona	Conservation Covenant	TAS
Yambuk F.F.R.	Nature Conservation Reserve	VIC
Yambuk Wetlands N.C.R.	Natural Features Reserve	VIC

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State
Tasmania RFA	Tasmania
West Victoria RFA	Victoria

Nationally Important Wetlands	[Resource Information]
Wetland Name	State
Aire River	VIC
Bungaree Lagoon	TAS
Glenelg Estuary	VIC
Glenelg River	VIC
Lake Connewarre State Wildlife Reserve	VIC
Lake Flannigan	TAS
Lavinia Nature Reserve	TAS
Long Swamp	VIC
Lower Aire River Wetlands	VIC
Lower Merri River Wetlands	VIC
Pearshape Lagoon 1	TAS
Pearshape Lagoon 2	TAS
Pearshape Lagoon 3	TAS
Pearshape Lagoon 4	TAS
Piccaninnie Ponds	SA
Princetown Wetlands	VIC
Swan Bay & Swan Island	VIC
Tower Hill	VIC
Yambuk Wetlands	VIC

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Apollo Bay to Skenes Creek Coastal Trail	2022/09274		Assessment
Cape Winds Offshore Windfarm Geophysical, Geotechnical and Marine Studies	2023/09629		Referral Decision
Offshore Tidal Energy Facility and Submarine Cable	2008/4480		Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Southern Winds Offshore Wind Project	2022/09435		Assessment
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed
Spinifex Offshore Surveys	2022/09359		Completed
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
City Of Greater Geelong Mosquito Control Program 2021-2030, Vic	2020/8782	Controlled Action	Further Information Request
Establishment of plantation for use of effluent water	2003/1063	Controlled Action	Completed
Green Point Wind Farm	2001/529	Controlled Action	Post-Approval
Kentbruck Green Power Hub, Vic	2019/8510	Controlled Action	Assessment Approach
Lonsdale Golf Club Redevelopment	2003/969	Controlled Action	Post-Approval
Lorne Golf Course redevelopment	2004/1513	Controlled Action	Post-Approval
Mosquito Control	2005/2132	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval
Pelican Point residential subdivision	2006/2529	Controlled Action	Completed
Port Phillip Bay Channel Deepening	2002/576	Controlled Action	Post-Approval
Redevelopment of post office and construction of dwellings	2007/3639	Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Residential and Golf Course Development Project	2003/1144	Controlled Action	Post-Approval
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Wind Turbines	2001/439	Controlled Action	Completed
Not controlled action			
Airey Inlet water reclamation plant to Anglesea sewerage system	2006/2539	Not Controlled Action	Completed
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed
Anglesea Mine South Wall Vegetation removal, Anglesea, Vic	2017/8060	Not Controlled Action	Completed
Apollo Bay Water Storage Basin, VIC	2012/6484	Not Controlled Action	Completed
Barwon Heads Rd gas pipeline installation	2006/2769	Not Controlled Action	Completed
Barwon Heads Stormwater Outfall upgrade, Victoria	2016/7650	Not Controlled Action	Completed
Bluff Heights Estate Stages 2 to 4	2003/1047	Not Controlled Action	Completed
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed
Construction and operation of Barwon Water biosolids treatment facility	2008/4345	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Construction of Barwon Heads Bridge	2005/2375	Not Controlled Action	Completed
Construction of Infrastructure to Extract, Treat & Transfer Groundwater to Wurde	2008/4104	Not Controlled Action	Completed
Construction of Overtaking Lanes on Great Ocean Rd	2008/4044	Not Controlled Action	Completed
construction of pump station for pump diversion from the Barham River	2003/1242	Not Controlled Action	Completed
Construction of the Edgars Road Extension, from Childs Road, Lalor to Cooper Street, Epping	2003/1135	Not Controlled Action	Completed
Development of Pt Nepean Quarantine Station (former) National Centre for Coasts and Climate	2008/4653	Not Controlled Action	Completed
Divestment of Norris Barracks	2003/963	Not Controlled Action	Completed
Drilling of Callister-1 exploration well in VIC/P51	2004/1633	Not Controlled Action	Completed
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed
Gas Fields Development	2011/5879	Not Controlled Action	Completed
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed
Gleneig Spiny Crayfish Habitat Rehabilitation	2011/6164	Not Controlled Action	Completed
Golflinks Road Residential Development & Water Storage Facility at Barwon Heads	2004/1793	Not Controlled Action	Completed
Grevillea infecunda tip cuttings and soil samples	2005/1979	Not Controlled Action	Completed
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Installation of a 35 metre telecommunications facility at Jirrahlinga Animal San	2003/1151	Not Controlled Action	Completed
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed
Kongorong Wind Farm	2002/568	Not Controlled Action	Completed
Lot 5 Pelican Point Road, Pelican Point SA - Proposed New Dwelling	2021/9011	Not Controlled Action	Completed
Maintenance and priority works to heritage buildings at Point Nepean Quarantine	2006/3151	Not Controlled Action	Completed
Maintenance Dredging South Channel 2012	2011/6198	Not Controlled Action	Completed
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed
Maintenance works at Barwon Heads Bridge	2003/1199	Not Controlled Action	Completed
Marine and Freshwater Resources Institute (MAFRI) Facility	2000/121	Not Controlled Action	Completed
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed
New Water Infrastructure Upgrade, Grassy Dam, King Island	2013/6882	Not Controlled Action	Completed
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed
Ocean Grove rising main 2 upgrade	2009/4978	Not Controlled Action	Completed
Ocean Grove Rising Main 2 Upgrade (OGRM2) - East Section & River Crossing	2010/5508	Not Controlled Action	Completed
Oceanlinx South Australia 1mW Greenwave Project	2012/6528	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed
Piccaninnie Ponds flow path restoration project, SA	2013/6711	Not Controlled Action	Completed
Point Nepean Quarantine Station (former)/Restoration of Medical Superintendent's	2006/3149	Not Controlled Action	Completed
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed
Portland Landfill Borehole Installation, Vic	2017/7886	Not Controlled Action	Completed
Port Phillip Channel Deepening Project - Trial Dredge Program	2005/2164	Not Controlled Action	Completed
Proposed replacement of existing road culvert	2013/7077	Not Controlled Action	Completed
Queenscliff Harbour Redevelopment	2004/1352	Not Controlled Action	Completed
Redevelopment Project to Upgrade and Extend the Portland Trawler Wharf	2008/4317	Not Controlled Action	Completed
Rehabilitation of Lake Connewarre State Game Reserve	2002/708	Not Controlled Action	Completed
Remedial Works to the Swan Island Bridge	2003/1129	Not Controlled Action	Completed
Replacement of sewer pipelines	2002/623	Not Controlled Action	Completed
Residential/Resort/Golf Course development	2002/907	Not Controlled Action	Completed
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed
St Quentin Consulting Pty Ltd /Residential development/305 Great Ocean Road, Jan Juc/VIC/Development	2014/7184	Not Controlled Action	Completed
Torquay Sewerage Strategy - pipe replacement between Torquay and the Black Rock	2004/1704	Not Controlled Action	Completed
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Transfer of 90ha Point Nepean Quarantine Station from Commonwealth to Victorian	2008/4521	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Victorian Generator Project	2005/1984	Not Controlled Action	Completed
West Triton Drilling Program - Otway Basin	2007/3909	Not Controlled Action	Completed
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey in Permit Areas T/32P and T/33P	2002/845	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2008/3962	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey, Petroleum Exploration Permit Area EPP27	2006/2776	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey in VIC/P50 and VIC/P46	2004/1810	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
2D Siesmic Marine Survey	2008/4074	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey within Torquay Sub-basin off sthn Victoria	2012/6256	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
Benbows Paddock residential development, Cape Bridgewater	2007/3247	Not Controlled Action (Particular Manner)	Post-Approval
Bernoulli 3D Seismic Survey	2006/3053	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Construction of bridge across Barwon River	2006/2947	Not Controlled Action (Particular Manner)	Post-Approval
Construct private dwelling	2008/4234	Not Controlled Action (Particular Manner)	Post-Approval
Controlled Burn, Understorey Clearance and Removal of UXO	2003/1030	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval
Fuelbreak construction	2009/4915	Not Controlled Action (Particular Manner)	Post-Approval
Geelong Bypass Section 3	2005/2099	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Maintenance Dredging Program 2012-21 in Port of Melbourne	2012/6332	Not Controlled Action (Particular Manner)	Post-Approval
OTE10 2D Marine Seismic Survey	2009/5223	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Seismic Survey VIC-P46	2002/826	Not Controlled Action (Particular Manner)	Post-Approval
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval
Shearwater 2D and 3D marine seismic survey	2005/2180	Not Controlled Action (Particular Manner)	Post-Approval
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins T/35P and T/36P 3D Seismic Surveys	2007/3817	Not Controlled Action (Particular Manner)	Post-Approval
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Surface Geochemical Exploration Program, TAS	2010/5780	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Torquay Sub-basin (VIC/P62) OTE12-3D Seismic Survey	2012/6655	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vegetation clearance and residential subdivision near Mt Gambier	2004/1370	Not Controlled Action (Particular Manner)	Post-Approval
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval
Wolseley 3D seismic acquisition survey	2010/5703	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
2D & 3D Seismic Surveys - Permit Area - VIC/P50	2008/4517	Referral Decision	Completed
3D Marine Seismic Survey	2011/6156	Referral Decision	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Referral decision			
3D Seismic Survey	2008/4014	Referral Decision	Completed
8 Lot Industrial Subdivision	2008/4527	Referral Decision	Completed
Alteration Reconstruction Restoration and Repairs to Buildings	2008/4179	Referral Decision	Completed
Portland Wave Energy Project	2008/3946	Referral Decision	Completed
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed
Upgrade of Services Infrastructure Point Nepean Quarantine Station	2008/4591	Referral Decision	Completed
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed
Wind Farm	2001/139	Referral Decision	Completed
Wolseley 3D Seismic Acquisition Survey in Permit T/32P	2010/5291	Referral Decision	Completed
Works to the buildings and surrounds at the former Point Nepean Quarantine Stati	2008/4156	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Bonney Coast Upwelling	South-east
West Tasmania Canyons	South-east

Biologically Important Areas

Scientific Name	Behaviour	Presence
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur

Scientific Name	Behaviour	Presence
Ardenna tenuirostris Short-tailed Shearwater [82652]	Breeding	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Eudyptula minor Little Penguin [1085]	Breeding	Known to occur
Eudyptula minor Little Penguin [1085]	Foraging	Known to occur
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Breeding	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Known Foraging Area	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Regia MSS Commercial Fishery Review

9 August 2023

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Table of Contents

Introduction **3**

Commonwealth Fisheries **5**

Bass Strait Central Zone Scallop Fishery 8
Eastern Tuna and Billfish Fishery 10
Small Pelagic Fishery (Western sub-area) 12
Southern Bluefin Tuna Fishery (SBTF) 14
Southern and Eastern Scalefish and Shark Fishery (SESSF) - Shark Gillnet and Hook Sector 16
Southern and Eastern Scalefish and Shark Fishery (SESSF) - Commonwealth Trawl Sector and Scalefish Hook Sector 19
Southern Squid Jig Fishery 23
Western Tuna and Billfish Fishery 26

Victorian Fisheries **28**

Abalone Fishery 30
Bays and Inlet Fisheries 31
Eel Fishery 32
Giant Crab Fishery 33
Multispecies Ocean Fisheries 35
Octopus Fishery 37
Pipi Fishery 39
Rock Lobster Fishery 41
Scallop Fishery 43
Wrasse (Ocean) Fishery 45

Tasmanian Fisheries **47**

Abalone Fishery 48
Giant Crab Fishery 50
Octopus Fishery 52
Rock Lobster Fishery 54

South Australian Fisheries **56**

Abalone Fishery 58
Charter Boat Fishing 59
Giant Crab Fishery 60
Marine Scalefish Fishery 61
Rock Lobster Fishery 62

References **63**

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Acknowledgements

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Introduction

This review of commercial fisheries has been prepared for CGG Services (Australia) Pty Ltd (CGG) to identify Commonwealth and State (Victorian, Tasmanian, and South Australian) fisheries that have authority to fish within the Regia Marine Seismic Survey (Regia MSS) Activity Planning Area and/or Environmental Planning Area (Figure 1).

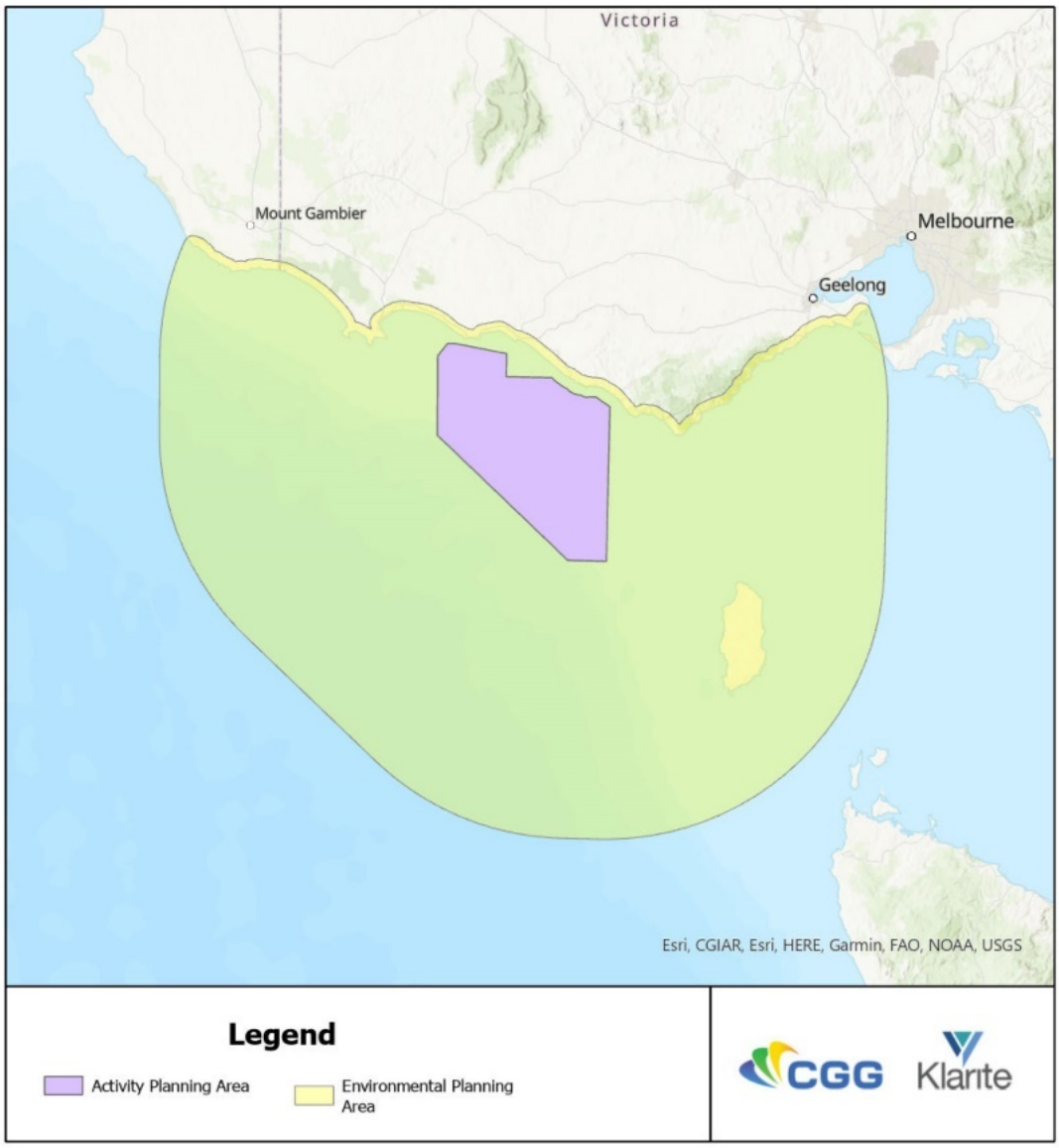

Figure 1: Regia Marine Seismic Survey Activity Planning Area and Environmental Planning Area

Commonwealth Fisheries

Commonwealth fisheries are managed by the Australian Fisheries Management Authority (AFMA) under the *Fisheries Management Act 1991* (Cth). AFMA jurisdiction covers the area of ocean from the coastline (under State-Commonwealth Offshore Constitutional Settlement Arrangements [OCS]) or from 3 nm from the coast out to the 200 nm limit (the Australian Fishing Zone (AFZ)). OCS arrangements are joint management arrangements of marine living resources that are found in waters subject to both Commonwealth and State control. Such arrangements provide for the management of the resources by the Commonwealth or respective State from the shoreline out to 200nm. Commonwealth commercial fisheries with authority to fish within the Activity Planning Area and Environmental Planning Area are:

- Bass Strait Central Zone Scallop Fishery (Bass Strait CZSF)
- Eastern Tuna and Billfish Fishery (ETBF)
- Skipjack Tuna Fishery (Eastern)
- Small Pelagic Fishery (SPF)
- Southern Bluefin Tuna Fishery (SBTF)
- Southern and Eastern Scalefish and Shark Fishery (SESSF)
- Southern Squid Jig Fishery
- Western Tuna and Billfish Fishery (ETBF)

Information relating to the target species, fishing locations, landed catch, value and other relevant aspects of each fishery is included in the following sections. Maps of relative fishing intensity for 2010 – 2020 and the Activity Planning Area and Environmental Planning Area are also provided.

The maps show the maximum area fished and the fishing intensity for each fishery. Fishing intensity (in kilograms of catch per square kilometre) is classified in shades of red, orange, and green to show high, medium, and low intensity classes, respectively. The data attributes include the class, the range of values in the class and the unit of measure. The maximum area fished shows the area fished by all fishers aggregated by 1-degree (111 km × 111 km) grid cells. The data provided by AFMA has been filtered to exclude catch from analysis areas where fewer than 5 boats operated during a given year.

Data sources are from the Commonwealth Fishery Status Report 2022 (Patterson et al. 2022) and AFMA website (AFMA 2023).

Table 1 provides a summary of the Commonwealth fisheries with fishing intensity within the Activity Planning and Environmental Planning Areas.

Table 1: Summary of Commonwealth Fisheries with Fishing Intensity within the Activity Planning and Environmental Planning Areas

Fishery	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area	Note
Bass Strait Central Zone Scallop Fishery	No	Yes	The Activity Planning Area and Environmental Planning Area overlap the fishery maximum fished area but this is due to the size of the grids used for reporting as there have been no active scallop beds within the area of overlap. The Environmental Planning Area overlaps where there has been fishing intensity during 2010 – 2020.
Eastern Tuna and Billfish Fishery	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the fishery maximum fished area. The Activity Planning Area and Environmental Planning Area do not overlap where there has been fishing intensity during 2010 – 2020.
Skipjack Tuna Fishery (Eastern)	No	No	Not currently active. There has been no catch effort in the fishery since the 2008 - 2009 season.
Small Pelagic Fishery (Western sub-area)	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the fishery maximum fished area. The Activity Planning Area and Environmental Planning Area do not overlap where there has been fishing intensity during 2009 – 2020.
Southern Bluefin Tuna Fishery (SBTF)	No	No	The Activity Planning Area and Environmental Planning Area do not overlap the fishery maximum fished area or were there has been fishing intensity during 2010 – 2020. Between May and October Southern Bluefin Tuna may migrate through the Activity Planning and Environmental Planning Areas.

Fishery	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area	Note
Southern and Eastern Scalefish and Shark Fishery (SESSF) Shark Gillnet and Hook Sector	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the Shark Hook Sub-Sector fishery maximum fished area. The Environmental Planning Area overlaps the Shark Hook Sub-Sector where there has been fishing intensity during 2010 – 2020. The Activity Planning Area and Environmental Planning Area overlap the Shark Net Sub-Sector maximum fished area and where there has been fishing intensity during 2010 – 2020.
Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth Trawl Sector and Scalefish Hook Sector	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the Commonwealth Trawl Sub-sector maximum fished area and where there has been fishing intensity (otter trawl only not Danish seine) during 2010 – 2020. The Activity Planning Area and Environmental Planning Area overlap the Scalefish Hook Sector maximum fished area and where there has been fishing intensity during 2010 – 2020.
Southern Squid Jig Fishery	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the Southern Squid Jig Fishery and Southern and Eastern Scalefish and Shark Fishery Commonwealth Trawl Sector Squid maximum fished area and where there has been fishing intensity during 2010 – 2020.
Western Tuna and Billfish Fishery	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the Western Tuna and Billfish Fishery maximum fished area. The Activity Planning Area and Environmental Planning Area do not overlap where there has been fishing intensity during 2010 – 2020.

Bass Strait Central Zone Scallop Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Bass Strait Central Zone Scallop Fishery	Scallops	Fishery operates in the Bass Strait between the Victorian and Tasmanian and starts at 20 nm from their respective coastlines. Commercial scallops in the Bass Strait Central Zone Scallop Fishery are mainly found at depths of 35 - 100 m and are caught using a steel dredge that is towed by the vessel along muddy to coarse sand substrates. Fishing effort is concentrated around King and Flinders Islands which are outside of the Regia Activity Planning Area. Currently there are 10 active boats using towed dredges. Fishing season is 1 April to 31 December. Actual catch in 2021 was 2,344 tonnes. The major landing ports are Beauty Point, Devonport, and Stanley (Tasmania); Apollo Bay, Lakes Entrance, Melbourne, Port Welshpool, Queenscliff and San Remo (Victoria) Total fishery value in 2021 was A$4.7 million. In the 2021 fishing season there were 10 active vessels. The Activity Planning Area and Environmental Planning Area overlap the fishery maximum fished area, though fishing intensity from 2010 – 2020 has been to the east of the Activity Planning Area within the Environmental Planning Area (Figure 2). The area of overlap with the Activity Planning Area is due to the size of the grids used for reporting as there have been no active scallop beds within the area of overlap. Historical and current scallop beds are to the east and north of King Island outside of the Activity Planning Area (Koopman and Knuckey 2023). Fishing mortality: not subject to overfishing. Biomass: Not over fished.	No	Yes

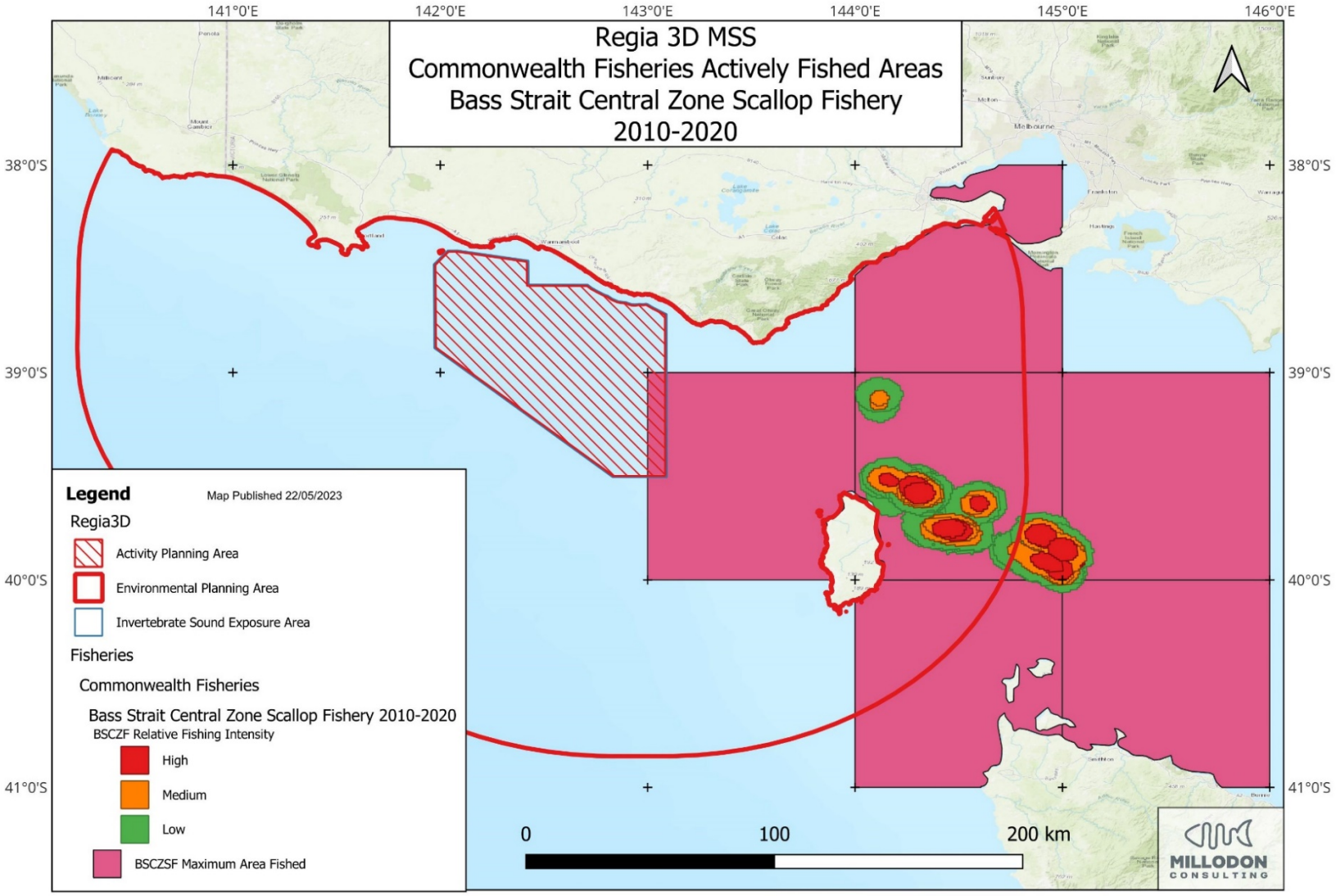

Figure 2: Bass Strait Central Zone Scallop Fishery Fishing Effort within the Activity Planning Area and Environmental Planning Area

Eastern Tuna and Billfish Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Eastern Tuna and Billfish Fishery	Albacore tuna Bigeye tuna Yellowfin tuna Swordfish Striped marlin	A longline and minor line fishery that operates in water depths > 200 m from Cape York to Victoria. Fishery effort is typically concentrated along the NSW coast and southern Queensland coast (Figure 3). No Victorian ports are used. In 2017 there was some fishing effort in Victoria at low levels. The number of active vessels has decreased within the fishery from around 152 in 1999 to 35 in 2021. Actual catch in the 2021 season was 5,148 tonnes. Total fishery value in 2021 was A$35.6 million. The Activity Planning Area and Environmental Planning Area overlap the fishery maximum fished area, though fishing intensity from 2010 – 2020 has been along the NSW coast and southern Queensland coast (Figure 3). Fishing mortality: not subject to overfishing. Biomass: Over fished – striped marlin. All other species not overfished.	Yes	Yes

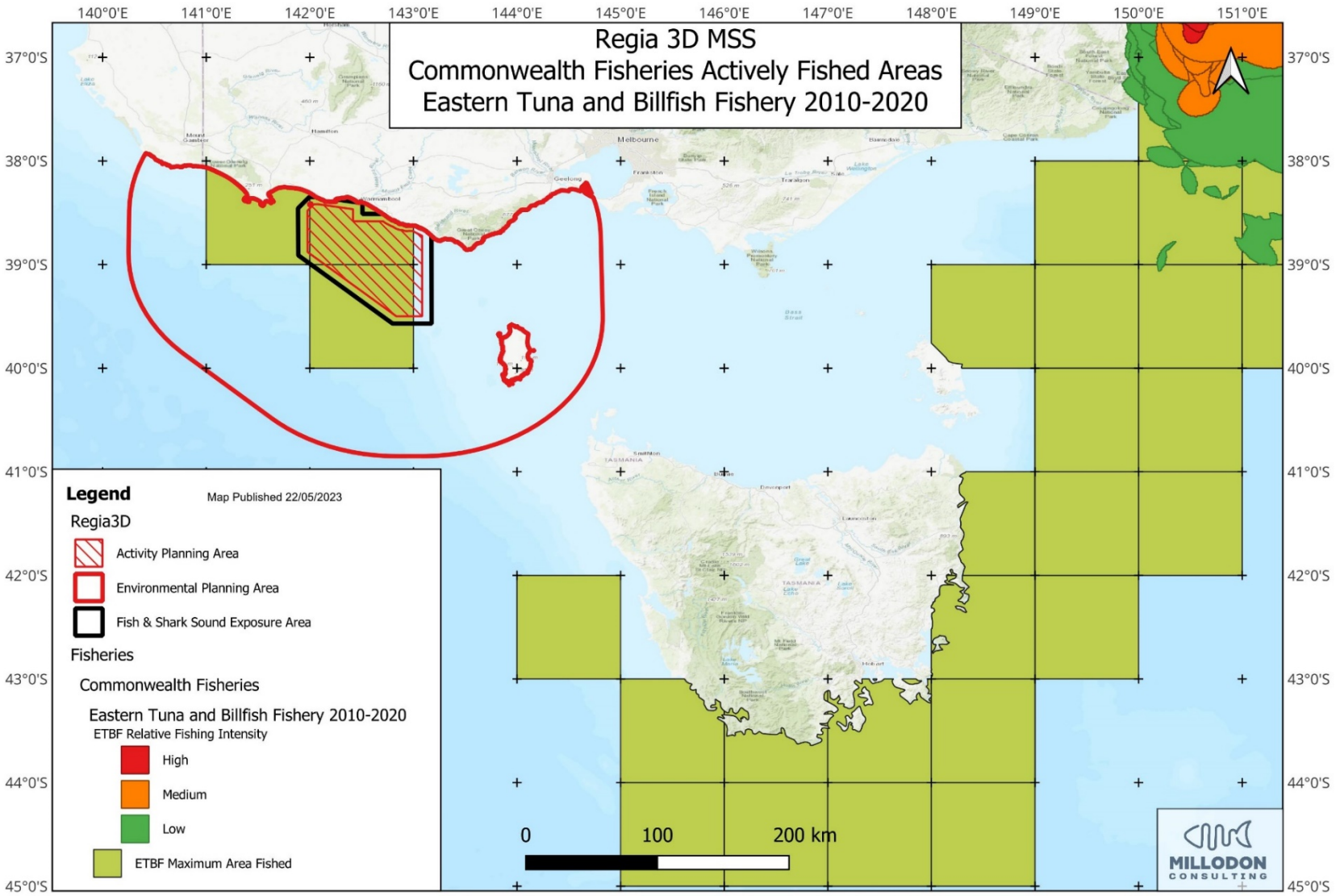

Figure 3: Eastern Tuna and Billfish Fishery Fishing Effort within the Activity Planning Area and Environmental Planning Area

Small Pelagic Fishery (Western sub-area)

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Small Pelagic Fishery (Western sub-area)	Australian sardine Blue mackerel Jack mackerel Redbait	The Small Pelagic Fishery extends from the southern Queensland to southern Western Australia. Fishers use midwater trawls and purse seine nets. Geelong is a major landing port. Total retained catch of the four target species was 18,878 tonnes in the 2021-22 season. Fishery effort generally concentrated in the near-shore Great Australian Bight to the west and south of Port Lincoln. The Environmental Planning Area and a small part of the Activity Planning Area overlap the fishery maximum fished area. There has been no ABARES classified fishing intensity from 2009 – 2020 in the Activity Planning Area or Environmental Planning Area (Figure 4). Fishing mortality: not subject to overfishing. Biomass: Not over fished.	Yes	Yes

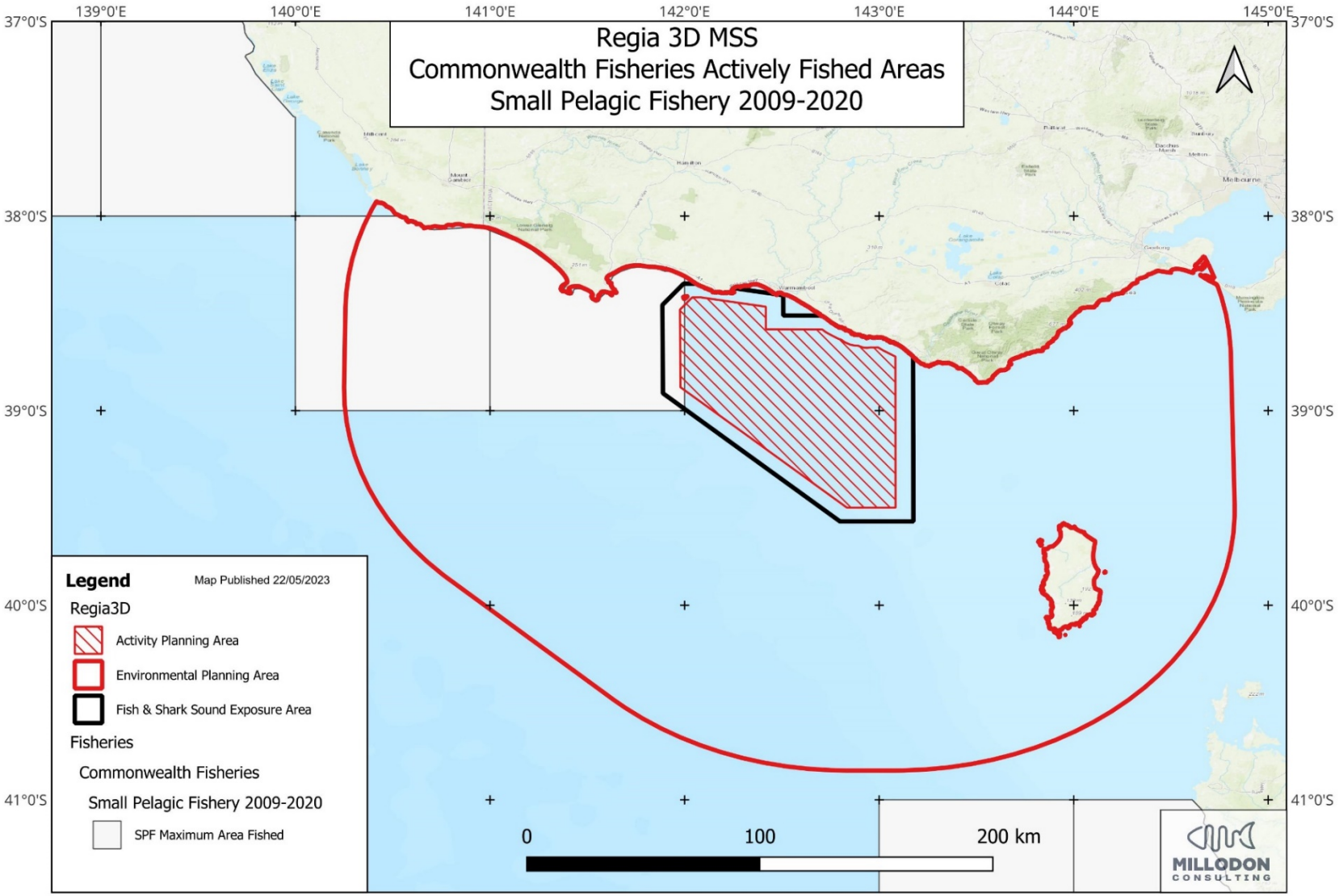

Figure 4: Small Pelagic Fishery (Western sub-area) Fishing Effort within the Activity Planning Area and Environmental Planning Area

Southern Bluefin Tuna Fishery (SBTF)

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Southern Bluefin Tuna Fishery (SBTF)	Southern bluefin tuna	The SBTF covers the entire sea area around Australia, out to 200 nm from the coast. Southern bluefin tuna are also commonly caught off the NSW coastline. In this area, fishers catch these fish using the longline fishing method. A pelagic longline and purse seine fishery that was worth $41.39 million in 2020-21 (actual catch was 5,646 tonnes). The fishery operates year-round. Fishery effort is generally concentrated in the Great Australian Bight and off the southern NSW coast. The Activity Planning Area and Environmental Planning Area do not overlap the fishery maximum fished area or where there has been classified fishing intensity from 2010 – 2020 (Figure 5). Between May and October, when the waters off NSW and Victoria are cooler, Southern Bluefin Tuna may migrate through the Activity Planning and Environmental Planning Areas. Fishing mortality: not subject to overfishing. Biomass: Not over fished.	No	No

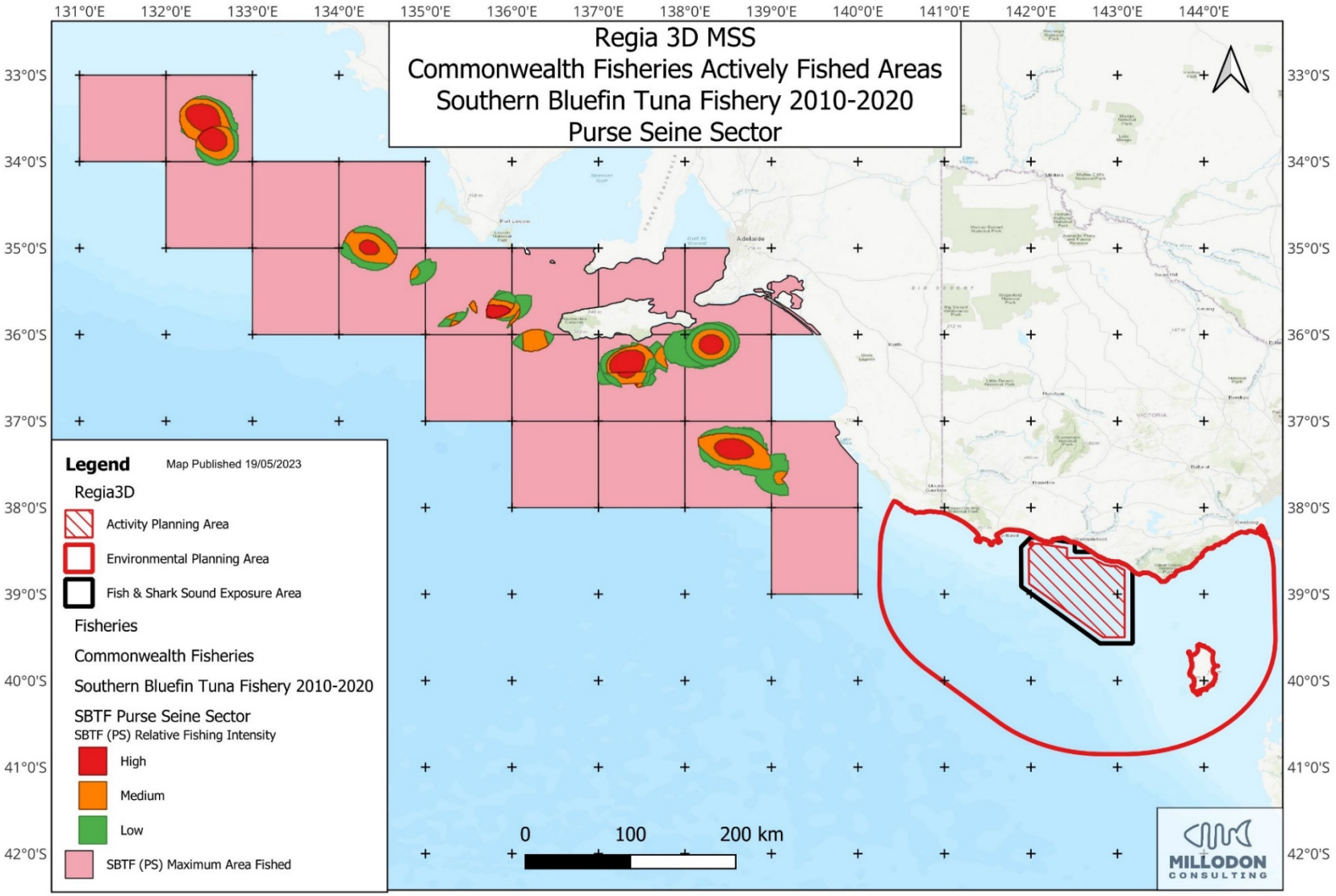

Figure 5: Southern Bluefin Tuna Fishery Fishing Effort within the Activity Planning Area and Environmental Planning Area

Southern and Eastern Scalefish and Shark Fishery (SESSF) - Shark Gillnet and Hook Sector

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Southern and Eastern Scalefish and Shark Fishery (SESSF) Shark Gillnet and Hook Sector	Elephantfish Gummy shark Sawsharks School shark	The Southern and Eastern Scalefish and Shark Fishery (SESSF) stretches south from Fraser Island in southern Queensland, around Tasmania, to Cape Leeuwin in southern Western Australia. The shark gillnet and shark hook sectors (SGSHS) are part of the Gillnet, Hook and Trap Sector (GHTS) of the Southern and Eastern Scalefish and Shark Fishery (SESSF). The SGSHS uses demersal gillnet and demersal longline to target gummy shark. Sawsharks and elephantfish are caught as by-products of fishing for gummy sharks. Most fishing in the sector using nets occurs in Bass Strait targeting elephantfish, gummy shark, sawsharks and school shark. Fishing is generally concentrated east of King Island. Most fishing using hooks occurs off South Australia (Figure 7). The Activity Planning Area and Environmental Planning Area overlap the Shark Hook Sub-Sector maximum fished area but there has only been classified fishing intensity from 2010 – 2020 in the Environmental Planning Area (Figure 6). The Activity Planning Area and Environmental Planning Area overlap the Shark Net Sub-Sector maximum fished area and where there has been fishing intensity from 2010 – 2020 (Figure 7). Total retained catch of the target species was 2,150 tonnes in the 2021-22 season. No value is provided for 2021-22 season. In 2020-21, the fishery value was A$28.84 million. In the 2021-2022 fishing season there were 27 active gillnet vessels and 40 active hook vessels. Fishing mortality: school shark is uncertain. Biomass: school shark is over fished.	Yes	Yes

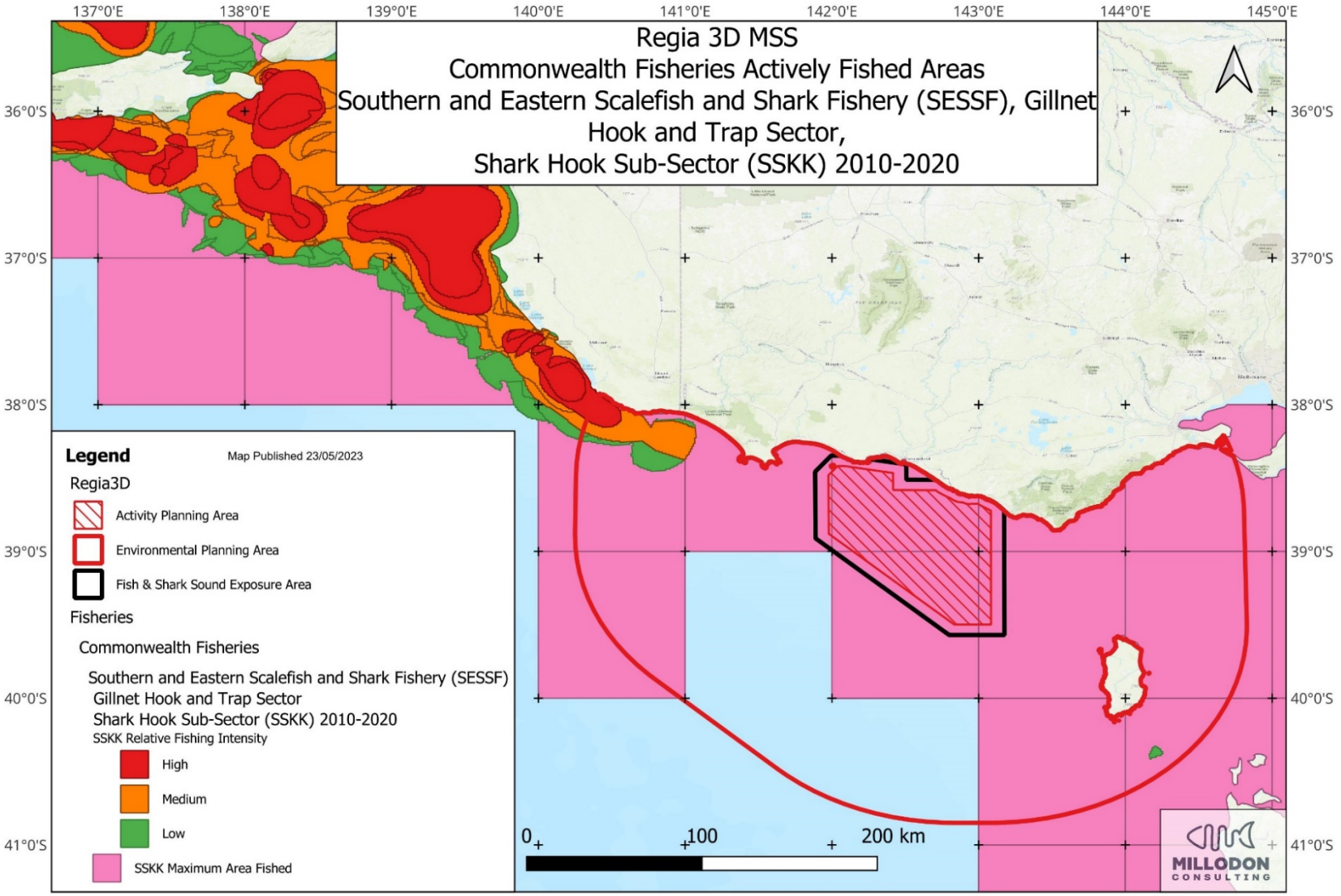

Figure 6: Southern and Eastern Scalefish and Shark Fishery Shark Hook Sub-Sector Fishing Effort within the Activity Planning Area and Environmental Planning Area

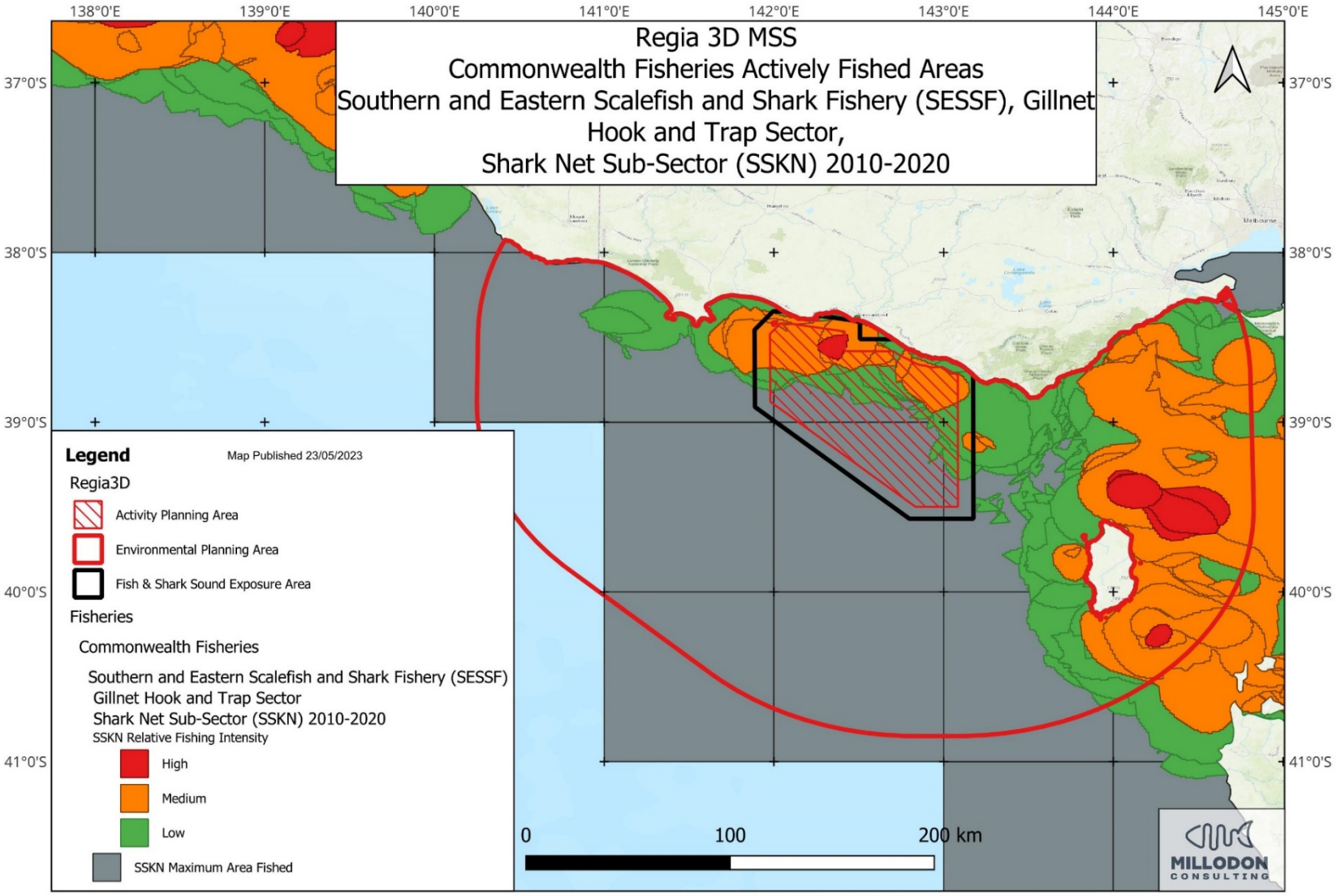

Figure 7: Southern and Eastern Scalefish and Shark Fishery Shark Net Sub-Sector Fishing Effort within the Activity Planning Area and Environmental Planning Area

Southern and Eastern Scalefish and Shark Fishery (SESSF) - Commonwealth Trawl Sector and Scalefish Hook Sector

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth Trawl Sector Scalefish Hook Sector	Blue-eye trevalla Blue grenadier Eastern school whiting Orange roughy Pink ling Ribaldo Tiger flathead	The Commonwealth Trawl Sector of the SESSF extends south from Barrenjoey Point in northern New South Wales to east of Kangaroo Island off South Australia. The Commonwealth Trawl Sector is a multispecies fisheries, targeting a variety of fish and shark species. The Commonwealth Trawl Sector and Scalefish Hook Sector are reported together as they share many target species. A multi-sector, multi-species fishery that uses a range of gear year-round targeting fish and shark species. Fishing is generally concentrated along the 200 m bathymetric contour. The Commonwealth Trawl Sector predominantly uses demersal otter trawl and Danish-seine fishing methods. The Scalefish Hook Sector uses a variety of longline and dropline hook fishing methods, some of which are automated. The Activity Planning Area and Environmental Planning Area overlap the Commonwealth Trawl Sub-sector maximum fished area and where there has been fishing intensity from 2010 – 2020 (Figure 8). Though the Activity Planning Area and Environmental Planning Area overlap the Danish Seine Sub-sector maximum fished area but not where there has been ABARES classified fishing intensity from 2010 – 2020 in either area (Figure 9). The Activity Planning Area and Environmental Planning Area overlap the Scalefish Hook Sector maximum fished area and where there has been low fishing intensity from 2010 – 2020 (Figure 10). In the 2021 – 2022 season there where 32 trawl, 19 Danish-seine and 21 scalefish hook vessels operating. Total retained catch of the target species was 19,501 tonnes in the 2021-22 season. No value is provided for 2021-22 season. In 2020-21, the fishery value was A$64 million. Fishing mortality: some species subject to overfishing. Biomass: some species over fished.	Yes	Yes

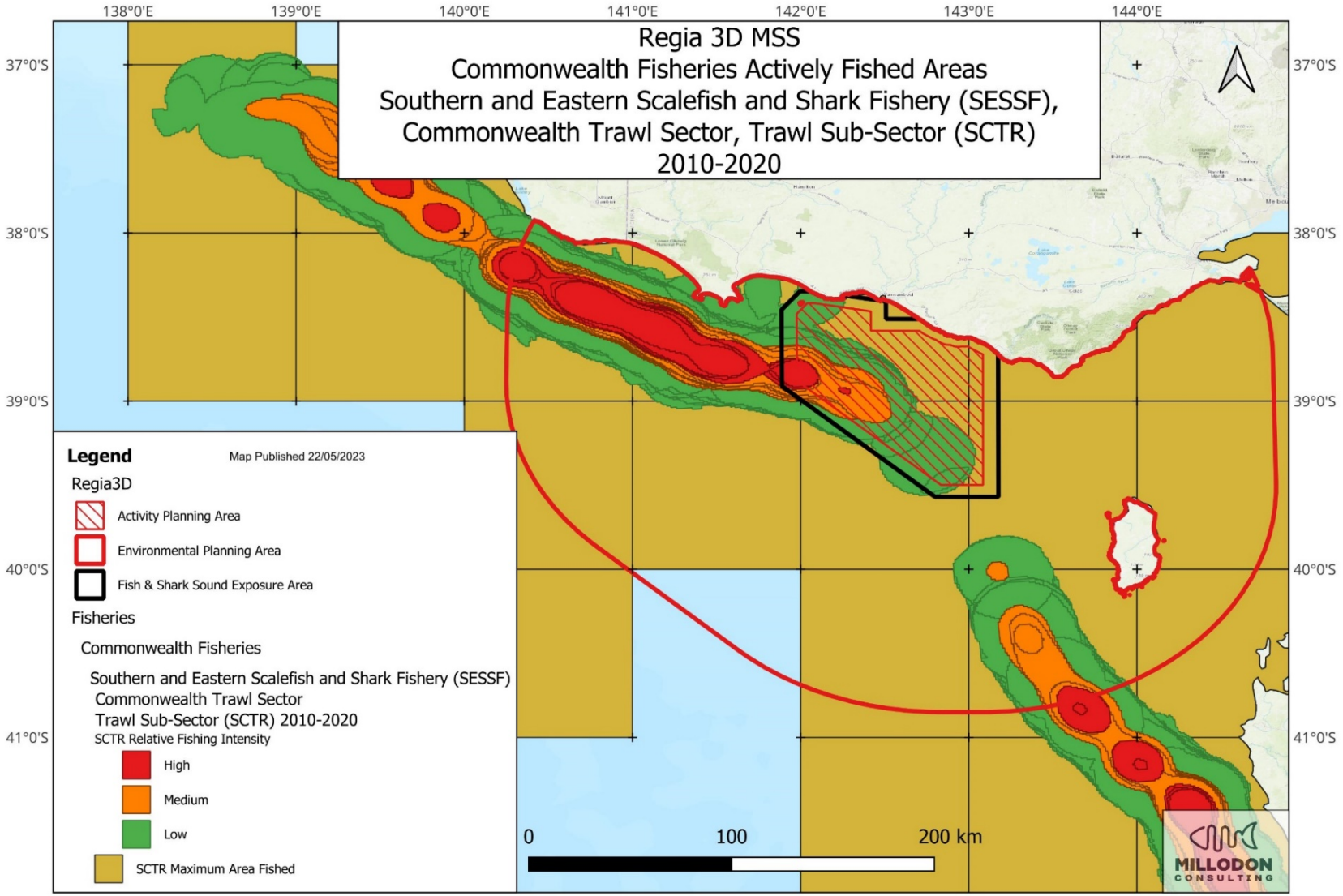

Figure 8: Southern and Eastern Scalefish and Shark Fishery Commonwealth Trawl Sub-Sector Fishing Effort within the Activity Planning Area and Environmental Planning Area

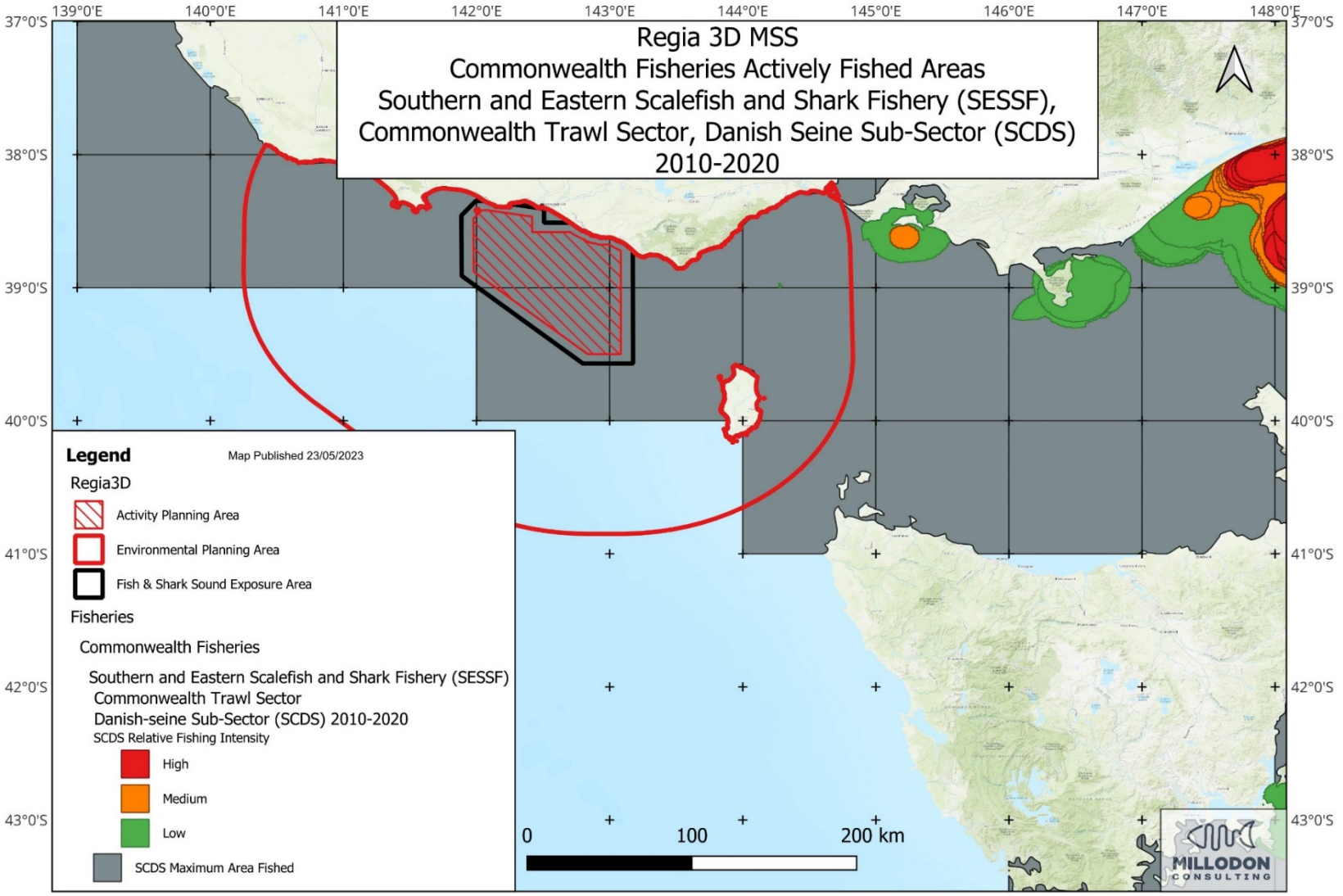

Figure 9: Southern and Eastern Scalefish and Shark Fishery Danish Seine Sub-Sector Fishing Effort within the Activity Planning Area and Environmental Planning Area

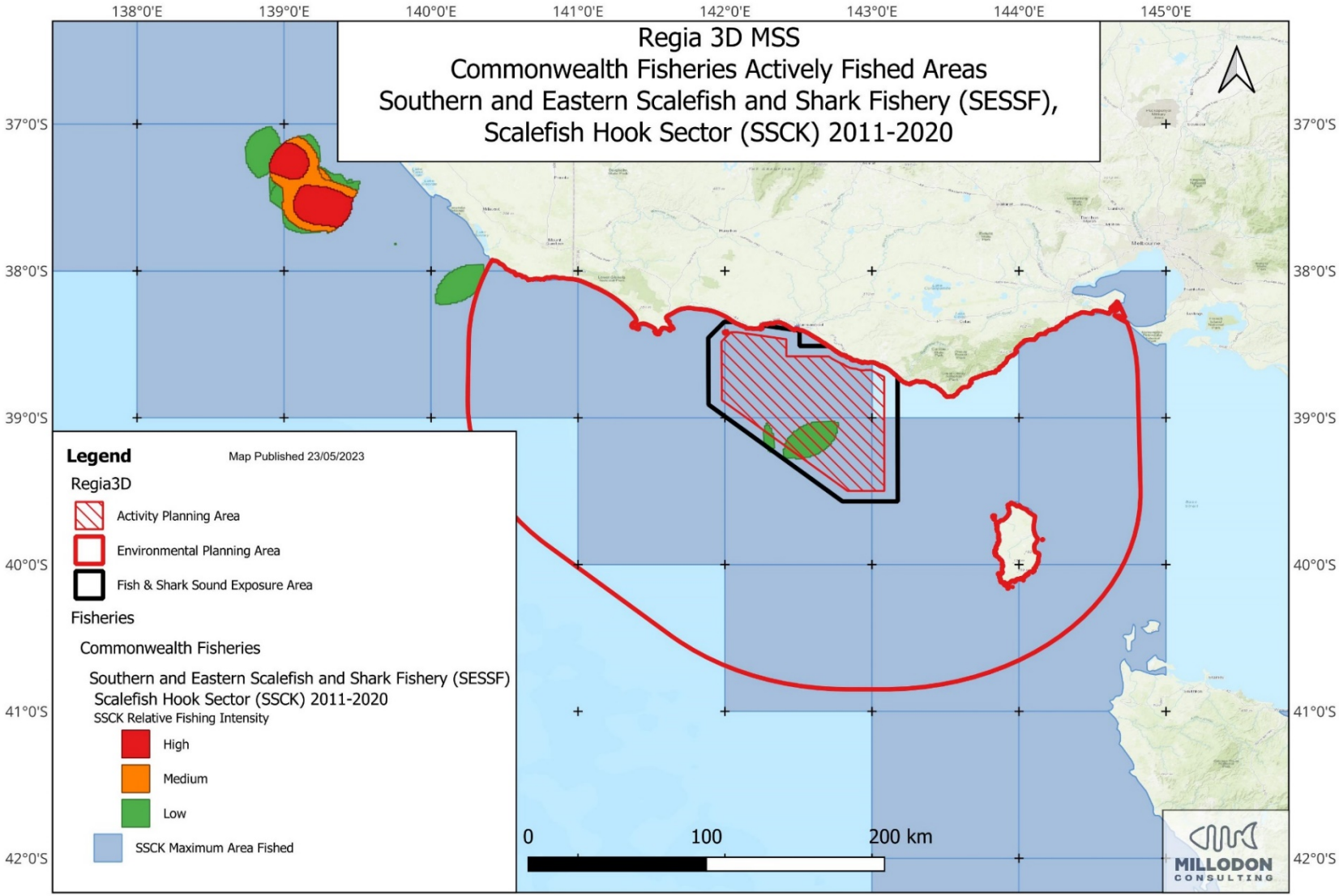

Figure 10: Southern and Eastern Scalefish and Shark Fishery Scalefish Hook Sector Fishing Effort within the Activity Planning Area and Environmental Planning Area

Southern Squid Jig Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Southern Squid Jig Fishery	Gould's squid (arrow squid)	A single species fishery that operates year-round. Portland and Queenscliff are the major Victorian landing ports. Jigging typically occurs midwater at depths between 50 and 100 m at night using large lights that illuminate the waters around a boat. The Commonwealth Trawl Fishery also catches Gould' squid. The Activity Planning Area and Environmental Planning Area overlap the Southern Squid Jig Fishery maximum fished area and where there has been fishing effort from 2010 – 2020 (shown as relative fishing intensity on Figure 11). The Activity Planning Area and Environmental Planning Area overlap the Southern and Eastern Scalefish and Shark Fishery Commonwealth Trawl Sector Squid maximum fished area and where there has been classified fishing intensity from 2010 – 2020 (Figure 12). In 2021, the actual catch of 939 tonnes was worth A$3.30 million. In 2021 there were eight active vessels in the fishery with the landing ports being Triabunna (Tasmania); Queenscliff and Apollo Bay (Victoria). Fishing mortality: not subject to overfishing. Biomass: Not over fished.	Yes	Yes

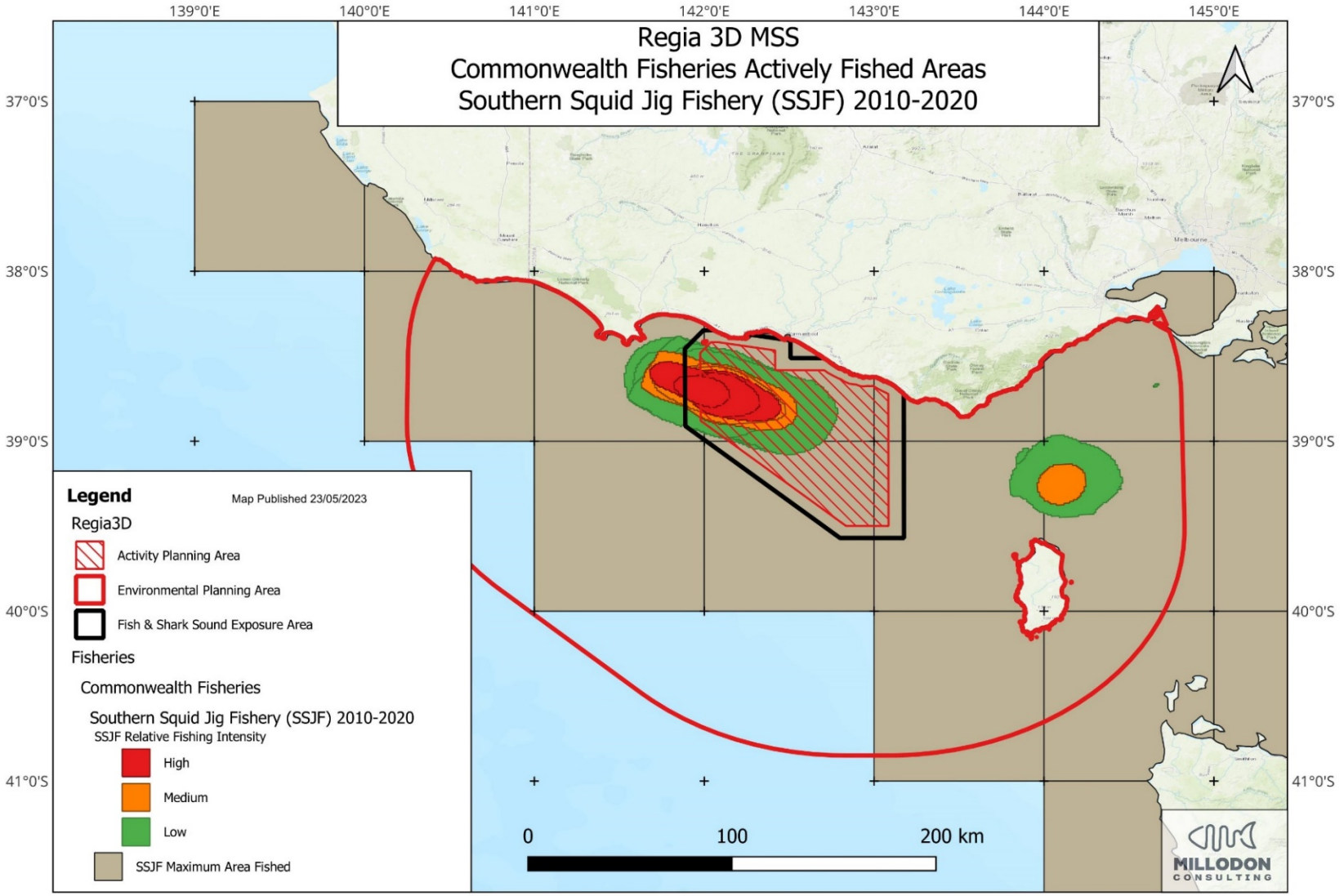

Figure 11: Southern Squid Jig Fishery Fishing Effort within the Activity Planning Area and Environmental Planning Area

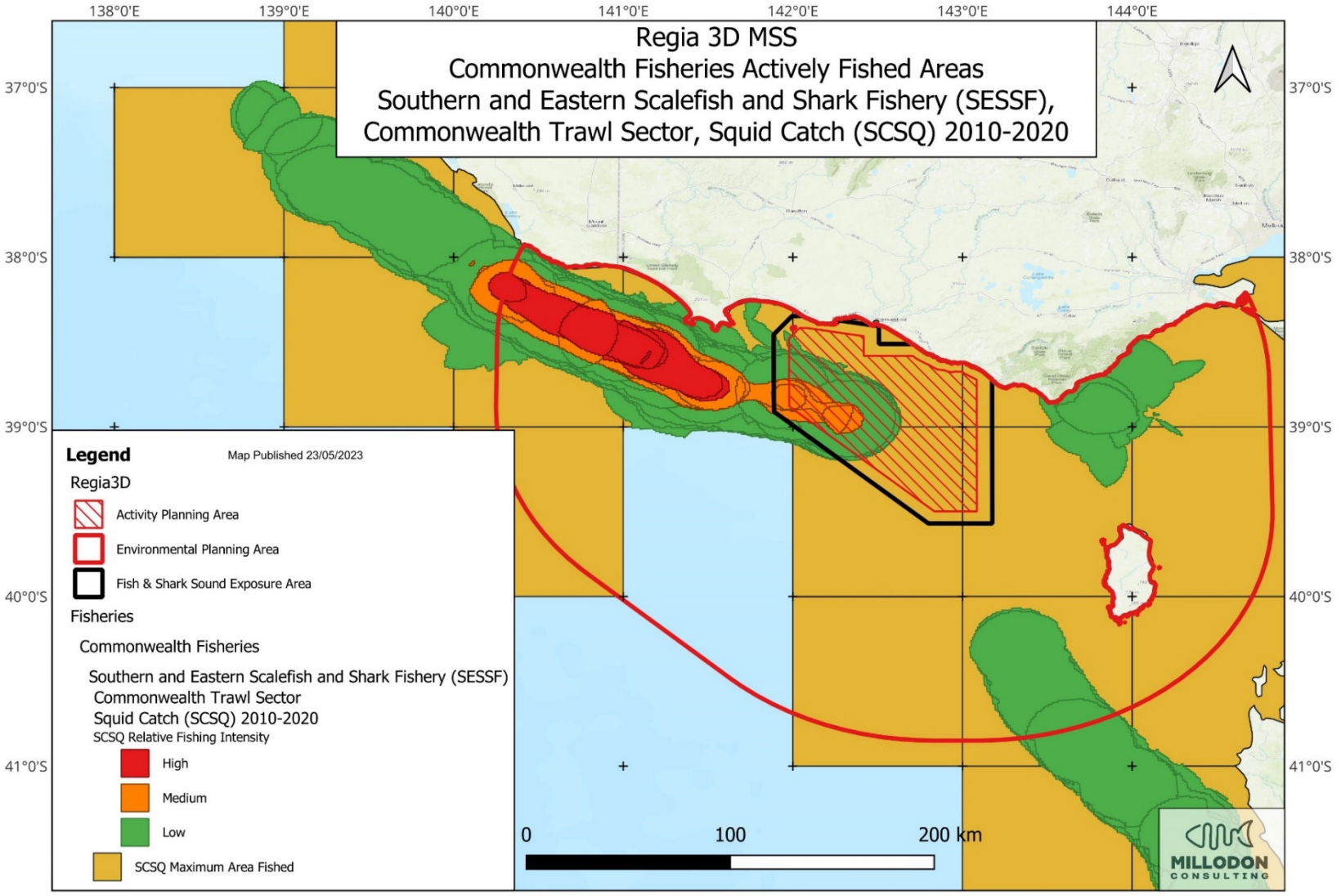

Figure 12: Southern and Eastern Scalefish and Shark Fishery Commonwealth Trawl Sector Squid Fishing Effort within the Activity Planning Area and Environmental Planning Area

Western Tuna and Billfish Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Western Tuna and Billfish Fishery	Albacore tuna Bigeye tuna Yellowfin tuna Broadbill swordfish Striped marlin	The Western Tuna and Billfish Fishery (WTBF) operates in Australia's Exclusive Economic Zone and high seas of the Indian Ocean. In recent years, fishing effort has concentrated off south-west Western Australia, with occasional activity off South Australia. The main fishing gear in the WTBF is pelagic longline, with low levels of minor-line fishing. The Activity Planning Area and Environmental Planning Area overlap the Western Tuna and Billfish Fishery maximum fished area but not where there has been classified fishing intensity from 2010 – 2020 (Figure 12). No Victorian ports are used. Actual catch in the 2021 season was 252 tonnes with the fishery value confidential due to only two active vessels. Fishing mortality: all except swordfish subject to overfishing. Biomass: Over fished – striped marlin. All other species not overfished.	Yes	Yes

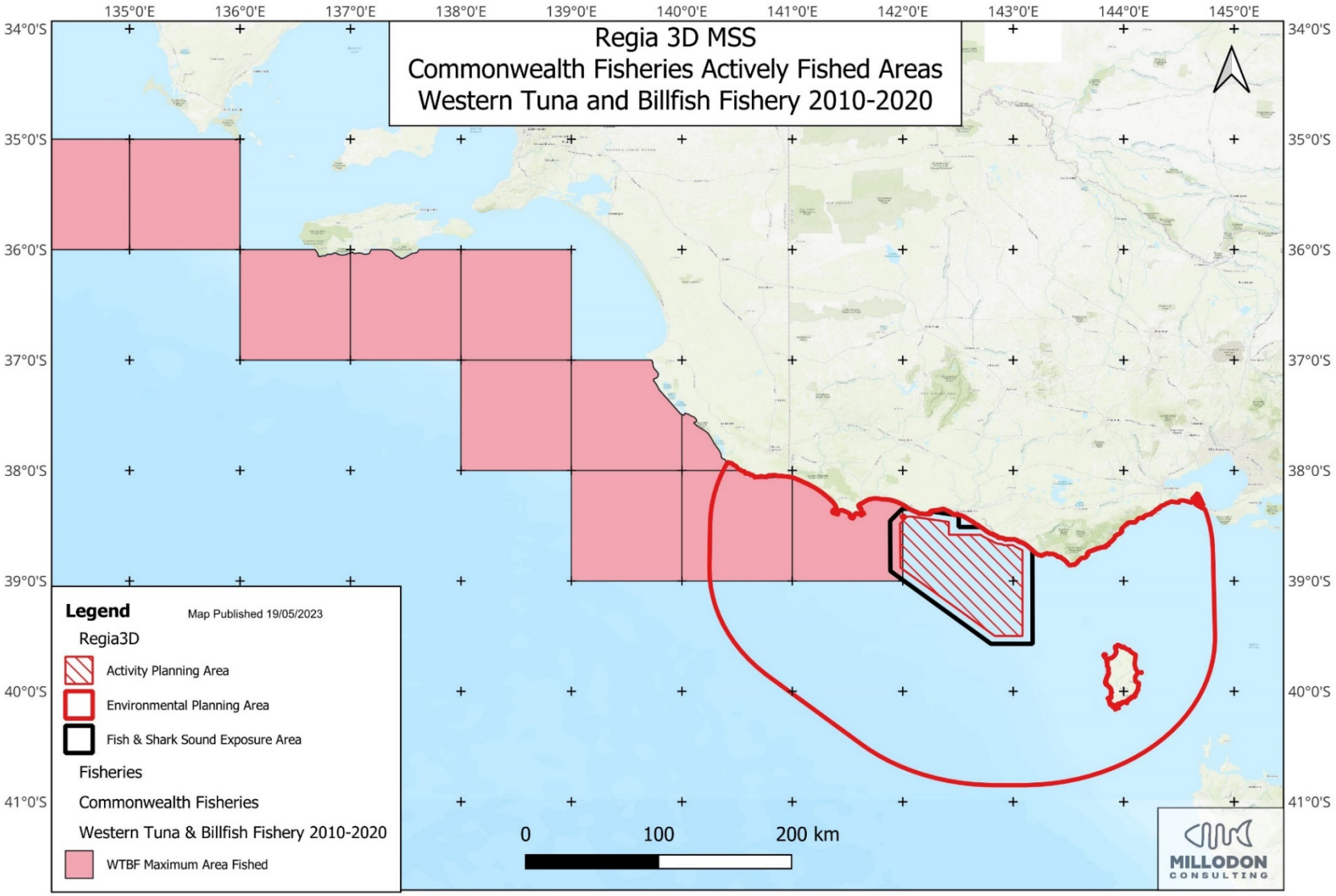

Figure 13: Western tuna and Billfish Fishery Fishing Effort within the Activity Planning Area and Environmental Planning Area

Victorian Fisheries

Victorian fisheries are managed by the Victorian Fisheries Authority (VFA) under the *Fisheries Act 1995* (Cth). VFA has regulatory responsibility for the management of fisheries in Victorian State Waters out to 3 nm and Commonwealth waters where the VFA manage fisheries on behalf of the Commonwealth under the Offshore Constitutional Settlement (OCS) arrangements. OCS arrangements are joint management arrangements of particular marine living resources that are found in waters subject to both Commonwealth and State control. Such arrangements allow for the management of the resources by State authorities, even in waters outside the State 3 nm territorial sea boundary. In Victoria, such arrangements are in place out to 20 nm for key species such as scallop and rock lobster.

Victorian commercial fisheries with jurisdictions to fish within the Activity Planning Area and Environmental Planning Area are:

- Abalone Fishery
- Bays and Inlet Fisheries
- Eel Fishery
- Giant Crab Fishery
- Multi-species Ocean Fisheries
- Octopus Fishery
- Pipi Fishery
- Rock Lobster Fishery
- Scallop (Ocean) Fishery
- Wrasse (Ocean) Fishery

No areas where aquaculture or seaweed harvesting occurs where identified within the Activity Planning Area and Environmental Planning Area.

Information relating to the target species, fishing locations, landed catch, value and other relevant aspects of each fishery is included in the following sections. Maps are also provided showing where catch and effort has been reported in a VFA grid between 2011 – 2022 in relation to the Activity Planning Area and Environmental Planning Area.

Data sources are from the Victorian Fisheries Authority Commercial Fish Production Information Bulletin July 2021 to June 2022 (VFA 2022) and VFA website (VFA 2023).

Table 2 provides a summary of the Victorian fisheries with catch and effort within the Activity Planning and Environmental Planning Areas.

Table 2: Summary of Victorian Fisheries with Fishing Catch and Effort within the Activity Planning and Environmental Planning Areas

Fishery	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area	Note
Abalone Fishery	No	Yes	The Activity Planning Area does not overlap the fishery while the Environmental Planning Area overlaps the Western and Central zones of the fishery.
Bays and Inlet Fisheries	No	No	The fishery is not within the Activity Planning Area or Environmental Planning Area.
Eel Fishery	No	No	As the Activity Planning Area or Environmental Planning Area does not overlap with coastal river basins there is no overlap with this fishery. The Activity Planning Area or Environmental Planning Area may overlap where glass eels migrate.
Giant Crab Fishery	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the area actively fished by the Giant Crab Fishery.
Multispecies Ocean Fisheries – Ocean General	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the area actively fished by the Ocean General Fishery.
Octopus Fishery	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the area actively fished by the Octopus Fishery.
Pipi Fishery	No	Yes	The Environmental Planning Area overlaps the actively fished areas of the Discovery Bay zones of the Pipi Fishery.
Rock Lobster Fishery	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the area actively fished by the Rock Lobster Fishery.
Scallop Fishery	No	No	The Scallop Fishery does not operate within the Activity Planning Area or Environmental Planning Area.
Wrasse (Ocean) Fishery	Yes	Yes	The Activity Planning Area and Environmental Planning Area overlap the area actively fished by the Wrasse (Ocean) Fishery.

Abalone Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Abalone Fishery	Blacklip abalone Greenlip abalone	The Abalone Fishery is one of Victoria's most valuable commercial fisheries. It operates along most of the Victorian shoreline, generally to 30 m depth where abalone are harvested by divers. Fishing is only allowed between sunrise and sunset. Abalone catch effort data was not provided by VFA due to confidentiality requirements but based on water depths, the Activity Planning Area does not overlap the fishery, while the Environmental Planning Area overlaps the Western and Central zones of the fishery. As of June 2022, there were 14 licences in the Western Zone and 33 in the Central Zone. Total allowable commercial catch limits of blacklip abalone for the Western Zone are considerably less than the Central Zone (2021-22 season: 66 tonnes compared with 251.2 tonnes, respectively). Greenlip abalone total allowable commercial catch limits are considerably lower than for blacklip abalone with 1.6 tonnes for the Western Zone and 3.46 tonnes for the Central Zone.	No	Yes

Bays and Inlet Fisheries

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Bays and Inlet Fisheries	Multi-species	Multi-species, multi gear fishery utilising octopus pot, bay fish trap, commercial hoop net, seine net, mesh net, fishing line (including a longline), mussel rake underwater breathing apparatus and a hand operated bait pump. The larger bay and inlet fisheries include Western Port, Port Phillip Bay, Corner Inlet/Nooramunga and the Gippsland Lakes. These areas are not within the Activity Planning Area or Environmental Planning Area.	No	No

Eel Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Eel Fishery	Short-finned eel Long-finned eel	Eel are harvested in Victorian coastal river basins south of the Great Dividing Range. Short-finned eels are found across the State, while long-finned eels are only found in eastern Victoria. Both species spend the majority of their life cycle in fresh water or estuaries but travel to the ocean to spawn once before dying. Spawning is thought to occur in the vicinity of the Coral Sea, although no precise spawning location for either species has been identified. Eggs are thought to be pelagic and hatch after about two days. Larvae are transported southwards along the east coast of Australia where they metamorphose into glass eels and swim into coastal bays and estuaries. Most short-finned glass eels migrate in the winter and spring, while long-finned glass eels migrate during summer and autumn. Commercial fishers are only permitted to use fyke nets to take eels and the number, dimensions, and mesh size of fyke nets is prescribed by regulation. As the Activity Planning Area or Environmental Planning Area does not overlap with coastal river basins there is no overlap with this fishery. However, the Activity Planning Area or Environmental Planning Area may overlap where glass eels migrate.	No	No

Giant Crab Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Giant Crab Fishery	Giant crab	Giant crabs are fished commercially in western Victoria. The fishery is a small quota managed fishery that is closely linked with the Rock Lobster Fishery. The majority of vessels are used primarily for rock lobster fishing with giant crab taken as by-product. However, a small number of fishers target giant crabs and processors who specialise in exporting giant crab have developed technologies to store and transport live crabs to international markets. The boundaries of the fishery mimic those of the Rock Lobster Fishery, however the fishery is based in the Western Zone. Giant crabs inhabit the continental slope at approximately 200 metres depth and are most abundant along the narrow band of the shelf edge. Closed seasons are: • Male: 15 September to 15 November to protect males during moult. • Female: 1 June to 15 November to protect females while breeding and in berry (with eggs attached). Total landed catch in 2015-16 was 10 tonnes. Data since then is not available due to insufficient data to report because there are less than five licence holders (policy requirement to protect commercial confidentiality of data). The Activity Planning Area and Environmental Planning Area overlap the area actively fished by the Giant Crab Fishery (Figure 14). Data from VFA for the last 5 years (2018 - 2022 shows the number of days fished in a block for that period (Figure 14). Fishing intensity is concentrated along the edge of the shelf with a maximum of 78 days fished in Activity and Environment Planning Area.	Yes	Yes

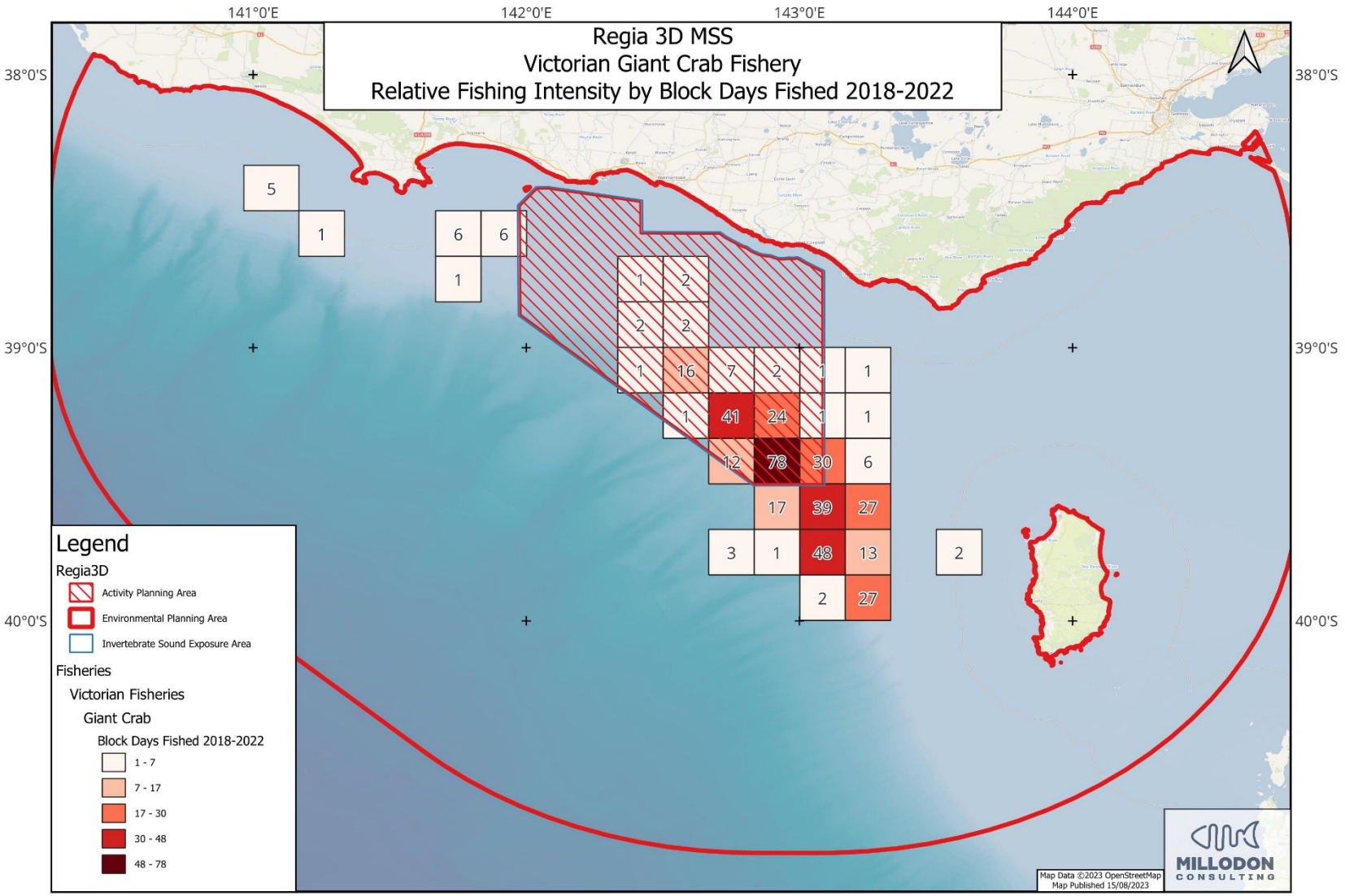

Figure 14: Giant Crab Fishery Relative Fishing Intensity within the Activity Planning Area and Environmental Planning Area

Multispecies Ocean Fisheries

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Multispecies Ocean Fisheries – Ocean General	Gummy shark School shark Australian salmon Snapper Small flathead bycatch	The wrasse, inshore trawl, southern rock lobster and giant crab fisheries are able to catch gummy shark and school sharks as part of their fishery. Snapper is caught using lines, nets and haul seine. Over 90% of the catch is from Port Phillip Bay, and around 5% from coastal waters. In 2020/21, 45 tonnes were landed but a value could not be provided as there is insufficient data to report because there are less than five licence holders (policy requirement to protect commercial confidentiality of data). The Activity Planning Area and Environmental Planning Area overlap the area actively fished by the Ocean General Fishery (Figure 15). Data from VFA for the last 5 years (2018 - 2022 shows the number of days fished in a block for that period (Figure 15). Fishing intensity is concentration nearshore with a maximum of 79 days fished in Activity Planning Area and 363 days in the Environment Planning Area.	Yes	Yes

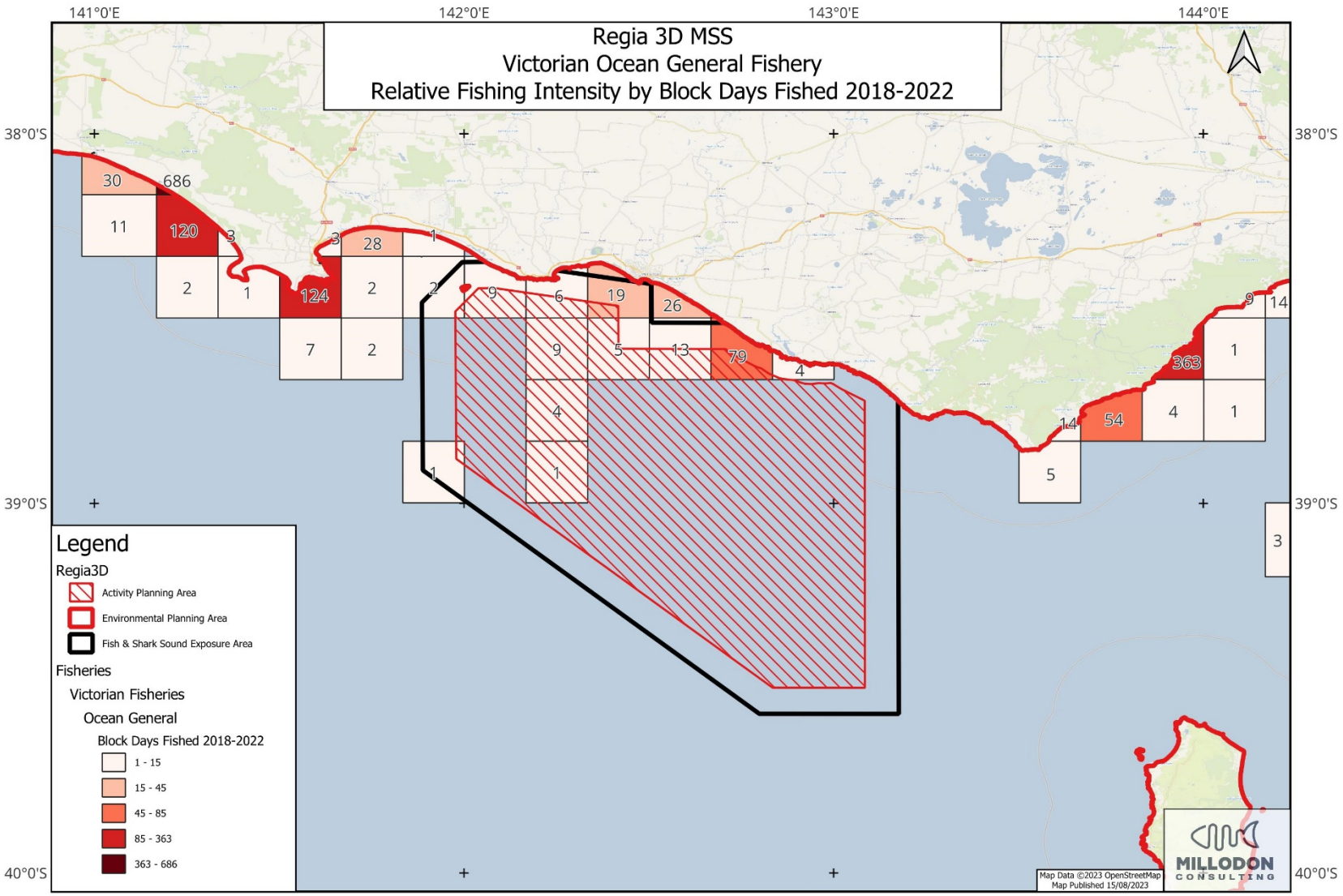

Figure 15: Ocean General Relative Fishing Intensity within the Activity Planning Area and Environmental Planning Area

Octopus Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Octopus Fishery	Pale octopus Maori octopus Gloomy octopus	Victoria's new Octopus (Eastern Zone) Fishery harvests mainly pale octopus in East Gippsland using purpose-built unbaited traps which minimise bycatch. The fishery may also catch Maori octopus and gloomy octopus. The fishery commenced on 1 August 2020. Three zones have been established for the management to commercial octopus fishing in Victoria: Eastern, Central and Western. Octopus Fishery Access Licences authorise commercial take of octopus from the Eastern Octopus Zone. Octopus fishing in the central and western octopus zones is less established and is being managed by the VFA through exploratory, temporary permits. The Activity Planning Area is within the Western Octopus Zone and the Environmental Planning Area is within the Western and Central Octopus Zones. The Activity Planning Area and Environmental Planning Area overlap the area actively fished by the Octopus Fishery (Figure 16). Data from VFA for the last 5 years (2018 - 2022 shows the number of days fished in a block for that period (Figure 16). Fishing intensity is concentration west of the Activity Planning Area with a maximum of 1 day fished in Activity Planning Area and 15 days in the Environment Planning Area.	Yes	Yes

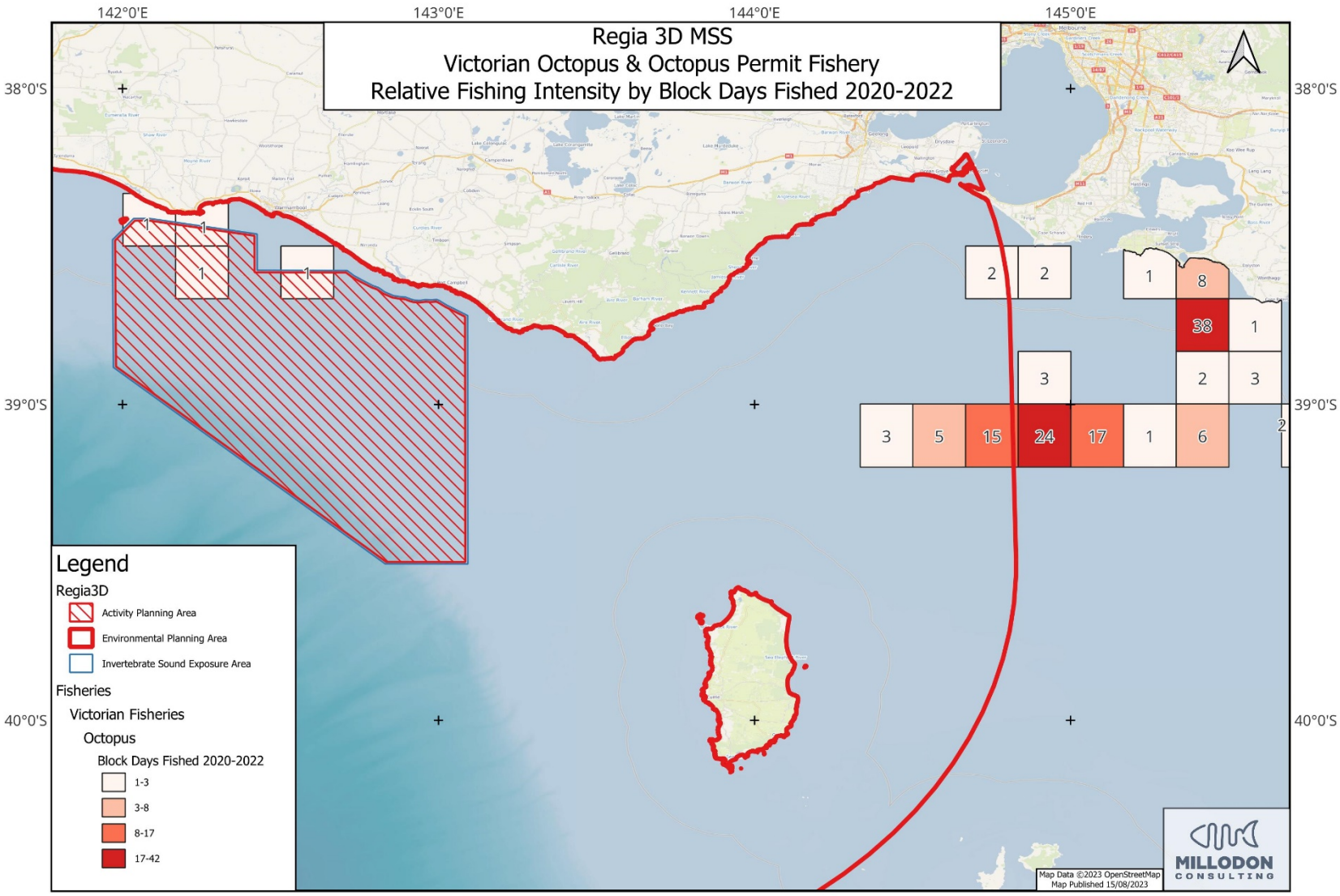

Figure 16: Octopus Fishery Relative Fishing Intensity within the Activity Planning Area and Environmental Planning Area

Pipi Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Pipi Fishery	Pipi	The new Victorian Pipi Fishery commenced on 1 April 2020. Pipi Fishery Access Licences have been issued for the Discovery Bay and Venus Bay commercial management zones. The Total Allowable Catch for the 2020/2021 season has been set at 10 tonne in Discovery Bay Western Zone, 40 tonne in Discovery Bay Eastern Zone and 2 tonne in the Venus Bay Commercial Zone. The Activity Planning Area does not overlap the area actively fished by the Pipi Fishery (Figure 17). The Environmental Planning Area overlaps the Discovery Bay zones (Figure 17).	No	Yes

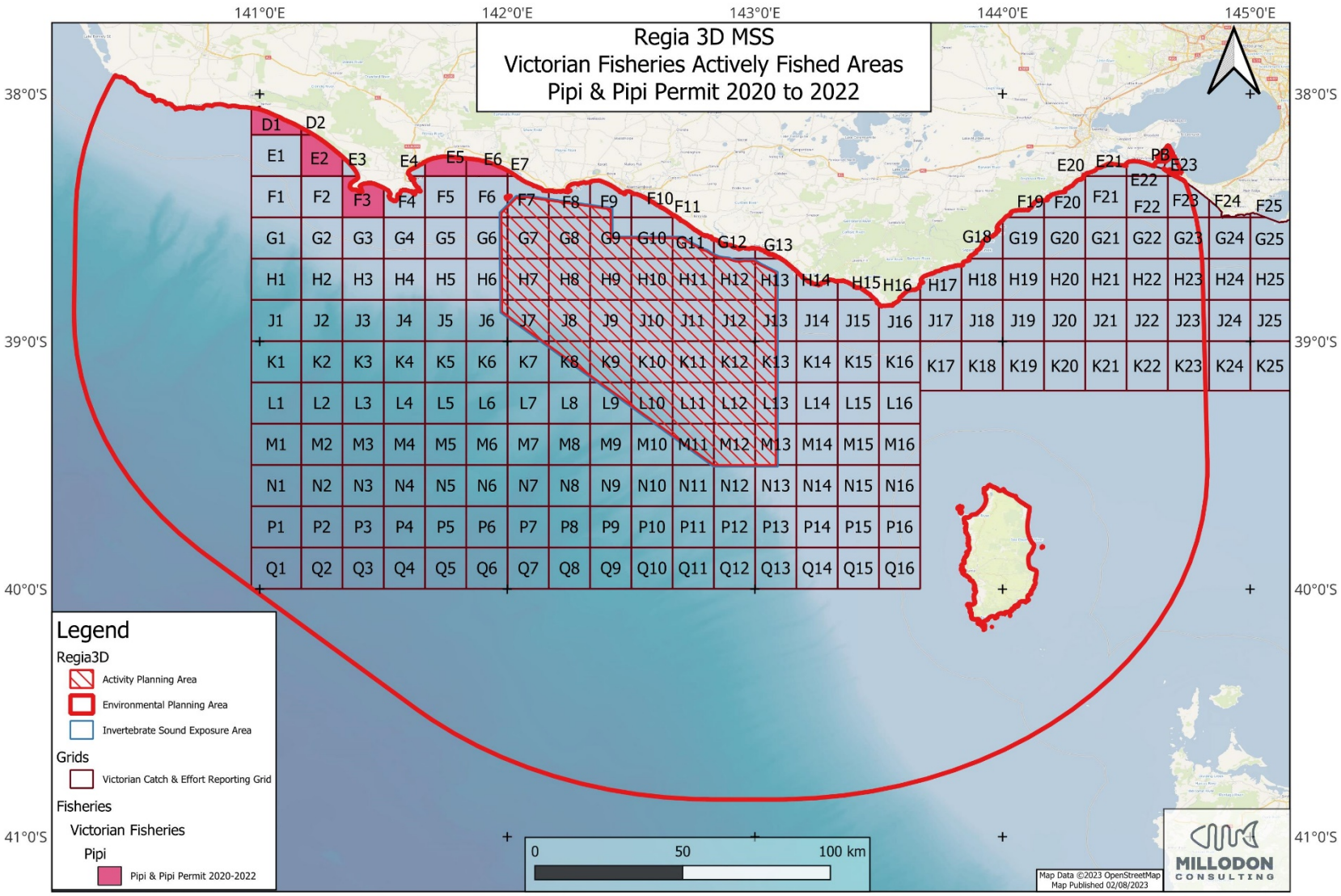

Figure 17: Pipi Fishery Permit Areas within the Activity Planning Area and Environmental Planning Area

Rock Lobster Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Rock Lobster Fishery	Southern rock lobster	The Rock Lobster Fishery is Victoria's most valuable fishery value of A$13.6 million in 2020/21 and is based on the southern rock lobster. The fishery is divided into two separately managed zones: the Eastern Zone and the Western Zone. Southern rock lobsters are found to depths of 150 m, with most of the catch coming from inshore waters less than 100 m deep. Fishing for rock lobsters is prohibited during closed seasons. • The closed season for female rock lobsters is from 1 June to 15 November and is designed to protect females in berry (with eggs attached) during the spawning period. • The closed season for male rock lobsters is from 15 September to 15 November and is designed to protect males during the moulting period when soft shells increase their vulnerability. The Activity Planning Area and Environmental Planning Area overlap the area actively fished by the Rock Lobster Fishery (Figure 18). Since 2009/10, annual quotas for the western zone that overlaps the Activity Planning Area have been set at between 230 and 260 tonnes and have been fully caught each year. In the western zone, most catch is landed through Portland, Port Fairy, Warrnambool, Port Campbell, and Apollo Bay. Data from VFA for the last 5 years (2018 - 2022 shows the number of days fished in a block for that period (Figure 18). Fishing intensity is concentration near with a maximum of 642 day fished in Activity Planning Area and 18.13 days in the Environment Planning Area.	Yes	Yes

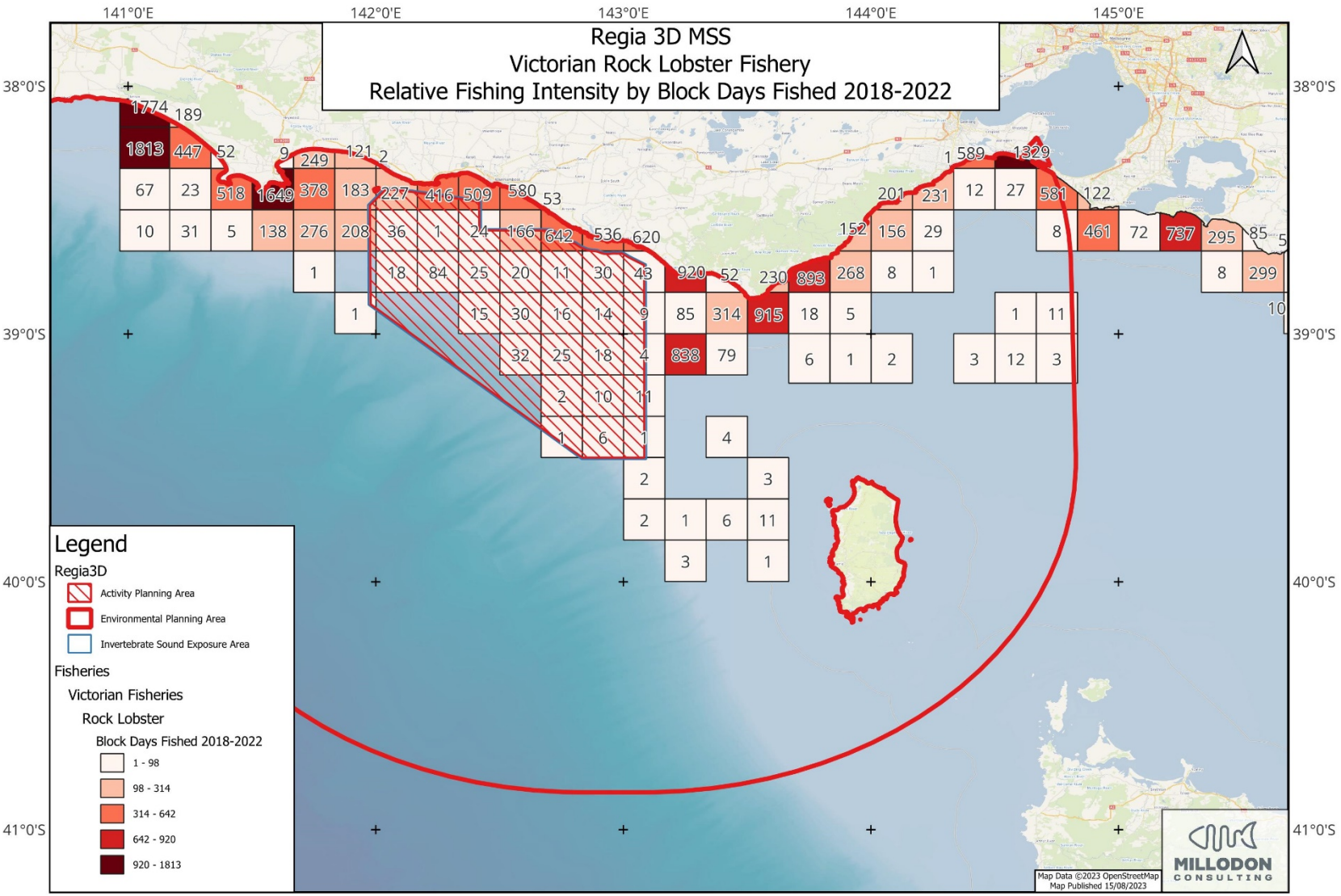

Figure 18: Rock Lobster Relative Fishing Intensity within the Activity Planning Area and Environmental Planning Area

Scallop Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Scallop Fishery	Scallops	The Scallop Fishery is within the waters of the Victorian zone extend out to 20 nm from the high tide water mark but exclude the bays and inlets along the coast where commercial fishing for scallops is prohibited. The Scallop Fishery does not operate within the Activity Planning Area or Environmental Planning Area (Figure 19).	No	No

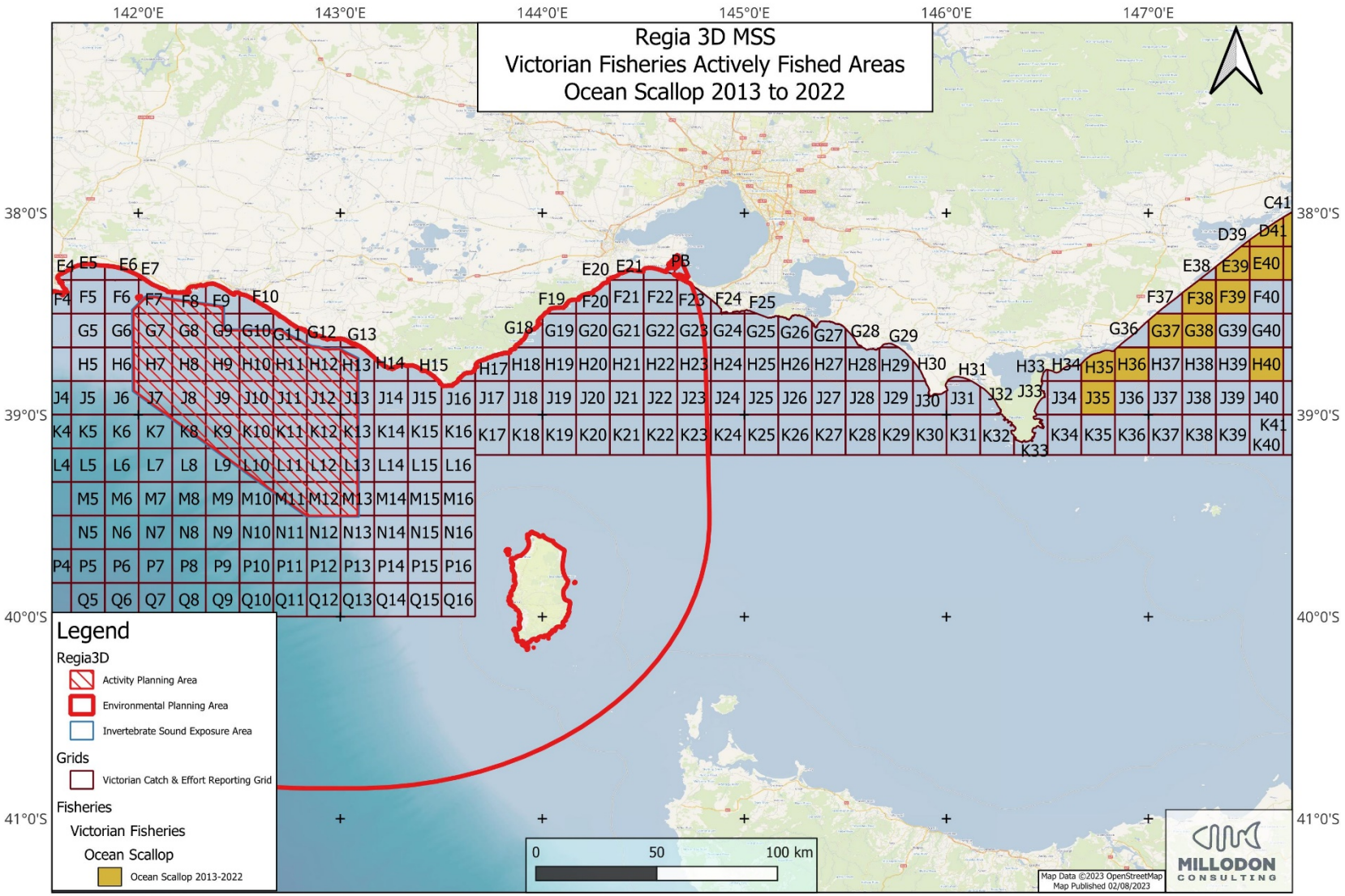

Figure 19: Scallop Fishery Fishing Effort within the Activity Planning Area and Environmental Planning Area

Wrasse (Ocean) Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Wrasse (Ocean) Fishery	Wrasse	The fishery extends along the entire length of the Victorian coastline and out to 20 nm offshore, except for marine reserves. Fishers mostly use hook and line. Limited entry fishery with 23 licences at June 2022. Total annual catch in 2021/22 was 21 tonnes. Most wrasse is harvested by hook and line, although commercial rock lobster fishers who also hold a commercial wrasse licences can keep those fish that they catch in their rock lobster pots. Wrasse inhabit depths up to 160 m, whereas fishers mostly operate in depths shallower than 30 m to reduce their losses due to barotrauma, where the swim bladder expands and damages the fish as it is hauled to the surface. The Activity Planning Area and Environmental Planning Area overlap the area actively fished by the Wrasse (Ocean) Fishery (Figure 20). Data from VFA for 2011 - 2022 shows the maximum number of vessels in grids within the Activity Planning Area was three, with a maximum fishing days of 106.	Yes	Yes

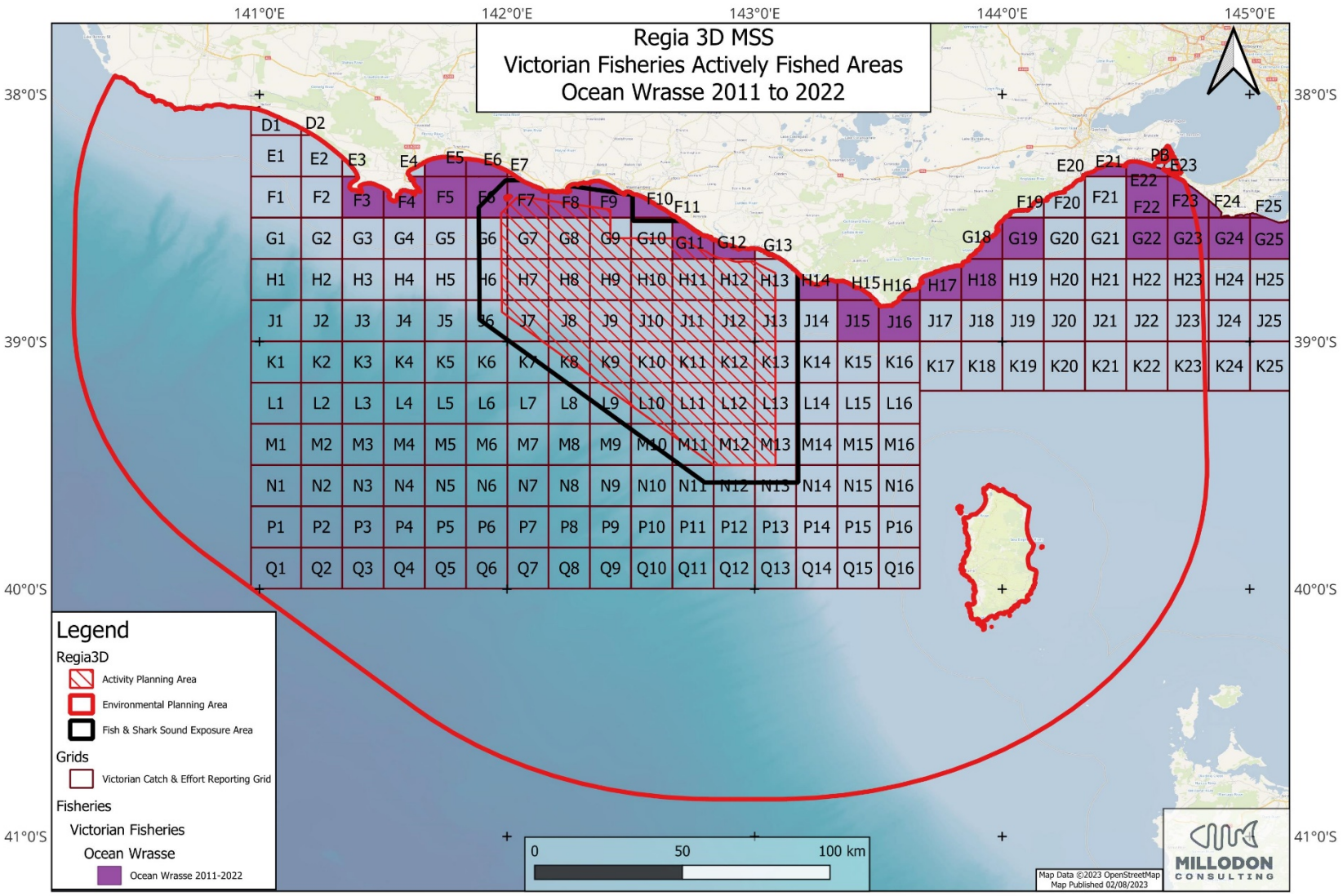

Figure 20: Wrasse (Ocean) Fishery Fishing Effort within the Activity Planning Area and Environmental Planning Area

Tasmanian Fisheries

The Department of Natural Resources and Environment Tasmania (DNRET) manages Tasmania's commercial fisheries under the *Living Marine Resources Management Act 1995*.

All fisheries except for the Giant Crab Fishery and the Rock Lobster Fishery operate within Tasmanian waters. The Giant Crab Fishery and the Rock Lobster Fishery also operate in Commonwealth waters under an Offshore Constitutional Settlement (OCS) between the Australian Government and the Government of Tasmania.

Via stakeholder consultation with DNRET it was confirmed that no Tasmanian fisheries overlap the Activity Planning Area and that the following fisheries may fish within the Environmental Planning Area around King Island.

- Abalone Fishery
- Giant Crab Fishery
- Octopus Fishery
- Rock Lobster Fishery

Information relating to the target species, fishing locations, landed catch, value and other relevant aspects of each fishery is included in the following sections. Data sources are from the Fishing Tasmania (2023) and UTAS (2023) unless noted.

Abalone Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Abalone Fishery	Blacklip abalone Greenlip abalone	The Tasmanian wild abalone industry operates within Tasmanian coastal waters (Figure 21) and is a major contributor to the Tasmanian economy. It is the largest wild abalone fishery in the world, providing around 25% of the annual harvest. Abalone are hand-captured by divers in depths between 5-30 m. Blacklip abalone are collected on rocky substrate around the Tasmanian shoreline and are the main focus of the fishery. Greenlip abalone are distributed along the north coast and around the Bass Strait islands and usually account for around 5% of the total wild harvest. In 2020/21, the gross value of production of the fishery was around $50 million from a total catch of approximately 1,000 tonnes. The Activity Planning Area does not overlap the area actively fished by the Abalone Fishery, while the Environmental Planning Area overlaps the fishery area around King Island (Figure 21).	No	Yes

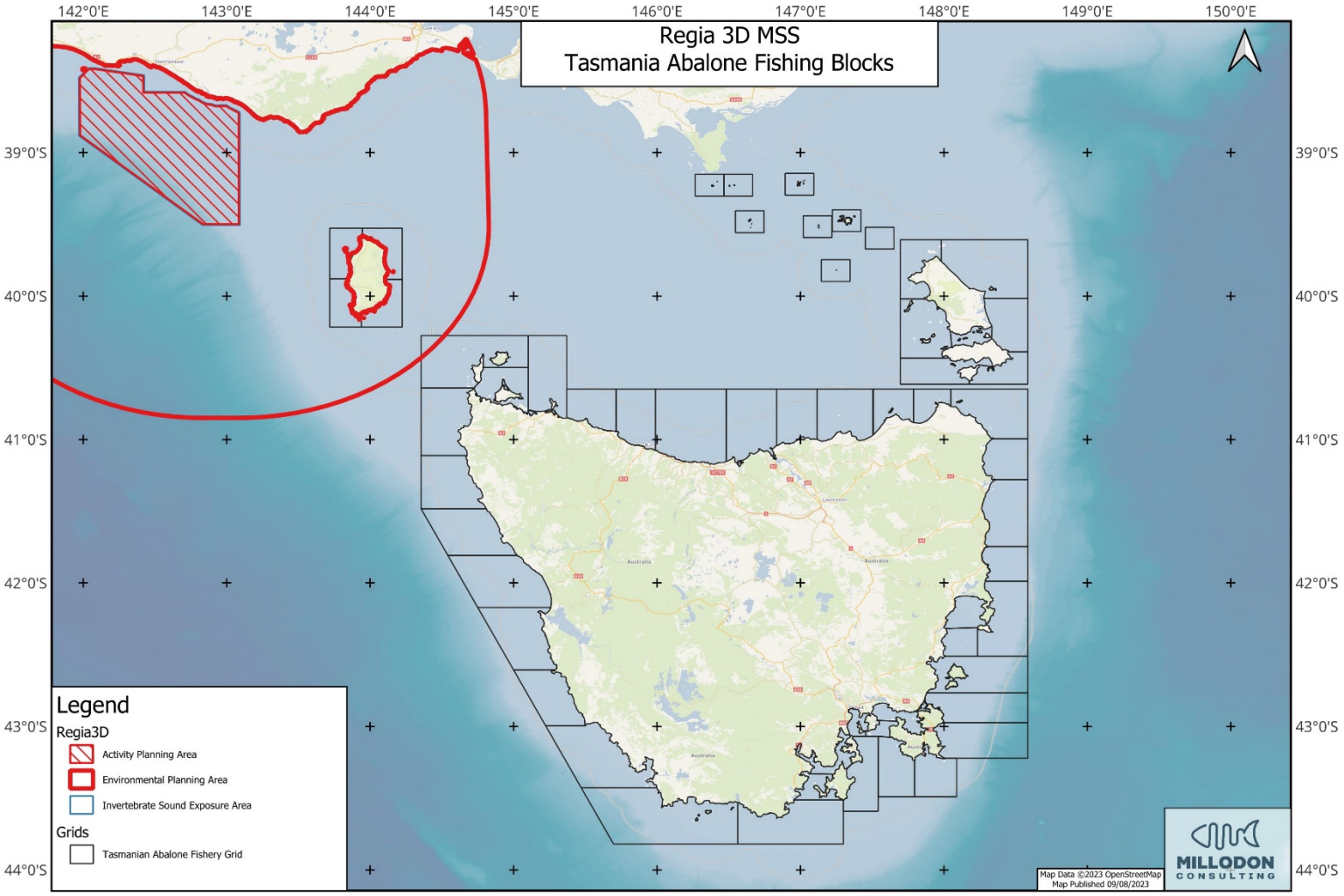

Figure 21: Tasmania Abalone Fishing Block Map

Giant Crab Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Giant Crab Fishery	Giant crab	The Giant Crab Fishery is a comparatively small fishery with the annual harvest set at 20.7 tonnes but with a high landed value of around $2 million. The fishery is managed by Tasmania under an Offshore Constitutional Settlement (OCS) between the Australian Government and the Government of Tasmania despite the majority of catch taken in Commonwealth waters. The Giant Crab Fishery has the following closures: • Females - from 15 November in a year to 31 May the following year inclusive. The Activity Planning Area does not overlap the Giant Crab Fishery, while the Environmental Planning Area overlaps the fishery area around King Island (Figure 22).	No	Yes

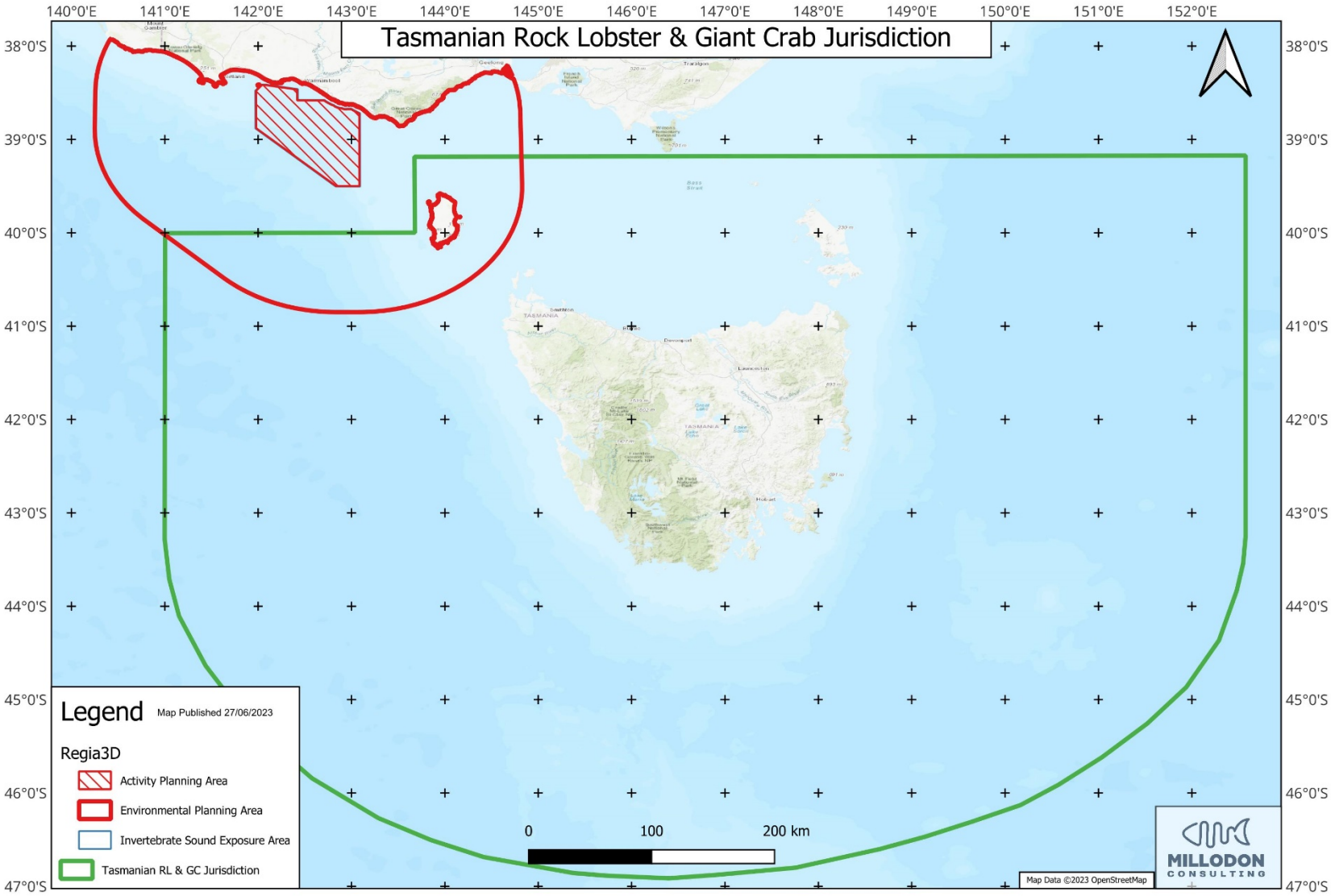

Figure 22: Tasmanian Giant Crab Fishery and Rock Lobster Fishery Jurisdiction

Octopus Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Octopus Fishery	Pale octopus Gloomy octopus Maori octopus	Information in this section is from Fraser et. al (2022). Octopus are caught commercially in Tasmanian waters across multiple fisheries using a range of gear types. Most catch comes from a targeted unbaited trap fishery for pale octopus in northern Tasmania, primarily Bass Strait, by fishers operating under the fishing licence (octopus). Holders of the fishing licence (octopus) also retain low quantities of Māori octopus as by-product and take occasional landings of gloomy octopus in years when the fishery extends towards eastern Bass Strait. The Scalefish and Rock Lobster fisheries take octopus as by-product. The total catch of pale octopus in 2020/21 was 154 t, representing the highest recorded catch. These catches are well above the average of 100 t observed over the last decade. Almost all the catch in 2020/21 (72%) occurred in only three fishing blocks – two east of King Island and one inshore adjacent to Stanley. Two licences have been issued for the operation of two vessels. The Activity Planning Area does not overlap the Octopus Fishery, while the Environmental Planning Area overlaps the fishery area on the west side of King Island (Figure 23).	No	Yes

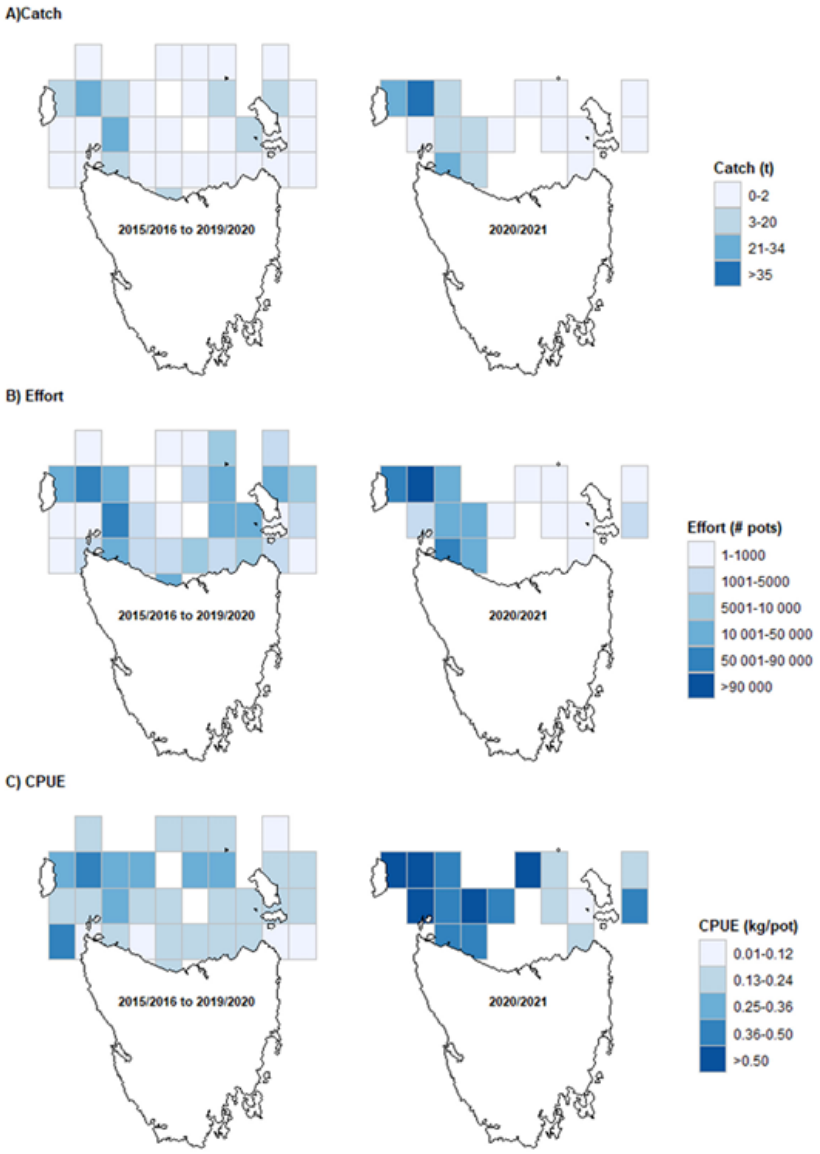

Figure 23: Pale Octopus Catch, effort (pot lifts) and nominal CPUE averaged over the last 5 years (left) and for 2020/21 (right) (Fraser et. al 2022)

Rock Lobster Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Rock Lobster Fishery	Southern rock lobster	The Rock Lobster Fishery primarily targets southern rock lobster, and small amounts of eastern rock lobster (less than 1% of the fishery). The commercial fishery currently catches just over 1,000 tonnes per annum with a landed value of about $90 million. Commercial fishers use baited pots to harvest lobster all around Tasmania, including in waters surrounding major islands. The fishery takes place in Tasmanian and Commonwealth waters (Figure 24). The Rock Lobster Fishery has the following season closures: • Males: 1 October to 15 November for all state waters (except for September closed region which is outside of Environmental Planning Area) to protect males during moulting period. • Females: 1 May to 15 November to protect females in berry (with eggs attached). The Activity Planning Area is not overlapped by the Tasmanian Rock Lobster Fishery, while the Environmental Planning Area overlaps the fishery area around King Island (Figure 24).	No	Yes

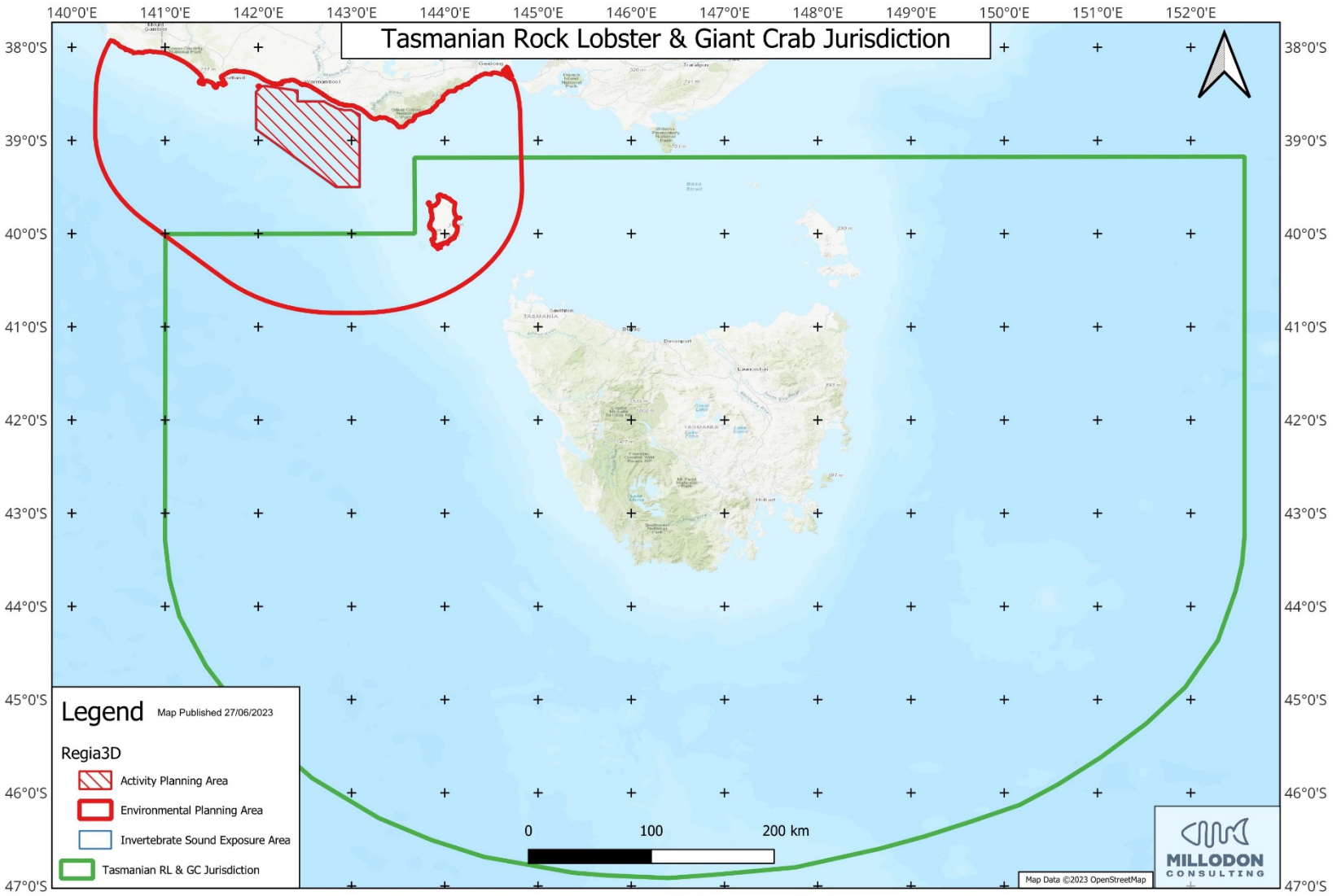

Figure 24: Tasmanian Giant Crab Fishery and Rock Lobster Fishery Jurisdiction

South Australian Fisheries

The *Fisheries Management Act 2007* and its regulations provide the legislative framework, objectives and guiding principles for the management of fisheries in South Australia. Management rules for commercial fisheries are provided in fisheries regulations under the Act.

The Department of Primary Industries and Regions (DPIR) is responsible for the ecologically sustainable development of South Australia's aquatic resources and the administration of the *Fisheries Management Act 2007*.

The Activity Planning Area does not overlap any South Australian Fisheries (Figure 25).

Data from DPIR identified that the Environmental Planning Area overlaps fishing blocks 56 and 58 in the Southern Zone of South Australia's Marine Fishing Areas (MFA) grid (Figure 25) where the following fisheries are active:

- Abalone Fishery
- Charter Boat Fishery
- Giant Crab Fishery
- Marine Scalefish Fishery
- Rock Lobster Fishery

Information relating to the target species, fishing locations, landed catch, value and other relevant aspects of each fishery is included in the following sections. Data sources are from DPIR fishing data from 2012 to 2022 for fishing blocks 56 and 58, which the Environmental Planning Area overlaps, and DPIR (2023), unless noted.

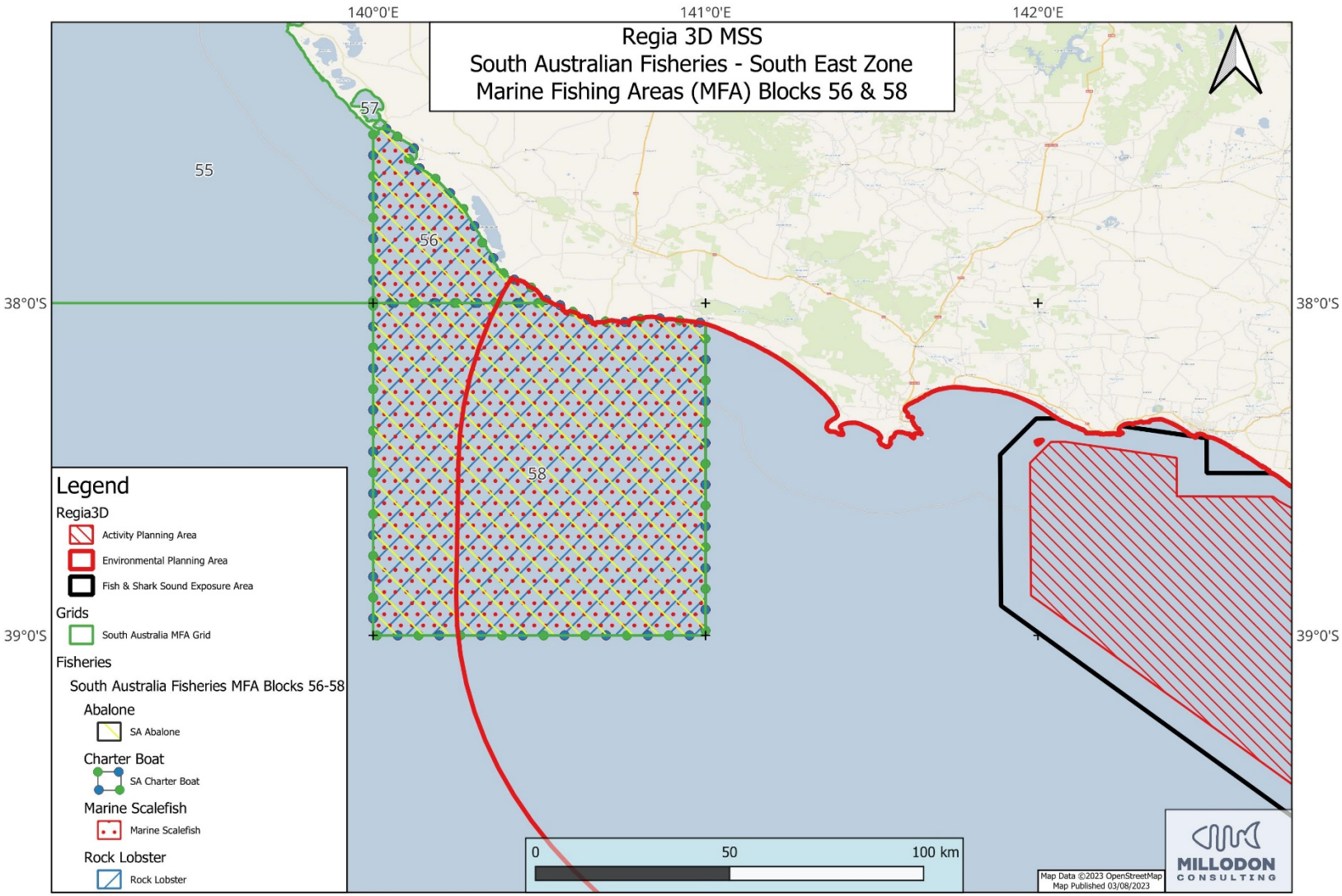

Figure 25: South Australian Fisheries within the Environmental Planning Area

Abalone Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Abalone Fishery	Blacklip abalone Greenlip abalone	The South Australian commercial abalone fishery takes greenlip and blacklip abalone that inhabit subtidal reefs out to approximately 30 m. Commercial abalone divers mostly operate from large, trailered boats. Divers use surface supplied air from the boat and may use motorised cages to mitigate physical interactions with white sharks. The Activity Planning Area does not overlap the fishery. The Environmental Planning Area overlaps the Southern Zone of the fishery where there have been six active licences from 2021 to 2022. Hours dived range from 921 to 1496 per year with annual catch between 101,133 to 153,491 kg.	No	Yes

Charter Boat Fishing

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Charter Boat Fishery	Various	The Charter Boat Fishery is a limited entry fishery with 82 licence holders of which 47 were active in 2020/2021. Fishing in inshore regions where water depths are < 50 m is the most frequent activity. Peak periods are between December and April (summer) and October. Seventy-eight species of fish, shark, mollusc, cephalopods, and crustacean are targeted with King George whiting, snapper and Bight redfish recording the highest catches. The above information is from Durante et al. (2022). The Activity Planning Area does not overlap the fishery. The Environmental Planning Area overlaps the fishery where there have been six active licences in 2019/20 but typically five or less than five licenses from 2012 to 2022.	No	Yes

Giant Crab Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Giant Crab Fishery	Giant crab	Information from in this section is from McLeay (2022). Giant Crab (*Pseudocarcinus gigas*), also known as king crab, is endemic to southern Australian waters and distributed from southern Western Australia to central New South Wales. While they occur at depths ranging from 20 to 600 m, the highest population densities are found at the edge of the continental shelf at depths of approximately 140 to 270 m. Fishers use a maximum of 100 steel-framed pots that must comply with pot dimension specifications. Commercial access to the giant crab resource is limited to licence holders in the Miscellaneous Fishery and Rock Lobster Fishery. Total allowable catch in the fishery is 22.1 t per year, consisting of 13.4 t in the Northern Zone and 8.7 t in the Southern Zone, with total catch ranging from 15.4 t in 2020/21 to 18.4 t in 2017/218. The giant crab fishing season is between 1 October 31 May, with the fishing season in the Southern Zone between 1 October and 30 April, and in the Northern Zone between 1 November and 31 May. The Activity Planning Area does not overlap the fishery. The Environmental Planning Area overlaps the southern zone of the fishery. DPIR could not provide data specific for the area overlapping the Environmental Planning Area as all data for the Giant Crab Fishery is confidential.	No	Yes

Marine Scalefish Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Marine Scalefish Fishery	King George Whiting Southern Garfish Southern Calamari	The Marine Scalefish Fishery is a multi-species and multi-gear fishery. Commercial fishing can be undertaken for more than 60 species of scalefish using a range of gear types. The Sardine Fishery is a part of the Marine Scalefish Fishery The Marine Scalefish Fishery operates in all coastal waters of South Australia between the Western Australian and Victorian border. For some species the Offshore Constitutional Settlement extends the fishery area out 200 nm to the Australian Exclusive Economic Zone miles. The fishing area includes gulfs, bays and estuaries, excluding the Coorong. The main species taken are: • King George Whiting • Southern Garfish • Southern Calamari. Those 4 species make up: • 60% of the total fishery production weight • 70% of the total fishery value. Not all species taken by this fishery are scalefish. Other species include squid, worms, and sharks. In 2020 there were >300 licences in the fishery. Total annual catches of primary species decline from 2,089 t in 2001 to 807 t in 2020. The Activity Planning Area does not overlap the fishery. The Environmental Planning Area overlaps the fishery where there have been 15 active licences in 2012/13 to less than 5 in 2021/22.	No	Yes

Rock Lobster Fishery

Fishery	Target species	Description	Fishing activity within the Activity Planning Area	Fishing Activity within the Environmental Planning Area
Rock Lobster Fishery	Rock lobster	The Rock Lobster Fishery is based on the capture of southern rock lobster (*Jasus edwardsii*). Other species are permitted to be landed and sold, including giant crab and octopus. Rock lobsters are commercially harvested with pots that are set overnight. Rock lobster licence holders may also harvest marine scalefish as endorsed on their licence. The Activity Planning Area does not overlap the fishery. The Environmental Planning Area is within the fishery Southern Zone which is closed from 31 May to 1 October. The total reported 2020 logbook catch was 1,275.5 t (99% of TACC). The annual catch within the Planning Area ranged from 331 t to 420 t from 2012 to 2022. During this period licence holders ranged from 43 to 71.	No	Yes

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Cover Sheet for Technical Reports

Documents

- **Appendix B7a** – *Modelling Report on Sound Emissions: Regia Marine Seismic Survey* (JASCO Applied Sciences)
  Appendix B7b – *Regia Marine Seismic Survey: Acoustic and Animat Modelling for Assessing Marine Fauna Sound Exposures* (JASCO Applied Sciences, Document 03301, Version 2.0)
  Appendix B7c – *Updated Underwater Sound Transmission Loss and Animat Modelling Study (SLR Consulting, 2025)*
  (Note: Appendix B7c replaces the previous NMFS 2024 User Spreadsheet Tool Output.)

Purpose

This cover sheet accompanies three technical reports that collectively inform the underwater sound impact assessment for the Regia Marine Seismic Survey (Regia MSS). The reports provide detailed numerical predictions of sound source characteristics, propagation behaviour, received sound levels at key coastal and offshore locations, and exposure assessments for marine mammals, fish, sea turtles, seabirds, invertebrates, and human divers.

These modelling studies were commissioned at successive stages of the EP's development in response to evolving survey design, stakeholder input, and updated international guidance. In temporal order they are;

Appendix B7a

Client: CGG
Date: 29 May 2023
Status: Approved for Use
Author: JASCO Applied Sciences

Summary:
Appendix B7a presents the initial sound modelling undertaken to characterise the expected sound emissions from the Regia MSS. The report includes detailed propagation modelling, predicted sound fields, and assessments of potential behavioural and physiological effects to marine fauna. This study established the baseline understanding of sound propagation in the region and informed early-stage environmental assessment and engagement.

Appendix B7b

Client: CGG
Date: 5 June 2024
Status: Approved for Use
Author: JASCO Applied Sciences

Summary:
Appendix B7b expands on the initial modelling by incorporating changes to survey design and additional coastal receptor sites requested during consultation, including popular recreational and commercial dive locations. The study also reflects updated activity boundaries (e.g. ≥50 m minimum depth and the western extension of the Active Source Area to the Vic/P79 permit boundary). It provides refined predictions of sound propagation and fauna exposure profiles under the revised survey configuration.

Appendix B7c (Revised)

Updated Underwater Sound Transmission Loss and Animat Modelling Study

Client: CGG
Date: 01 December 2025
Status: Approved for Use
Author: SLR Consulting (Canada) Ltd.

Summary:
Appendix B7c presents a comprehensive updated modelling study undertaken by SLR Consulting. This work incorporates the 2024 updated noise exposure criteria issued by the US National Marine Fisheries Service (NMFS), updated source signatures, species-specific auditory weighting functions, cumulative SEL modelling, and Animat modelling for low-frequency cetaceans. The study assesses both conventional and alternative source arrays and evaluates impact zones across multiple marine fauna groups.

The updated analysis confirms that earlier modelling remains conservative. While the revised NMFS criteria result in some changes to predicted behavioural and cumulative exposure ranges, these remain within the mitigation boundaries and activity limitations adopted in the EP for most species groups. The study validates the robustness of the existing impact predictions and supports the effectiveness of the adopted and modified management measures.

A new provider SLR Consulting, was acquired for this work due to incompatible timelines available with our initial provider, JASCO Applied Sciences.

Intended Use

These modelling reports form a core technical input to the environmental impact assessment for underwater sound. They support the demonstration that impacts from the Regia MSS are understood and appropriately managed in accordance with the requirements of the *Offshore Petroleum and Greenhouse Gas Storage (*Environment*) Regulations 2023*.

The reports are intended for regulatory submission and should be read in conjunction with the EP and its associated appendices.

Access and Use Restrictions

These documents must be considered in their full and unedited form. Any reproduction or reference must be clearly cited and contextualised within the scope and assumptions of each modelling study. The reports contain information specific to the Regia MSS and should not be applied to other activities without independent technical assessment.

Distribution

When finalised, these reports are made available to relevant persons and stakeholders via the Regia MSS Consultation Hub at **www.regiamss.com.au** and are submitted to NOPSEMA as part of the EP documentation package.

SLR's Underwater Sound Transmission Loss Modelling and Animat Study

Following the release of the updated United States National Marine Fisheries Service (NMFS) 2024 Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing, CGG commissioned a new standalone modelling study (Appendix B7c) to ensure that the EP is based on the most contemporary scientific criteria. This study also incorporated updated source signature modelling and additional analysis not previously available. Appendix B7c provides a consolidated, updated technical assessment that integrates:

- Revised NMFS 2024 auditory injury (formerly PTS) and TTS thresholds
- Updated frequency-weighted functions
- New near-field and far-field source signature modelling
- Modelling of a conventional array smaller than previously modelled, and an alternative acoustic array technology (namely ©SERCEL's Bluepulse technology)
- Short- and long-range propagation modelling using site-specific bathymetry, sound-speed profiles, and the reduced source size
- Cumulative SEL modelling for representative survey lines
- Animat modelling for Pygmy Blue Whale and Southern Right Whale.

This cover sheet provides concise context for key aspects of the updated modelling and highlights specific features of the study that warrant additional clarification and/or declaration to support interpretation within the EP.

1. Acknowledging Variability Between Modelling Providers

To date, multiple independent providers have completed acoustic modelling studies for the Regia MSS, each applying different modelling software frameworks, propagation algorithms, source characterisations, and environmental inputs. These methodological and input variations, combined with ongoing refinements to the survey design, mean that direct one-to-one comparison of predicted impact distances between studies is not technically valid or scientifically meaningful. There is no right or wrong outputs from these studies but rather a collective range of outputs that characterize the sound fields and interactions that are possible across a range of input parameters.

As expected, these refinements have resulted in some variation, both increases and decreases, in predicted impact ranges between studies. Such variation reflects differences in modelling assumptions and computational approaches, rather than discrepancies in technical quality or robustness. Importantly, the collective results consistently demonstrate and reaffirm that directional patterns and relative changes provide the most meaningful basis for evaluating improvements associated with reduced source volume, updated criteria, or the application of alternative technologies.

2. CGGs Interpretation and Application of Acoustic Modelling Results in the Regia MSS EP

CGG considers the latest acoustic modelling study conducted by SLR to be the most technically robust and scientifically accurate assessment to date, for the Regia MSS. This study incorporates updated internationally adopted auditory criteria, refined propagation parameters, and, critically, the new lower source configuration proposed for the survey, resulting in sound-field predictions that are realistic, transparent, and still precautionary in their underlying assumptions. Accordingly, the EP has

been revised to adopt SLR's sound transmission loss modelling and ANIMAT outputs as the primary acoustic reference, with their findings incorporated throughout the document where relevant.

These modelling outputs form the primary acoustic reference for general marine receptor assessment within the EP. However, as is consistent with contemporary best practice, CGG views acoustic modelling as an important but inherently theoretical tool that informs, but does not solely determine, impact management outcomes. CGG considers that application of these outputs for Southern Right Whales (SRWs) warrants an additional layer of precaution due to the species' higher sensitivity when SRWs are nursing their calves in the Reproduction BIA. For the Regia MSS, modelling outputs will be integrated alongside pre-survey baseline measurements of ambient noise and continuous real-time sound monitoring when managing impacts to SRWs. This adaptive, measurement-based approach provides a higher level of environmental confidence than reliance on predictive modelling alone, ensuring that sound levels within the SRW Reproduction BIA remain within acceptable levels.

3. Animat Discussion and Justification

In addition to the propagation modelling, CGG commissioned SLR to perform Animat modelling for Pygmy Blue Whales (PBWs) engaging in foraging behaviours, and for SRWs engaging in reproduction and foraging behaviours. This report can be found in Appendix E of SLR's acoustic modelling report (Regia MSS EP - Appendix B7c). These behavioural modes align with those expected within the designated BIAs off the southwest Victorian coast, ensuring behavioural modelling that is spatially and seasonally appropriate for the Regia MSS.

To investigate potential effects on PBW foraging, movement parameters and dive profiles were derived from blue whale tagging studies reported across multiple peer-reviewed sources. The full literature base informing these parameters is documented in Appendix E of SLR's acoustic modelling report (Regia MSS EP – Appendix B7c).

To investigate potential effects on SRW migration, resting, and foraging, movement parameters were drawn from tagged North Atlantic Right Whales and SRWs, supported by an equivalent body of peer-reviewed literature (Appendix E, Appendix B7c). Because no published studies exist describing detailed parameter sequences for SRWs engaging in "aggregation" behaviours, right whale foraging behaviour was used as a scientifically credible surrogate. This approach is consistent with established practice, particularly given evidence that SRWs undertake resting and foraging behaviour in the study region.

Seeding and Overseeding

High seeding density (also called overseeding) in animat modelling refers to deliberately placing far more virtual animals ("animats") into the simulation than exist in the real world so that the model can produce a statistically stable and defensible distribution of potential exposure outcomes. Because marine mammals typically occur at low densities and their exact locations and behaviours at any point in time are unknown, modelling real-world abundance would not provide enough simulated individuals to generate a stable or meaningful probability distribution of exposure. By deliberately placing a much higher number of virtual animals into the model domain, the method captures rare, low-probability, or short-duration exposure events that might otherwise be missed, ensuring the model explores the full range of plausible interactions between animals and the sound field. This overseeding is a well-recognised precautionary practice in animat-based exposure studies. Over-seeding avoids coincidental positioning that might lead to artificially low exposure estimates, increases statistical stability by producing a more stable distribution of exposure outcomes, and ensures that potential exposure likelihood is not underestimated.

A density of 2 animats per square kilometre was applied across the model domain, resulting in an intentionally high "over-population" relative to expected real-world whale distributions. As a result, the animat analysis provides a highly conservative representation of the range of possible interactions between whales and the modelled sound fields. Coupling this higher seeding density with stochastic movement behaviour allows the model to sample many more potential trajectories, reducing

sensitivity to initial placement and avoiding inadvertent underestimation of exposure likelihood. Accordingly, the animat framework incorporated a Monte Carlo approach, in which over-seeding and stochastic movement were repeatedly simulated to generate a stable, realistic, and precautionary distribution of potential exposure pathways.

Monte-Carlo Approach

The Monte Carlo approach refers to using large numbers of randomised simulations to predict how animals might move through an environment and how they may be exposed to underwater sound. This movement-based exposure modelling accounts for the changing positions of both the sound source (where applicable) and marine animals over time. Because the actual locations and movements of animals cannot be known, the model simulates plausible movement patterns by repeatedly sampling from sets of scientific literature-derived behavioural parameters. This Monte Carlo-style simulation of many virtual animals ("animats") within the defined area allows estimation of the likely sound-exposure histories across a wide range of possible behavioural scenarios.

It is used to account for the fact that the exact movements, behaviours, and positions of marine animals cannot be predicted with certainty. Instead of relying on a single assumed pathway or behaviour, the model generates multiple independent realisations, each following slightly different randomly assigned movement paths and behavioural parameters within realistic boundaries. This approach allows the model to:

- Capture the full range of plausible animal movements, rather than a single deterministic path.
- Represent natural variability in behaviour (e.g., speed, direction changes, dive patterns).
- Estimate the probability of exposure to different sound levels across many possible scenarios.
- Avoid overly rigid or simplistic assumptions about how animals respond to sound.

By pairing over-seeding with Monte Carlo methods, the model evaluates a broad ensemble of independent movement simulations, producing results that are both precautionary and statistically robust. This combination ensures that exposure likelihood is not underestimated, while still maintaining an appropriate level of biological and behavioural realism. CGG therefore considers this modelling approach appropriate for integration into its impact management design for PBWs and SRWs. The results function as conservative indicators of potential impact zones for PBWs and SRWs within a realistic behavioural envelope.

Regia Marine Seismic Survey

Acoustic and Animat Modelling for Assessing Marine Fauna Sound Exposures

Initial Acquisition Area

JASCO Applied Sciences (Australia) Pty Ltd

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The results presented herein are relevant within the specific context described in this report. They could be misinterpreted if not considered in the light of all the information contained in this report. Accordingly, if information from this report is used in documents released to the public or to regulatory bodies, such documents must clearly cite the original report, which shall be made readily available to the recipients in integral and unedited form.

Contents

Executive Summary 1
1. Introduction 6
2. Modelling Scenarios 7
2.1. Sensitive receivers 9
3. Noise Effect Criteria 11
3.1. Marine Mammals 12
3.2. Fish, Fish Eggs, and Fish Larvae 13
3.3. Sea Turtles 14
3.4. Diving Birds 15
3.5. Invertebrates 15
3.5.1. Benthic Invertebrates (Crustaceans and Bivalves) 15
3.5.2. Plankton 16
4. Methods 18
4.1. Parameter Overview 18
4.2. Acoustic Source Model 18
4.3. Sound Propagation Models 18
4.4. Geometry and Modelled Regions 19
4.5. Accumulated SEL 19
4.6. Animal Movement and Exposure Modelling 20
4.6.1. Methodology 20
4.6.2. Exposure–based Radial Distance Estimation 22
4.6.3. Species Specific Behaviour Profile Parameterisation 23
5. Results 25
5.1. Acoustic Source Levels and Directivity 25
5.2. Per-pulse Sound Fields 25
5.2.1. Tabulated Results 27
5.2.2. Sound Field Maps and Graphs 33
5.3. Multiple Source Fields 41
5.3.1. Tabulated Results 42
5.3.2. Sound Level Contour Maps 43
5.4. Animal Movement Exposure Ranges 45
5.4.1. Exposure Range Histograms: Pygmy Blue Whales 48
5.4.2. Exposure Range Histograms: Southern Right Whales 51
6. Discussion and Summary 56
6.1. Per-Pulse Sound Fields 56
6.2. Multiple Pulse Sound Fields 57
6.3. Acoustic Results Summary 57
6.4. Animal Movement Modelling 60

6.4.1. PTS and TTS 61
6.4.2. Behavioural Effects 62
Glossary 63
Literature Cited 71
Appendix A. Acoustic Metrics A-1
Appendix B. Acoustic Source Model B-1
Appendix C. Sound Propagation Models C-1
Appendix D. Methods and Parameters D-1
Appendix E. Model Validation Information E-1
Appendix F. Supplemental Results F-1

Figures

Figure 1. Overview of the modelled sites, acquisition lines, and features for the Regia Marine Seismic Survey. 8
Figure 2. Overview Map of the considered scenarios for animal movement modelling. 9
Figure 3. Sensitive receiver locations, modelled sites and acquisition lines for SEL_{24h}. 10
Figure 4. Exposure modelling process overview. 20
Figure 5. Depiction of animats in a moving sound field. 21
Figure 6. Animat track from an example simulation 22
Figure 7. Example distribution of animat closest points of approach 23
Figure 8. *Site 1, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 33
Figure 9. *Site 2, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 34
Figure 10. *Site 3, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 34
Figure 11. *Site 4, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 35
Figure 12. *Site 5, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 35
Figure 13. *Site 6, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 36
Figure 14. *Site 7, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 36
Figure 15. *Site 8, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 37
Figure 16. *Site 9, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 37
Figure 17. *Site 10, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 38
Figure 18. *Site 11, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 38

Figure 19. *Site 2, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow azimuth for broadside, and the tow azimuth for the endfire slice. 39
Figure 20. *Site 3, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow azimuth for broadside, and the tow azimuth for the endfire slice. 39
Figure 21. *Site 5, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow azimuth for broadside, and the tow azimuth for the endfire slice. 40
Figure 22. *Site 7, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow azimuth for broadside, and the tow azimuth for the endfire slice. 40
Figure 23. *Site 10, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow azimuth for broadside, and the tow azimuth for the endfire slice. 41
Figure 24. *Scenario A*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. 43
Figure 25. *Scenario B*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. 44
Figure 26. *Scenario C*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. 44
Figure 27. *Scenario A, female pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 48
Figure 28. *Scenario A, male pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 49
Figure 29. *Scenario A, female pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 49
Figure 30. *Scenario A, male pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 50
Figure 31. *Scenario A, migrating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 51
Figure 32. *Scenario A, migrating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 52
Figure 33. *Scenario A, aggregating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 52
Figure 34. *Scenario A, aggregating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 53
Figure 35. *Scenario A, migrating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 53

Figure 36. *Scenario A, migrating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 54
Figure 37. *Scenario A, aggregating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 54
Figure 38. *Scenario A, aggregating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 55
Figure 39. Acoustic (R_{max}) and exposure ranges ($ER_{95\%}$) for TTS/PTS and the behavioural thresholds (NOAA), shown for each species. 61

Figure A-1. Decidecade frequency bands (vertical lines) shown on a linear frequency scale and a logarithmic scale. A-3
Figure A-2. Sound pressure spectral density levels and the corresponding decidecade band sound pressure levels of example ambient noise shown on a logarithmic frequency scale. A-4
Figure A-3. Auditory weighting functions for functional marine mammal hearing groups used in this project as recommended by Southall et al. (2019). A-7
Figure B-1. Layout of the modelled 2820 in^3 seismic source where the plotted layout is such that the array is centred on the origin and vessel travel direction is in the positive x-direction. B-2
Figure B-2. Predicted source level details for the 2820 in^3 seismic source with a 7 m tow depth. B-3
Figure B-3. Directionality of the predicted horizontal source levels for the 2820 in^3 seismic source, 5 Hz to 2 kHz. B-4
Figure C-1. The N×2-D and maximum-over-depth modelling approach used by MONM. C-1
Figure D-1. Sample areas ensonified to an arbitrary sound level with R_{max} and $R_{95\%}$ ranges shown for two scenarios. D-1
Figure D-2. *Site 2 tow direction 113*°: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. D-2
Figure D-3. *Site 3 tow direction 113*°: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. D-3
Figure D-4. *Site 5 tow direction 113*°: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. D-3
Figure D-5. *Site 8 tow direction 113*°: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. D-4
Figure D-6. *Site 10 tow direction 113*°: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. D-4
Figure D-7. Bathymetry map of the modelling area for the Regia Marine Seismic Survey. D-5
Figure D-8. The sound speed profile (December) used for all modelling, showing the entire water column (left) and the top 100 m within the profile (right). D-6
Figure F-1. *Scenario B, female pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-1
Figure F-2. *Scenario B, male pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-2
Figure F-3. *Scenario B, female pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-2
Figure F-4. *Scenario B, male pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-3

Figure F-5. *Scenario C, female pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel)..... F-3
Figure F-6. *Scenario C, male pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel)..... F-4
Figure F-7. *Scenario C, female pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel)..... F-4
Figure F-8. *Scenario C, male pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel)..... F-5
Figure F-9. *Scenario B, migrating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-5
Figure F-10. *Scenario B, migrating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-6
Figure F-11. *Scenario B, aggregating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-6
Figure F-12. *Scenario B, aggregating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-7
Figure F-13. *Scenario B, migrating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-7
Figure F-14. *Scenario B, migrating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-8
Figure F-15. *Scenario B, aggregating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-8
Figure F-16. *Scenario B, aggregating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-9
Figure F-17. *Scenario C, migrating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-9
Figure F-18. *Scenario C, migrating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-10
Figure F-19. *Scenario C, aggregating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-10
Figure F-20. *Scenario C, aggregating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-11
Figure F-21. *Scenario C, migrating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-11

Figure F-22. *Scenario C, migrating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-12
Figure F-23. *Scenario C, aggregating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-12
Figure F-24. *Scenario C, aggregating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). F-13

Tables

Table 1. Summary of maximum (R_{max}) horizontal distances (in km) from all modelled sites and scenarios to behavioural response thresholds and temporary threshold shift (TTS) and permanent threshold shift (PTS) for marine mammals showing the relevant metric. 2
Table 2. Summary of animat simulation results for PTS, TTS and SPL behavioural response criteria for pygmy blue whales and southern right whales 3
Table 3. Summary of horizontal distances (in km) to turtle behavioural response criteria, temporary threshold shift (TTS), and permanent threshold shift (PTS). 4
Table 4. Summary of maximum fish, fish eggs, and larvae injury and temporary threshold shift (TTS) onset distances for single impulse and 24 hour sound exposure level (SEL_{24h}) modelled scenarios. 5
Table 5. Key parameters of the two accumulated sound exposure level (SEL) scenarios. 7
Table 6. Location details for the single impulse modelled sites. 8
Table 7. Location details for the sensitive receiver sites. 10
Table 8. Unweighted sound pressure level (SPL), 24-hour sound exposure level (SEL_{24h}), and peak pressure (PK) thresholds for acoustic effects on marine mammals. 12
Table 9. Criteria for seismic noise exposure for fish, adapted from Popper et al. (2014) 14
Table 10. Acoustic effects of impulsive noise on sea turtles: Unweighted sound pressure level (SPL), 24 hour sound exposure level (SEL_{24h}), and peak pressure (PK) thresholds 15
Table 11. Far-field source level specifications for 2820 in^3 source 25
Table 12. *Sites 1-11, 2820 in^3 source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) from the seismic source to modelled maximum-over-depth and maximum-over-tow direction unweighted per-pulse sound exposure level (SEL) isopleths from the modelled single impulse sites, with water depth indicated. 27
Table 13. *Sites 1-11, 2820 in^3 source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) from the seismic source to modelled maximum-over-depth per-pulse sound pressure level (SPL) isopleths from the modelled single impulse sites, with water depth indicated. 28
Table 14. *Sites 1-11, Penguin behavioural threshold, SPL, 2820 in^3 source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) from the seismic source to modelled maximum-over-depth per-pulse sound pressure level (SPL) isopleths from the modelled single impulse sites, with water depth indicated. 29
Table 15. *2820 in^3 source*: Maximum (R_{max}) horizontal distances (in km) from the seismic source to modelled maximum-over-depth peak pressure level (PK) thresholds based on Southall et al. (2019) for marine mammals, and Popper et al. (2014) for fish and Finneran et al. (2017) for sea turtles, for relevant modelled sites with water depth indicated. The results presented are the maximum ranges from the set of modelled tow directions for each site, as described in Table 6. 30
Table 16. *2820 in^3 source*: Maximum (R_{max}) horizontal distances (in m) from the seismic source to modelled seafloor (receiver located 50 cm above seafloor) peak pressure level thresholds (PK) at eleven representative water depths. 31

Table 17. 2820 *in³ source*: Maximum (R_{max}) horizontal distances (in m) from the seismic source to modelled seafloor (receiver located 5 cm above seafloor) peak-peak pressure levels (PK-PK) at seven representative water depths. 31
Table 18. Maximum (R_{max}) horizontal distances (in m) from the 2820 in³ to particle motion threshold: Peak acceleration magnitude level (m/s²) threshold for benthic invertebrates 5 cm above the seafloor, with water depth indicated. Results included in relation to benthic invertebrates (Section 3.5.1)..... 32
Table 19. Maximum-over-depth received sound levels (SPL) at the sensitive receivers outlined in Section 2.1 along with the distance between the receiver and associated modelled site. 32
Table 20. Maximum-over-depth distances (in km) to frequency-weighted 24 h sound exposure level (SEL_{24h}) based permanent threshold shift (PTS) and temporary threshold shift (TTS) for marine mammals Southall et al. (2019) and sea turtles (Finneran et al. 2017) using the 2820 in³ seismic source for all scenarios. Maximum extents are in the broadside direction. 42
Table 21. *Fish criteria*: Maximum horizontal distances (R_{max}, in km) from the survey lines and area (km²) to injury and temporary threshold shift (TTS) thresholds considering 24 h of survey activity. 42
Table 22. Summary of animat simulation results for pygmy blue whales with animats not restricted to the BIA (Seeding A). 45
Table 23. Summary of animat simulation results for pygmy blue whales with animats restricted to the shelf (Seeding B). 45
Table 24. Summary of animat simulation results for southern right whales with animats restricted to the adjusted aggregation BIA (Seeding A). 46
Table 25. Summary of animat simulation results for southern right whales with animats restricted to the known core range area (Seeding B). 47
Table 26. Summary of maximum (R_{max}) horizontal distances (in km) from modelled sites or scenarios to behavioural response thresholds and temporary threshold shift (TTS) and permanent threshold shift (PTS) for marine mammals. 58
Table 27. Summary of horizontal distances (in km) to turtle behavioural response criteria, temporary threshold shift (TTS), and permanent threshold shift (PTS). 58
Table 28. Summary of maximum fish, fish eggs, and larvae injury and temporary threshold shift (TTS) onset distances for single impulse and 24 hour sound exposure level (SEL_{24h}) modelled scenarios. 59
Table 29. Summary of animat simulation results for PTS, TTS and SPL behavioural response criteria for pygmy blue whales and southern right whales 60

Table A-1. Parameters for the auditory weighting functions used in this project as recommended by Southall et al. (2019). A-6
Table B-1. Layout of the modelled 2820 in³ seismic source. B-3
Table D-1. Geoacoustic profile used in the acoustic propagation models less than 50 m water depth. D-7
Table D-2. Geoacoustic profile used in the acoustic propagation models for between 50 m and 150 m water depth. D-7
Table D-3. Geoacoustic profile used in the acoustic propagation models for all modelled sites greater than 150 m water depth. D-8

Executive Summary

JASCO Applied Sciences (JASCO) performed a numerical modelling study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic impacts on key regional receptors including marine mammals, fish, turtles, benthic invertebrates, sponges, coral, plankton and divers. The modelling considered a seismic source in triple configuration with a 2820 in^3 total volume, towed at a 7 m depth behind a single vessel, with a 12.5 m impulse interval (inter-pulse interval) and a 37.5 m crossline array separation.

JASCO's specialised airgun array source model was used to predict the acoustic signature of the seismic source and complementary underwater acoustic propagation models were used in conjunction with the modelled array signatures to estimate sound levels over a large area around the sources. Single-impulse sound fields were predicted at 11 sites over the proposed survey line plans, with water depths ranging from 40 to 174 m. Accumulated sound exposure fields were predicted for three representative scenarios for likely survey operations over 24 h. Three animal movement modelling scenarios, to address different line acquisition plans, for likely survey operations over 24 hours were modelled.

The modelling methodology considered source directivity and range-dependent environmental properties likely to be encountered within the proposed survey area. Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p), zero-to-peak pressure levels (PK, L_{pk}), peak-to-peak pressure levels (PK-PK; $L_{pk\text{-}pk}$), and either single-impulse (i.e., per-pulse) or accumulated sound exposure levels (SEL, L_E) as appropriate for different noise effect criteria. A conservative sound speed profile that would be most supportive of sound propagation conditions for the period of the survey was defined and applied to all modelled sites.

SEL_{24h} is a cumulative metric that reflects the dosimetric effect of noise levels within 24 hours, based on the assumption that a receiver (e.g., an animal) is consistently exposed to such noise levels at a fixed position. More realistically, marine animals would not stay in the same location for 24 hours (especially in the absence of location-specific habitat) but rather a shorter period, depending on the animal's behaviour and the source's proximity and movements. Therefore, a reported radius for the SEL_{24h} criteria does not mean that marine fauna travelling within this radius of the source will be impaired, but rather that an animal could be exposed to the sound level associated with impairment (Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS)) if it remained at that location for 24 hours.

A more realistic representation of the potential exposures for foraging pygmy blue whales in the foraging Biologically Important Area (BIA) and both migrating and aggregating southern right whales within the known core range area and aggregation BIA was undertaken using animal movement modelling ('animat modelling'). Simulations with animats (i.e., simulated animals) restricted to the BIA provide an understanding of how animats will be exposed given the location and environment-specific context in which they are most likely to occur. Scenarios in which the pygmy blue and southern right whales are seeded in an unrestricted manner allow for the calculation of exposure range across the entire project area. These ranges may then be interpreted to determine BIA action zones for different project options and scenarios. The unrestricted seeding approach is informative in cases where there is very little or no overlap between the BIA and the planned active source area. While acoustic modelling inherently assumes static animals, the JASCO Animal Simulation Model Including Noise Exposure (JASMINE) combines modelled sound fields with realistic animal movements to predict how animals might be impacted through sound exposure. The exposure ranges account for animats sampling the sound field vertically and horizontally based on species-specific diving and movement parameters. JASMINE provides a framework for understanding and predicting sound exposure for species of interest and for calculating ranges to relevant regulatory thresholds. The distribution of distances to the source of simulated animals ('animats') predicted to be exposed to sound levels above relevant thresholds was used to calculate the horizontal distance that includes 95% of the

animat distances that exceeded a given effect threshold ($ER_{95\%}$). Within the $ER_{95\%}$, there is generally some proportion of animats that do not exceed the threshold criteria. This occurs for several reasons, including the spatial and temporal characteristics of the sound field and the way in which the animats are exposed to the sound field over time, both vertically and horizontally. The probability that an animat within the $ER_{95\%}$ was exposed above threshold was also computed (P_{exp}) to provide additional context. Due to insufficient density data availability, the modelling results are not related to real-world density estimates for pygmy blue and southern right whales.

The acoustic analysis considered the distances away from the seismic source at which several effects criteria or relevant sound levels were reached. The results are summarised below considering all the representative single-impulse sites and all accumulated SEL scenarios for both acoustic modelling results and pygmy blue whale and southern right whale animat $ER_{95\%}$ results and probabilities.

Marine Mammals – Acoustic Results

- The maximum distance where the NOAA marine mammal behavioural response criterion of 160 dB re 1 µPa (SPL) for impulsive noise could be exceeded varied between 2.95 and 10.3 km for the 2820 in^3 seismic source, depending on modelled site.
- The results for marine mammal injury considered the criteria from Southall et al. (2019). These criteria contain two metrics (PK and SEL_{24h}), both required for the assessment of marine mammal PTS and TTS. The longest distance associated with either metric is required to be applied for assessment; Table 1 summarises the maximum distances, along with the relevant metric.
- The distance to PTS and TTS was always farthest in the broadside direction, distances are shown in Table 1.

Table 1. Summary of maximum (R_{max}) horizontal distances (in km) from all modelled sites and scenarios to behavioural response thresholds and temporary threshold shift (TTS) and permanent threshold shift (PTS) for marine mammals showing the relevant metric. Maximum extents are in the broadside direction of the 2820 in^3 seismic source.

Hearing group	Maximum modelled distance to effect threshold (R_{max})						
	Behavioural response[1]	Scenario A		Scenario B		Scenario C	
		TTS[2] (km)	PTS[2] (km)	TTS[2] (km)	PTS[2] (km)	TTS[2] (km)	PTS[2] (km)
Low-frequency cetaceans	10.3 (SPL)	34.0 (SEL_{24h})	4.89 (SEL_{24h})	14.8 (SEL_{24h})	1.65 (SEL_{24h})	43.5 (SEL_{24h})	1.90 (SEL_{24h})
High-frequency cetaceans		0.05 (SEL_{24h})	–	0.05 (SEL_{24h})	–	0.04 (SEL_{24h})	–
Very high-frequency cetaceans		0.74 (PK)	0.43 (PK)	0.74 (PK)	0.43 (PK)	0.65 (PK)	0.33 (PK)
Otariid Pinnipeds		0.05 (SEL_{24h})	–	0.06 (SEL_{24h})	–	0.06 (SEL_{24h})	–

Noise exposure criteria: [1] NOAA (2019) and [2] Southall et al. (2019).
A dash indicates the threshold was not reached within the limits of the modelling resolution (20 m).

Animal Movement Modelling

- The exposure ranges predicted using animat modelling are significantly more realistic, due to the incorporation of species-specific realistic movements, rather than conservative approach of calculating ranges using the maximum-over-depth sound fields and receivers which are stationary

for 24 hours. This is because the exposure ranges account for animats sampling the sound field vertically and horizontally based on species-specific diving and movement parameters.

- Exposure ranges ($ER_{95\%}$) for single exposure metrics, such as the SPL behavioural response criteria, are typically comparable to the predicted acoustic ranges. Exposure ranges are generally slightly lower than the R_{max} acoustic ranges, which is the case for this study.
- All scenarios resulted in exposures above the behavioural response threshold NOAA (2019). Of these, the maximum $ER_{95\%}$ to the marine mammal behavioural response threshold NOAA (2019) was 8.43 km, with a probability of exposure of 85%. These results are summarised in Table 2.
- Exposure ranges from animal movement modelling for PTS and TTS criteria are typically shorter than those predicted using acoustic propagation modelling because of the shorter time ('dwell time') to accumulate sound energy of the moving animats. There were exposures above threshold for all considered scenarios and species. The maximum $ER_{95\%}$ to TTS and PTS thresholds (Southall et al. 2019) were 13.2 and 1.50 km, respectively, with probabilities of exposure of 58 and 50%.

Table 2. Summary of animat simulation results for PTS, TTS and SPL behavioural response criteria for pygmy blue whales and southern right whales Maximum Exposure ranges show $ER_{95\%}$ (km) first and probability of exposure of animats travelling within the $ER_{95\%}$ (P_{exp} (%)) in parentheses.

Species	Scenario	Behavioural response (SPL)[4]	TTS (SEL24h)[3]	PTS (SEL24h)[3]
		160[2]	168[1]	183[1]
Pygmy blue whale	A	8.09 (86%)	13.2 (58%)	1.40 (51%)
	B	6.82 (93%)	6.05 (60%)	0.53 (50%)
	C	6.77 (92%)	7.60 (60%)	0.34 (47%)
Southern right whale	A	8.43 (85%)	11.6 (60%)	1.50 (50%)
	B	6.81 (92%)	6.04 (52%)	0.54 (49%)
	C	7.58 (85%)	6.71 (37%)	0.25 (37%)

[1] LF-weighted SEL_{24h} ($L_{E,24h}$; dB re 1 $\mu Pa^2 \cdot s$)
[2] SPL (L_p; dB re 1 µPa)
[3] Southall et al. (2019) criteria for marine fauna.
[4] NOAA (2019) recommended unweighted behavioural threshold for marine mammals.

Sea Turtles

- The PK sea turtle injury criteria of 232 dB re 1 µPa for PTS and 226 dB re 1 µPa for TTS from Finneran et al. (2017) was not exceeded at a distance longer than 20 m from the acoustic centre of the source.
- The maximum distance to the SEL_{24h} metrics of 204 dB re 1 $\mu Pa^2 s$ for PTS and 189 dB re 1 $\mu Pa^2 s$ for TTS (summarised in Table 3) for all scenarios was 0.07 km for PTS onset and 3.43 km for TTS onset for the 2820 in^3 seismic source (Finneran et al. 2017). As is the case with marine mammals, a reported radius for SEL_{24h} criteria does not mean that sea turtles travelling within this radius of the source will be injured, but rather that an animal could be exposed to the sound level associated with either PTS or TTS if it remained in that location for 24 hours.
- Table 3 summarises the distances to where the criterion for behavioural response of turtles to 166 dB re 1 µPa (SPL) and the 175 dB re 1 µPa (SPL) threshold for behavioural disturbance (McCauley et al. 2000) could be exceeded.

Table 3. Summary of horizontal distances (in km) to turtle behavioural response criteria, temporary threshold shift (TTS), and permanent threshold shift (PTS).

Hearing group	Maximum modelled distance to effect threshold (R_{max})							
	Behavioural response[1]	Behavioural disturbance[1]	Scenario A		Scenario B		Scenario C	
			TTS[2]	PTS[2]	TTS[2]	PTS[2]	TTS[2]	PTS[2]
Sea Turtles	5.97 (SPL)	2.55 (SPL)	3.43 (SEL_{24h})	0.07 (SEL_{24h})	1.14 (SEL_{24h})	0.07 (SEL_{24h})	0.82 (SEL_{24h})	0.06 (SEL_{24h})

Noise exposure criteria: [1] McCauley et al. (2000), and [2] Finneran et al. (2017)

Penguins

- The maximum distance to the OCW-weighted penguin TTS SEL_{24h} threshold of 188 dB re 1 μPa^2s was reached between 0.05 and 0.06 km for all scenarios was. PTS and PK thresholds were not resolved withing the modelled resolution of 20 m. As is the case with marine mammals, a reported radius for SEL_{24h} criteria does not mean that a penguin underwater travelling within this radius of the source will be injured, but rather that an animal could be exposed to the sound level associated with either PTS or TTS if it remained in that location for 24 hours.
- The maximum distance where the OCW-weighted penguin behavioural response threshold of 120 dB re 1 µPa (SPL) for impulsive noise could be exceeded varied between 9.08 and 52.1 km for the 2820 in^3 seismic source, depending on modelled site.

Fish, fish eggs, and fish larvae

- This modelling study assessed the ranges for quantitative criteria based on Popper et al. (2014) and considered both PK (seafloor and water column) and SEL_{24h} metrics associated with mortality and potential mortal injury as well as impairment in the following groups:
  - Fish without a swim bladder (also appropriate for sharks in the absence of other information),
  - Fish with a swim bladder that do not use it for hearing,
  - Fish that use their swim bladders for hearing,
  - Fish eggs and fish larvae.
- Table 4 summarises distances to effect criteria for fish, fish eggs, and fish larvae along with the relevant metric. Seafloor sound levels were assessed at a set of representative depths related to the planned acquisition lines ranging from 40 to 170 m.

Table 4. Summary of maximum fish, fish eggs, and larvae injury and temporary threshold shift (TTS) onset distances for single impulse and 24 hour sound exposure level (SEL_{24h}) modelled scenarios.

Relevant hearing group	Effect criteria	Water column	
		Metric associated with longest distance to criteria	R_{max} (km)
Fish: No swim bladder	Recoverable injury	SEL_{24h}	0.07
	TTS	SEL_{24h}	7.86
Fish: Swim bladder not involved in hearing and Swim bladder involved in hearing	Recoverable injury	PK	0.22
	TTS	SEL_{24h}	7.86
Fish eggs, and larvae (relevant to plankton)	Injury	PK	0.22

Benthic invertebrates, Sponges, and Coral

To assist with assessing the potential effects on these receptors, the following results were determined:

- Crustaceans: The sound level of 202 dB re 1 µPa PK-PK from Payne et al. (2008), which is representative of no effects, was considered for seafloor sound levels; the sound level was reached at ranges between 295 and 711 m for the 2820 in^3 source.
- Bivalves: The distance where a particle acceleration of 37.57 ms^{-2} at the seafloor could occur was determined for comparing to results presented in Day et al. (2016a). This particle acceleration was reached at a range of 52 m for depth 40 m, 4 m for a depth of 50 m, and was not reached at any greater depth.
- Sponges and coral: The PK sound level at the seafloor directly underneath the seismic source was estimated at all modelled sites and compared to the sound level of 226 dB re 1 µPa PK for sponges and corals (Heyward et al. 2018); the threshold was reached at a range of 2 m for depth 40 m and was not reached at any greater depth.

Divers and Swimmers

An SPL human health assessment of 145 dB re 1 µPa (SPL; LP) derived from (Parvin 2005) was considered for people swimming and diving. At the closest separation between considered modelled sites and receiver locations a sound level of 153.1 dB re 1 µPa (SPL; LP) was predicted at Little River and Taylors Beach. It is important to review the provided contour maps to contextualise levels at coast areas to understand where the human health assessment level may be reached.

1. Introduction

JASCO Applied Sciences (JASCO) performed a numerical estimation study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic effect on receptors including marine mammals, fish, sea turtles, benthic invertebrates, plankton, sponges, corals and divers.

This study considered a 2820 in^3 seismic source array. JASCO's specialised Airgun Array Source Model (AASM) was used to predict acoustic signatures and spectra (see Section 4.2). AASM accounts for individual airgun volumes, airgun bubble interactions, and array geometry to yield accurate source predictions.

Complementary underwater acoustic propagation models were used in conjunction with the array signature and spectra to estimate sound levels considering site-specific environmental influences. Single-impulse sound fields were predicted at eleven unique geographic locations linked to the considered survey line plans and three representative scenarios for accumulated SEL modelling were considered. Accumulated sound exposure fields were predicted for each representative scenario for likely survey operations over 24 hours (see Section 2).

The modelling methodology considered source directivity and range-dependent environmental properties. Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p), zero-to-peak pressure levels (PK, L_{pk}), peak-to-peak pressure levels (PK-PK; $L_{pk\text{-}pk}$), and either single-impulse (i.e., per-pulse) or accumulated sound exposure levels (SEL, L_E) as appropriate for different noise effect criteria.

The planned seismic acquisition area overlaps the pygmy blue whale foraging BIA as well as the aggregation BIA and known core range area for southern right whales. The acoustic modelling results were also used in conjunction with animal movement modelling ('animat modelling') simulations to predict the distance at which feeding pygmy blue whales (*Balaenoptera musculus brevicauda*), aggregating and migrating southern right whales (*Eubalaena australis*) are expected to be exposed above threshold criteria for PTS, TTS, and behavioural response. Estimates of sound exposure distribution were determined by moving large numbers of simulated animals (animats) through a modelled time-evolving sound field, computed using acoustic models. This approach provides the most realistic prediction of the maximum expected SPL and SEL_{24h} for comparison against the relevant thresholds.

Section 3 explains the metrics used to represent underwater acoustic fields and the effect criteria considered. Section 4 details the methodology for predicting the source levels and modelling the sound propagation, including the specifications of the seismic source and all environmental parameters the propagation models require. Section 4 also describes the methodology used in the animal movement and exposure modelling simulations. Section 5 presents the results, which are then discussed and summarised in Section 6.

2. Modelling Scenarios

Three nominal acquisition scenarios were considered for both acoustic propagation modelling and animal movement modelling. Acoustic modelling consisted of both source and propagation modelling and was conducted at eleven individual single-impulse sites for SEL and SPL while water column PK was assessed at six sites. The locations of the modelled sites are provided in Table 6 and the acquisition lines for the scenarios are shown in Figure 1. This study considered a 2820 in^3 seismic source towed in a triple array configuration at a speed of 4.5 knots with an impulse interval (inter-pulse interval) of 12.5 m and a crossline array separation of 37.5 m. The acoustic propagation modelling utilised the sound speed profile for December, as this month will likely result in favourable propagation conditions within potential acquisition time window for the proposed survey.

The single impulse sites and the accumulated SEL scenarios were determined based on proposed survey line plans with lines orientated at 113/293°. The single impulse sites and accumulated SEL scenarios were chosen to be representative of the range of water depths and the potential sound propagation characteristics of the considered line plans. Near-field sea-floor PK and PK-PK sound levels were assessed considering eleven water depths chosen to represent the depth range encompassed by the considered line plans. Particle motion modelling was also performed at these representative water depths.

The three scenarios account total number of impulses and acquisition time as shown in Table 5. The total assessment period for accumulated sound exposure level was 24 h and during line turns, the seismic source was not operating for modelling purposes. The time surveying and time on turns combine to a total 24 h period.

All animat simulations were run in two configurations: one with animats restricted to the BIA, and another with unrestricted animat seeding.

Table 5. Key parameters of the two accumulated sound exposure level (SEL) scenarios.

Scenario	Array	Impulse interval (m)	Tow direction (°)	Total impulses	Acquisition period (h)
A	Triple 2820 in^3 seismic source	12.5	113/293	8768	13.15
B				11306	16.96
C				11277	16.91

Table 6. Location details for the single impulse modelled sites. Sites were modelled at the tow azimuths used to model the 24 h scenario.

Site	Scenario(s)	Tow azimuths (°)	Latitude (°S)	Longitude (°E)	MGA[1] Zone 54		Water depth (m)
					X (m)	Y (m)	
1	A	113/293	38° 27' 38.76"	142° 6' 23.37"	596537	5742480	40
2†			38° 31' 45.72"	142° 13' 13.43"	606375	5734742	50
3†	A, B		38° 34' 46.31"	142° 18' 36.24"	614112	5729068	55
4			38° 36' 56.37"	142° 29' 18.79"	629594	5724822	58
5†			38° 29' 57.77"	142° 0' 26.98"	587853	5738294	45
6	B, C		38° 47' 44.74"	142° 29' 15.08"	629180	5704837	81
7			38° 39' 9.22"	142° 3' 4.80"	606865	5714555	71
8†			38° 42' 40.30"	142° 13' 44.82"	591481	5721254	62
9	C		38° 54' 13.43"	142° 24' 11.18"	621664	5692971	125
10†			38° 50' 31.49"	142° 12' 53.35"	605428	5700047	174
11			38° 46' 28.15"	142° 0' 39.98"	587832	5707763	167

[1] Map grid of Australia (MGA)
† FWRAM modelling conducted at these sites.

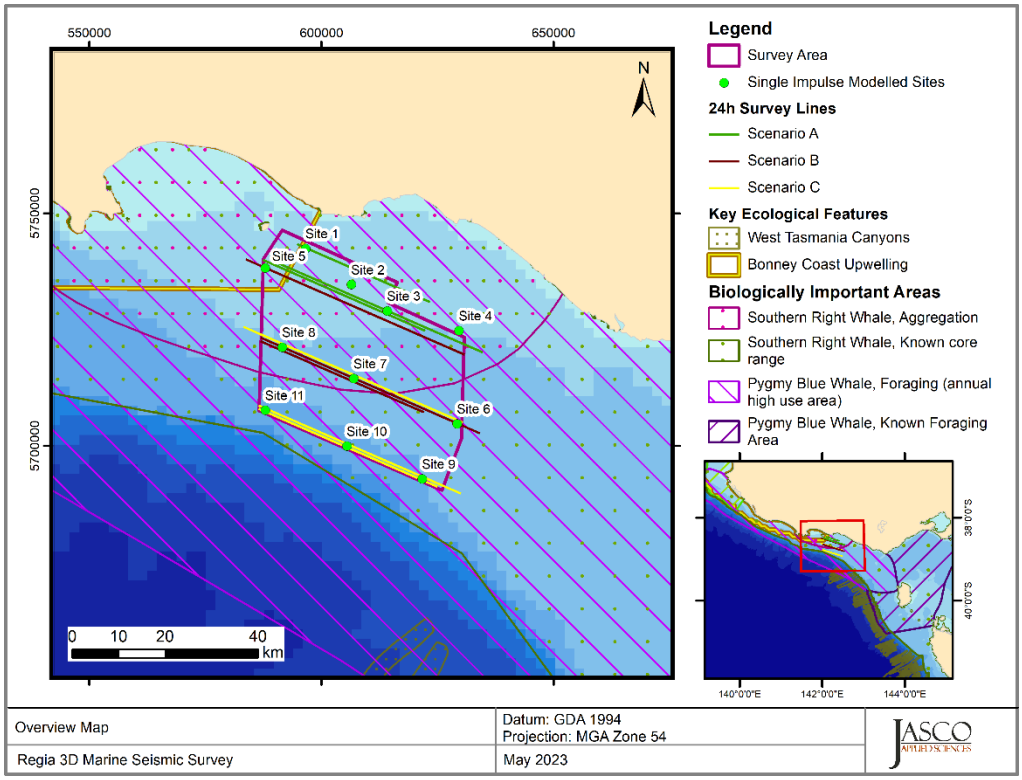

Figure 1. Overview of the modelled sites, acquisition lines, and features for the Regia Marine Seismic Survey.

Animal Movement modelling simulations were run for pygmy blue whales and southern right whales considering the three nominal acquisition scenarios. In general, animats are randomly placed, or seeded, within the simulation boundary at a specified density (animats/km^2) within the species preferred depth range. During the simulation, if an animat's movement takes itself outside of its preferred depth range, it will begin to make movements (while still following the parameters within its species behaviour file) back towards its preferred depth range. For all simulations, animats were

seeded at a nominal horizontal sampling density of 4 animats/km^2. Each of the animat simulations were run for a representative 24 h duration.

Figure 2 shows an overview of the animat modelling simulation extents, along with the animat seeding areas for each scenario.

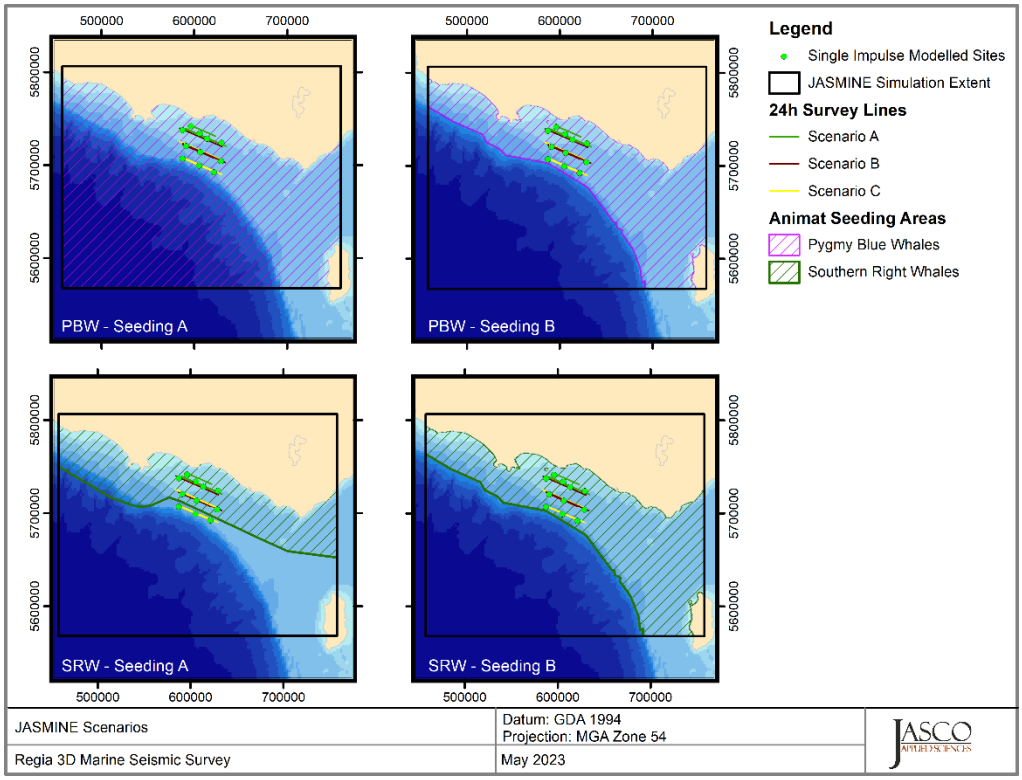

Figure 2. Overview Map of the considered scenarios for animal movement modelling.

2.1. Sensitive receivers

The Regia MSS lies within a foraging BIA for pygmy blue whales and an aggregation BIA for southern right whales. In addition, there are several swimming, diving and surfing beach that are within proximity of the survey. Lady Julia Percy Island, is also an important sensitive location, the closest modelled sites to the edge of the island are Site 1 and Site 5, at respective distances of about 9.3 and 8.4 km. The received acoustic levels at several receiver locations have been calculated and are presented below in Section 5.2.1.4. The receiver locations have been labelled 1–8 and are summarised in Table 7.

Table 7. Location details for the sensitive receiver sites.

Receiver ID	Sensitive receiver location	Receptors	Latitude (S)	Longitude (E)	MGA[1] Zone 54	
					X (m)	Y (m)
1	Lady Julia Percy Island	Seals, White Sharks	38° 25' 27.17"	142° 0' 35.78"	588158	5746633
2	Southern Right Whale Migration and Resting BIA	Southern Right Whales	38° 33' 42.51"	142° 43' 43.45"	650618	5730432
3	Discovery Bay	Human Swimmers	38° 22' 32.87"	141° 21' 27.02"	531227	5752428
4	Portland	Human Swimmers/Divers, Penguins	38° 18' 22.33"	141° 36' 44.44"	553538	5760033
5	Little River and Taylors Beach	Human Swimmers/Divers	38° 23' 41.36"	142° 10' 38.43"	602812	5749721
6	Port Fairy Bay	Human Swimmers/Divers, Penguins	38° 22' 7.15"	142° 15' 13.53"	609525	5752537
7	Twelve Apostles Marine Park	Human Swimmers/Divers	38° 41' 8.43"	143° 7' 13.02"	684418	5715970
8	Aire River Beach	Human Swimmers/Divers	38° 48' 31.92"	143° 27' 47.14"	713871	5701551

[1] Map Grid of Australia (MGA)

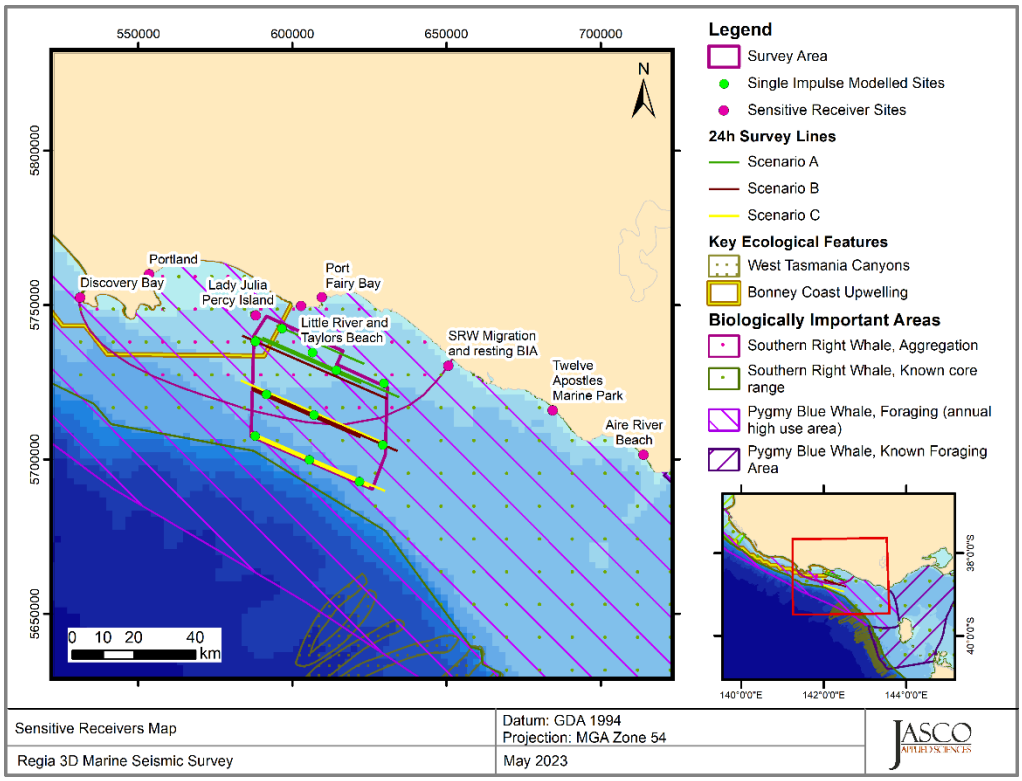

Figure 3. Sensitive receiver locations, modelled sites and acquisition lines for SEL_{24h}.

3. Noise Effect Criteria

The perceived loudness of sound, especially impulsive sound such as that from seismic airguns, is not generally proportional to the instantaneous acoustic pressure. Rather, perceived loudness depends on the pulse rise-time and duration, and the frequency content. Several sound level metrics, such as PK, SPL, and SEL, are commonly used to evaluate sound and its effects on marine life (Appendix A). The period of accumulation associated with SEL is defined, with this report referencing either a "per pulse" assessment or over 24 h. The acoustic metrics in this report reflect the updated ISO standard for acoustic terminology, ISO/DIS 18405:2017 (2017).

Whether acoustic exposure levels might injure or disturb marine mammals is an active research topic. Since 2007, several expert groups have developed SEL-based assessment approaches for evaluating auditory injury, with key works including Southall et al. (2007), Finneran and Jenkins (2012), Popper et al. (2014), United States National Marine Fisheries Service (NMFS 2018) and Southall et al. (2019). The number of studies that have investigated the level of behavioural disturbance to marine fauna by anthropogenic sound has also increased substantially.

The following noise criteria and sound levels for this study were chosen because they include standard thresholds, thresholds suggested by the best available science, and sound levels presented in literature for species with no suggested thresholds (Sections 3.1–3.5 and Appendix A):

1. Peak pressure levels (PK; L_{pk}) and frequency-weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from (Southall et al. 2019) for the onset of Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) in marine mammals.
2. Marine mammal behavioural threshold based on the current US National Oceanic and Atmospheric Administration (NOAA 2019) criterion for marine mammals of 160 dB re 1 µPa (SPL; L_p) for impulsive sound sources.
3. Sound exposure guidelines for fish, fish eggs and larvae (including plankton) (Popper et al. 2014).
4. Peak pressure levels (PK; L_{pk}) and frequency-weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from Finneran et al. (2017) for the onset of permanent threshold shift (PTS) and temporary threshold shift (TTS) in turtles.
5. Sea turtle behavioural response threshold of 166 dB re 1 µPa (SPL; L_p), (McCauley et al. 2000) as cited in the Recovery Plan for Marine Turtles in Australia (Department of the Environment and Energy et al. 2017), along with a sound level associated with behavioural disturbance 175 dB re 1 µPa (SPL; L_p) (McCauley et al. 2000)
6. Diving birds (penguins):
    - Thresholds for otariid pinnipeds are used as a proxy (Section 3.4): Peak pressure levels (PK; L_{pk}) and frequency–weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from Southall et al. (2019) for the onset of PTS and TTS in otariids.
    - Behavioural response to impulsive sound of 120 dB re 1 µPa (SPL; L_p) for diving birds based on information from Sørensen et al. (2020).
7. Peak-peak pressure levels (PK-PK; $L_{pk\text{-}pk}$) and particle acceleration (ms^{-2}) at the seafloor to help assess effects of noise on crustaceans through comparing to results in Day et al. (2016a), Day et al. (2019), Day et al. (2016b), Day et al. (2017) and Payne et al. (2008).
8. A sound level of 226 dB re 1 µPa (PK; L_{pk}) reported for comparing to Heyward et al. (2018) for sponges and corals.
9. An SPL human health assessment threshold of 145 dB re 1 µPa (SPL; L_p) for sound exposure to people swimming and diving derived from Parvin (2005), and considering Ainslie (2008).

Additionally, to assess the size of the low-power zone required under the Australian Environment Protection and Biodiversity Conservation (EPBC) Act Policy Statement 2.1, Department of the

Environment, Water, Heritage and the Arts (DEWHA 2008), the distance to an unweighted per-pulse SEL of 160 dB re 1 µPa^2·s (L_E) is reported.

The following subsections (Sections 3.1–3.5, along with Appendix A.4 and A.5), expand on the thresholds, guidelines and sound levels for marine mammals, fish, fish eggs, fish larvae, sea turtles, and benthic invertebrates.

3.1. Marine Mammals

There are two categories of auditory threshold shifts or hearing loss: permanent threshold shift (PTS), a physical injury to an animal's hearing organs; and Temporary Threshold Shift (TTS), a temporary reduction in an animal's hearing sensitivity as the result of receptor hair cells in the cochlea becoming fatigued.

To help assess the potential for the possible injury and hearing sensitivity changes in marine mammals, this report applies the criteria recommended by Southall et al. (2019), considering both PTS and TTS. These criteria, along with the applied behavioural criteria (NOAA 2019), are summarised in Table 8, with descriptions included in Appendix A.4.1 (auditory impairment) and Appendix A.4.2 (behavioural response), with frequency weighting explained in Appendix A.5. Of particular note, whilst the newly published Southall et al. (2021) provides recommendations and discusses the nuances of assessing behavioural response, the authors do not recommend new numerical thresholds for onset of behavioural responses for marine mammals.

Table 8. Unweighted sound pressure level (SPL), 24-hour sound exposure level (SEL_{24h}), and peak pressure (PK) thresholds for acoustic effects on marine mammals.

Hearing group	NOAA (2019)	Southall et al. (2019)			
	Behaviour	PTS onset thresholds[1] (received level)		TTS onset thresholds[1] (received level)	
	SPL (L_p; dB re 1 µPa)	Weighted SEL (L_E; dB re 1 µPa^2 s)	PK (L_{pk}; dB re 1 µPa)	Weighted SEL (L_E; dB re 1 µPa^2 s)	PK (L_{pk}; dB re 1 µPa)
Low-frequency cetaceans (baleen whales)	160	183	219	168	213
High-frequency cetaceans (dolphins, plus toothed, beaked, and bottlenose whales)		185	230	170	224
Very-high-frequency cetaceans (*Kogia*, cephalorhynchid, and *L. australis*)		155	202	140	196
Pinnipeds[2] (Australian sea lion, Australian fur seal, New Zealand fur seal)		203	232	188	226

[1] Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS and TTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

[2] Listed as pinnipeds but equivalent to other marine carnivores in water in the Southall et al. (2019) criteria. Also equivalent to Otariid pindipeds listed in NMFS (2018).

L_p denotes sound pressure level period and has a reference value of 1 µPa.

$L_{pk,\,flat}$ peak sound pressure is flat weighted or unweighted and has a reference value of 1 µPa.

L_E denotes cumulative sound exposure over a 24-hour period and has a reference value of 1 µPa^{2}s.

3.2. Fish, Fish Eggs, and Fish Larvae

In 2006, the Working Group on the Effects of Sound on Fish and Turtles was formed to continue developing noise exposure criteria for fish and turtles, work begun by a panel convened by NOAA two years earlier. The resulting guidelines included specific thresholds for different levels of effects and for different groups of species (Popper et al. 2014). These guidelines defined quantitative thresholds for three types of immediate effects:

- Mortality, including injury leading to death.
- Recoverable injury, including injuries unlikely to result in mortality, such as hair cell damage and minor haematoma.
- TTS.

Masking and behavioural effects can be assessed qualitatively, by assessing relative risk rather than by specific sound level thresholds. However, as these depend upon activity-based subjective ranges, these effects are not addressed in this report and are included in Table 9 for completeness only. Because the presence or absence of a swim bladder has a role in hearing, fish's susceptibility to injury from noise exposure varies depending on the species and the presence and possible role of a swim bladder in hearing. Thus, different thresholds were proposed for fish without a swim bladder (also appropriate for sharks and applied to whale sharks in the absence of other information), fish with a swim bladder not used for hearing, and fish that use their swim bladders for hearing. Turtles, fish eggs, and fish larvae are considered separately. Table 9 lists relevant effects thresholds from Popper et al. (2014).

The SEL metric integrates noise intensity over some period of exposure. Because the period of integration for regulatory assessments is not well defined for sounds that do not have a clear start or end time, or for very long-lasting exposures, it is required to define a time. Popper et al. (2014) recommend applying a standard period, where this is either defined as a justified fixed period or the duration of the activity; however, Popper et al. (2014) also included caveats about how long the fish will be exposed because they can move (or remain in location) and so can the source. Popper et al. (2014) summarises that in all TTS studies considered, fish that showed TTS recovered to normal hearing levels within 18–24 hours. Due to this, a period of accumulation of 24 hours has been applied in this study for SEL, which is similar to that applied for marine mammals in NMFS (2016, 2018).

In the discussion of the criteria, Popper et al. (2014) discuss the complications in determining a relevant period of mobile seismic surveys, as the received levels at the fish change between impulses because the source is moving, and that in reality a revised guideline based on the closest PK or the per-pulse SEL might be more useful than one based on accumulated SEL. This is because exposures at the closest point of approach (CPA) are the primary exposures contributing to a receiver's accumulated level (Gedamke et al. 2011). Additionally, several important factors determine the likelihood and duration a receiver is expected to be in close proximity to a sound source (i.e., overlap in space and time between the source and receiver). For example, accumulation time for fast moving (relative to the receiver) mobile sources is driven primarily by the characteristics of the source (i.e., speed, duty cycle; NMFS 2016, 2018).

As discussed in Popper (2018), many fish species move around, some over large distances. The author suggests that it is reasonable to think that if the sound of a seismic source becomes too loud, the fish will move away from the source because they are able to determine the direction of a sound source. If the fish moves away, the amount of energy to which it is exposed is likely to be one or a few seismic pulses, and these would not likely be loud enough to result in any effect because the fish would move away at a much lower level signal than could cause harm. Data on TTS for fish are very limited, with the only study that examined recovery from seismic impulses being Popper et al. (2005). Popper (2018) states that if this study had been conducted on wild, free-swimming fish instead of caged ones, there would have been no effect whatsoever because they were likely to have moved

away from the source as it approached them, as would happen with normally free-moving demersal and pelagic fish species associated with a 3-D seismic survey in northern Australian waters, extrapolating from the Bethany 3-D assessed in Popper (2018).

Therefore, the time over which energy should be accumulated in each individual fish in the survey area should be limited to the time over which fish receives the maximum exposure, and 24 h is likely too long a period for calculating the accumulation of energy in determining potential harm (e.g., damage or TTS) (Popper 2018). Even if fish do show some TTS, recovery will start as soon as the most intense sounds end, and recovery is likely to even occur, to a limited degree, between seismic pulses. Based on very limited data, recovery within 24 h (or less) is very likely. If TTS does occur, the duration of exposure to the most intense sounds that could result in TTS will be over just a few hours. Thus, energy accumulating over longer periods than a few hours is probably inappropriate (Popper 2018).

Table 9. Criteria for seismic noise exposure for fish, adapted from Popper et al. (2014).

Type of animal	Mortality and Potential mortal injury	Impairment			Behaviour
		Recoverable injury	TTS	Masking	
Fish: No swim bladder (particle motion detection)	>219 dB SEL_{24h} or >213 dB PK	>216 dB SEL_{24h} or >213 dB PK	>>186 dB SEL_{24h}	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low
Fish: Swim bladder not involved in hearing (particle motion detection)	210 dB SEL_{24h} or >207 dB PK	203 dB SEL_{24h} or >207 dB PK	>>186 dB SEL_{24h}	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low
Fish: Swim bladder involved in hearing (primarily pressure detection)	207 dB SEL_{24h} or >207 dB PK	203 dB SEL_{24h} or >207 dB PK	186 dB SEL_{24h}	(N) Low (I) Low (F) Moderate	(N) High (I) High (F) Moderate
Fish eggs and fish larvae (relevant to plankton)	>210 dB SEL_{24h} or >207 dB PK	(N) Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low

Peak sound level (PK) dB re 1 µPa; SEL_{24h} dB re 1µPa^2·s. All criteria are presented as sound pressure, even for fish Without swim bladders, since no data for particle motion exist. Relative risk (high, moderate, or low) is given for animals at three distances from the source defined in relative terms as near (N), intermediate (I), and far (F).

3.3. Sea Turtles

There is a paucity of data regarding responses of turtles to acoustic exposure, and no studies of hearing loss due to exposure to loud sounds. Popper et al. (2014) suggested thresholds for onset of mortal injury (including PTS) and mortality for sea turtles and, in absence of taxon-specific information, adopted the levels for fish that do not hear well (suggesting that this likely would be conservative for sea turtles).

Finneran et al. (2017) presented revised thresholds for sea turtle injury and hearing impairment (TTS and PTS). Their rationale is that sea turtles have best sensitivity at low frequencies and are known to have poor auditory sensitivity (Bartol and Ketten 2006, Dow Piniak et al. 2012). Accordingly, TTS and PTS thresholds for turtles are likely more similar to those of fishes than to marine mammals (Popper et al. 2014).

McCauley et al. (2000) observed the behavioural response of caged sea turtles—green (*Chelonia mydas*) and loggerhead (*Caretta caretta*)—to an approaching seismic airgun. For received levels above 166 dB re 1 µPa (SPL), the sea turtles increased their swimming activity, and above 175 dB re 1 µPa they began to behave erratically, which was interpreted as an agitated state. The

Recovery Plan for Marine Turtles in Australia (Department of the Environment and Energy et al. 2017) acknowledges the 166 dB re 1 µPa SPL reported (McCauley et al. 2000) as the level that may result in a behavioural response to marine turtles. The 175 dB re 1 µPa level from McCauley et al. (2000) is recommended as a criterion for behavioural disturbance. These thresholds are shown in Table 10.

Table 10. Acoustic effects of impulsive noise on sea turtles: Unweighted sound pressure level (SPL), 24 hour sound exposure level (SEL_{24h}), and peak pressure (PK) thresholds

Effect type	Criterion	SPL (L_p; dB re 1 µPa)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1 µPa²·s)	PK (L_{pk}; dB re 1 µPa)
Behavioural response	McCauley et al. (2000)	166	NA	
Behavioural disturbance		175		
PTS onset thresholds[1] (received level)	Finneran et al. (2017)	NA	204	232
TTS onset thresholds[1] (received level)			189	226

[1] Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS and TTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

L_p denotes sound pressure level period and has a reference value of 1 µPa.

$L_{pk,flat}$ denotes peak sound pressure is flat weighted or unweighted and has a reference value of 1 µPa.

L_E denotes cumulative sound exposure over a 24 h period and has a reference value of 1 µPa²s.

3.4. Diving Birds

There are no regulatory thresholds with regard to onset of hearing impairment for penguins, any other bird species, or phylogenetically or anatomically related species. The only scientifically robust thresholds in this context exist for marine mammals. To allow for assessing the noise–induced impact risk of impulsive airgun signals on penguins, the least sensitive marine mammal hearing group, other carnivores in water (OCW), from Southall et al. (2019), is recommended as a proxy. This hearing group has been selected due to similar hearing sensitivity in the frequency band of underwater hearing for diving birds and otariid pinnipeds, which are included in the group. This provides a conservative approach, as otariids are considered more sensitive to underwater sound at higher frequencies than penguins.

There are also no regulatory thresholds or criteria established to assess potential behavioural responses by penguins or flying seabirds to underwater noise. To allow for assessing the potential for such impacts, an onset criterion for behavioural responses of penguins and flying seabirds of 120 dB re 1 µPa (SPL) for impulsive sources was chosen based on information from Sørensen et al. (2020). They exposed gentoo penguins (*Pygoscelis papua*) in a controlled exposure experiment to underwater noise bursts (impulsive signals) and demonstrated that the animals show a graded reaction depending on received sound levels. For consistency with the approach to assess PTS and TTS, the behavioural response threshold is applied as OCW weighted.

3.5. Invertebrates

3.5.1. Benthic Invertebrates (Crustaceans and Bivalves)

Research is ongoing into the relationship between sound and its effects on crustaceans, including the relevant metrics for both effect and impact. Available literature suggests particle motion, rather than sound pressure, is a more important factor for crustacean and bivalve hearing. Water depth and

seismic source size are related to the particle motion levels at the seafloor, with larger arrays and shallower water being related to higher particle motion levels, more likely relevant to effects on crustaceans and bivalves.

At the seafloor interface, crustaceans and bivalves are subject to particle motion stimuli from several acoustic or acoustically induced waves. These include the particle motion associated with an impinging sound pressure wave in the water column (the incident, reflected, and transmitted portions), substrate acoustic waves, and interface waves of the Scholte type. However, it is unclear which aspect(s) of these waves is/are most relevant to the animals, either when they normally sense the environment or their physiological responses to loud sounds so there is not enough information to establish similar criteria and thresholds as done for marine mammals and fish. Including recent research, such as Day et al. (2016b), current literature does not clearly define an appropriate metric or identify relevant levels (pressure or particle motion) for an assessment. This includes the consideration of what particle motion levels lead to a behavioural response, or mortality. Therefore, at this stage, we cannot propose authoritative thresholds to inform the impact assessment. However, levels can be determined for pressure metrics presented in literature to assist the assessment.

The pressure and acceleration examples provided in Day et al. (2016a) (Figures 11 and 12) indicate that the acceleration and pressure signals occurred simultaneously, which was interpreted as an indication that the waterborne sounds were responsible for the accelerations measured by the geophones. For clarity, it is important to distinguish that the acceleration from waterborne sound energy is *not* ground roll, which Day et al. (2016a) correctly define as the sound that propagates along the interface at a speed lower than the shear wave speed of the sediment. However, the report subsequently uses ground roll for all further discussions of particle acceleration. While Day et al. (2016a) discuss that they chose the simplest measure of ground roll, it should have been referring to as ‘the acceleration from waterborne sound energy’, or ‘waterborne acceleration’ for short.

For crustaceans, a PK-PK sound level of 202 dB re 1 µPa (Payne et al. 2008) is considered to be associated with no effect, and therefore applied in the assessment. Additionally for context related to different levels of potential impairment, the PK-PK sound levels determined for crustaceans in Day et al. (2016b), 209–212 dB re 1 µPa and 213 dB re 1 µPa from Day et al. (2019), are also included.

For bivalves, PK-PK sound levels of 212, and 213 are presented to allow comparison to the maximum sound levels measured in Day et al. (2016a) and Day et al. (2017) for scallops and pearl shell oyster.

Literature does not present a sound level associated with no impact, and as particle motion is the more relevant metric, particle acceleration from the seismic source has been presented for comparing the results in Table 7 of Day et al. (2016a). The maximum particle acceleration assessed for scallops was 37.57 ms^{-2}.

3.5.2. Plankton

To assess effects on plankton, there are only a few studies to base threshold criteria on. Popper et al. (2014) cites many of the references and studies on potential impacts of noise emissions on fish eggs and larvae prior to 2014. Results presented in Day et al. (2016b) for embryonic lobsters and Fields et al. (2019) for copepods align with those presented in Popper et al. (2014), which is that mortality and sub-lethal injury are limited to within tens of metres of seismic sources. Additionally, the Popper et al. (2014) criteria (Table 9), are extrapolated from simulated pile driving signals which have a more rapid rise time and greater potential for trauma than pulses from a seismic source.

Other research, such as McCauley et al. (2017), has indicated the potential for effects at longer range and at levels of 178 dB PK-PK, however, Fields et al. (2019) noted that it was difficult to reconcile the high mortality reported by McCauley et al. (2017) with the low mortalities reported in the greater previous body of earlier research and their experiment. They recommended further research into whether it is the sound pulse itself (i.e., the energy, peak pressures, or particle acceleration), the

(turbulent) fluid flow occurring more slowly (i.e., not related to the sound pulse), or other effects such as the bubble cloud that which might cause higher mortality near the seismic source.

4. Methods

4.1. Parameter Overview

The specifications of the seismic sources and the environmental parameters used in the propagation models are described in additional detail in Appendix D. A single sound speed profile for December was considered in this modelling study (Appendix D.3.2). This was identified as the seasonal period that would provide the farthest propagation by comparing model predictions for a subset of months identified when the survey could be in operation.

The modelled sites in spanned water depths of 40–174 m. In shallower waters, less than 150 m, seabed geologic profile was characterised as a layered limestone, variable cemented with a thin lay of overlying sand for water depth less than 50 m. For sites in deeper water, greater than 150 m, the seabed geologic profile was characterised as a thick package of unconsolidated sediments. Three geological profiles were defined to represent the different geo-acoustic properties across the area encompassed by the considered line plans, and are representative of the different zones within the entire Survey Area (Appendix D.3.3).

4.2. Acoustic Source Model

The pressure signature of the individual airguns and the composite decidecade-band point-source equivalent directional levels (i.e., source levels) of the 2820 in^3 seismic source were modelled with JASCO's Airgun Array Source Model (AASM). Although AASM accounts for notional pressure signatures of each seismic source with respect to the effects of surface-reflected signals on bubble oscillations and inter-bubble interactions, the surface-reflected signal (known as surface ghost) is not included in the far-field source signatures. The acoustic propagation models account for those surface reflections, which are a property of the propagating medium rather than the source.

AASM considers:

- Array layout.
- Volume, tow depth, and firing pressure of each airgun.
- Interactions between different airguns in the array.

All seismic sources considered were modelled over AASMs full frequency range, up to 25 kHz. Appendix B.1 details this model.

4.3. Sound Propagation Models

Three sound propagation models were used to predict the acoustic field around the seismic source:

- Combined range-dependent parabolic equation and Gaussian beam acoustic ray-trace model (MONM-BELLHOP, 10 Hz to 25 kHz).
- Full Waveform Range-dependent Acoustic Model (FWRAM, 10 to 1024 Hz).
- Wavenumber integration model (VSTACK, 10 to 1024 Hz).

The models were used in combination to characterise the acoustic fields at short and long ranges in terms of SEL, SPL, PK, and PK-PK. Appendix C details each model. MONM-BELLHOP was used to calculate SEL of a 360° area around each source location. FWRAM was used to model synthetic seismic pulses and to generate a generalised range-dependent SEL to SPL conversion function for

the considered modelled sites. The range-dependent conversion function was applied to predicted per-pulse SEL results from MONM-BELLHOP to estimate SPL values. FWRAM was also used to calculate water column PK and PK-PK levels.

VSTACK was used to calculate near field PK and PK-PK levels along 4 transects at the seafloor along the endfire and broadside directions considering a set of 11 unique water depths at 40, 50, 60, 70, 80, 90, 100, 120, 140, 160 and 170 m. This model was also used to model the peak particle acceleration magnitude considering the same 11 unique water depths. For modelled sites where the seabed is likely to be composed of outcropping limestone (Appendix D.3.3), an additional correction factor was applied to predictions to better estimate loss characteristics of the seabed (see Appendix C.3.2).

4.4. Geometry and Modelled Regions

To predict sound levels with MONM-BELLHOP was used to calculate propagation losses up to distances of 100 km from the source, with a horizontal separation of 20 m between receiver points along all modelled radials. The sound fields were modelled with a horizontal angular resolution of $\Delta\theta$ = 2.5° for a total of N = 144 radial planes. Receiver depths were chosen to span the entire water column over the modelled area, from 2 m to a maximum of 2700 m, with step sizes that increased with depth. To supplement the MONM results, high-frequency results for propagation loss were modelled using BELLHOP for frequencies from 1.25 to 25 kHz. The MONM and Bellhop results were combined to produce results for the full frequency range of interest.

FWRAM was run to 100 km along four radials (fore and aft endfire, and port and starboard broadside) for computational efficiency. This was done to compute SEL-to-SPL conversions (Appendix D.2) and also to quantify water column PK and PK-PK. The horizontal range step begins at 20 m and increases with range from the source.

The maximum modelled range for VSTACK was 1000 m, and a variable receiver range increment that increased away from the source was used, which increased from 10 to 25 m. The final tabulated distances were obtained through interpolating predicted received levels. Received levels were computed for receivers at 5 and 50 cm above the seafloor to assist in the assessment on invertebrates and fish respectively.

4.5. Accumulated SEL

New sound energy is introduced into an environment with each pulse from the seismic source. While some impact criteria are based on the per-pulse energy released, others, such as the marine mammal and fish SEL criteria (Section 3), account for the total acoustic energy marine fauna is subjected to over a specified duration, defined in this report as 24 h. An accurate assessment of the accumulated sound energy depends not only on the parameters of each seismic impulse but also on the number of impulses delivered in a duration and the relative positions of the impulses.

When there are many seismic impulses, it becomes computationally prohibitive to perform sound propagation modelling for every single event. The distance between the consecutive seismic impulses is small enough, such that the environmental parameters that influence sound propagation are virtually the same for many impulse points. The acoustic fields can, therefore, be modelled for a subset of seismic pulses and estimated at several adjacent ones. After sound fields from representative impulse locations are calculated, they are adjusted to account for the source position for nearby impulses.

Although estimating the cumulative sound field with the described approach is not as precise as modelling sound propagation at every impulse location, small-scale, site-specific sound propagation features tend to blur and become less relevant when sound fields from adjacent impulses are

summed. Larger scale sound propagation features, primarily dependent on water depth, dominate the cumulative field. The accuracy of the present method acceptably reflects those large-scale features, thus providing a meaningful estimate of a wide area SEL field in a computationally feasible framework.

To produce the map of accumulated received sound level distributions and calculate distances to specified sound level thresholds, the maximum-over-depth were calculated at each sampling point within the modelled region. The radial grids of maximum-over-depth and seafloor sound levels for each impulse were then resampled (by linear triangulation) to produce a regular Cartesian grid. The sound field grids from all impulses were summed (see Equation A-5) to produce the cumulative sound field grid with cell sizes of 20 m. The contours and threshold ranges were calculated from these flat Cartesian projections of the modelled acoustic fields.

The unweighted (fish) and frequency-weighted SEL_{24h} results were rendered as contour maps, including contours that focus on the relevant criteria-based thresholds. Only contours at ranges larger than the nearfield of the seismic source were rendered.

4.6. Animal Movement and Exposure Modelling

4.6.1. Methodology

The JASCO Animal Simulation Model Including Noise Exposure (JASMINE) was used to predict the exposure of animats to sound arising from the seismic activity. JASMINE integrates the predicted sound field with biologically meaningful movement rules for each marine mammal species (pygmy blue whales and southern right whales for the current analysis) that results in an exposure history for each animat in the model. An overview of the exposure modelling process using JASMINE is shown in Figure 4.

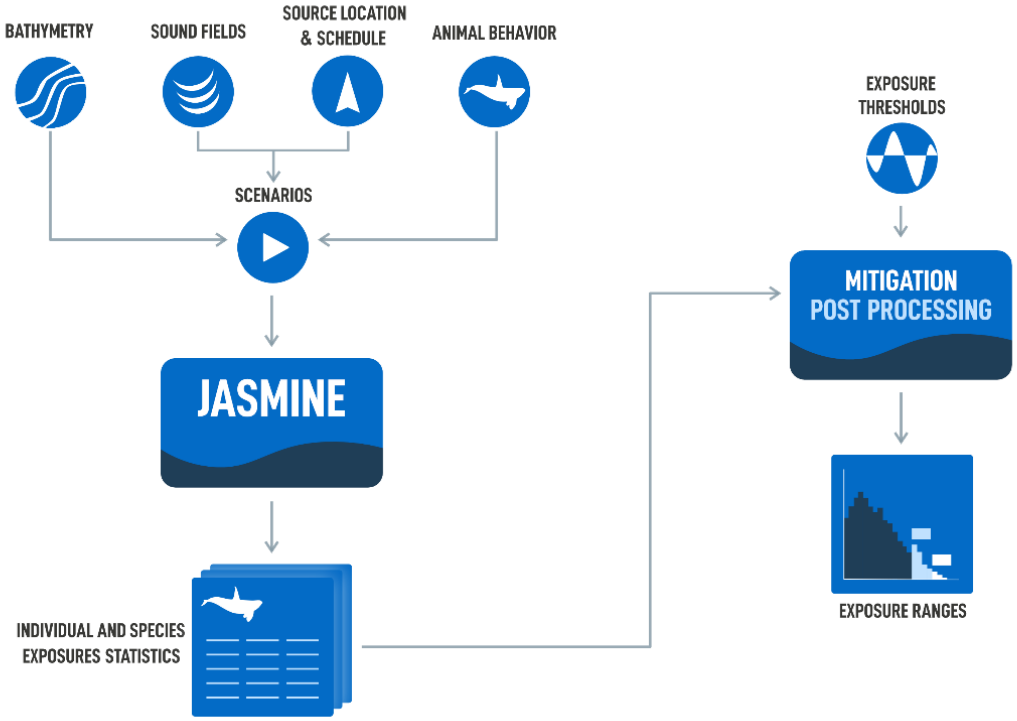

Figure 4. Exposure modelling process overview.

In JASMINE, the sound received by the animats is determined by the proposed seismic operations. As illustrated in Figure 5, animats are programmed to behave like the marine animals that may be present in an area. The parameters used for forecasting realistic behaviours (e.g., diving and foraging depth, swim speed, surface times) are determined and interpreted from marine mammal studies (e.g., tagging studies) where available, or reasonably extrapolated from related or comparable species. For cumulative metrics, an individual animats sound exposure levels are summed over a 24 h duration to determine its total received energy, and then compared to the relevant threshold criteria. For single-exposure metrics, the maximum exposure is evaluated against threshold criteria for each 24 h period. For additional information on JASMINE, see Appendix D.4.

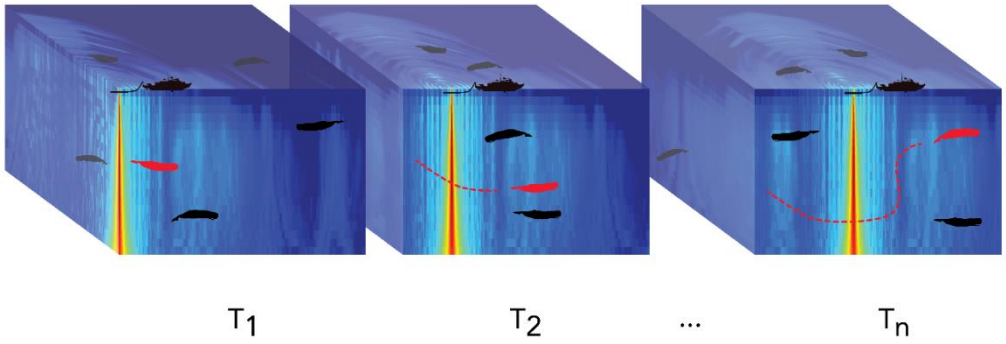

Figure 5. Depiction of animats in a moving sound field. Example animat (red) shown moving with each time step (T_n). The acoustic exposure of each animat is determined by where it is in the sound field, and its exposure history is accumulated as the simulation steps through time.

The exposure criteria for impulsive sounds (described in Section 3) were used to determine the number of animats that exceeded thresholds. To generate statistically reliable probability density functions, model simulations were run with animat sampling densities of 4 animats/km^2. The modelling results are not related to real-world density estimates for pygmy blue whales and southern right whales within BIAs or known core range area, as the number of animals potentially exposed is not calculated. To evaluate PTS, TTS and behavioural response, exposure results were obtained using detailed behavioural information for pygmy blue whales and southern right whales (described in Sections 4.6.3.1 and 4.6.3.2). Figure 2 illustrates the differences between the corresponding seeding areas.

The seismic source was modelled as a vessel towing an airgun array at a speed of 4.5 knots, with an impulse interval of 12.5 m. The simulated source tracks followed a racetrack configuration with acquisition not occurring on turns. At the time and location of each seismic pulse, the modelled source location with the closest distance was selected for exposure modelling. The track lines along with the acoustic modelling locations are shown in Figure 1.

Figure 6 shows an example animat track (generated for information purposes only and not related to the results presented in this report) with associated received levels from a stationary point source. The top panel displays the animat track relative to the point source, and the bottom panel displays the accumulation of SEL_{24h} for TTS and PTS criteria. At approximately 50 seconds, the animat is exposed so that the TTS threshold is exceeded, and at approximately 700 seconds the animat is exposed so that the PTS threshold is exceeded.

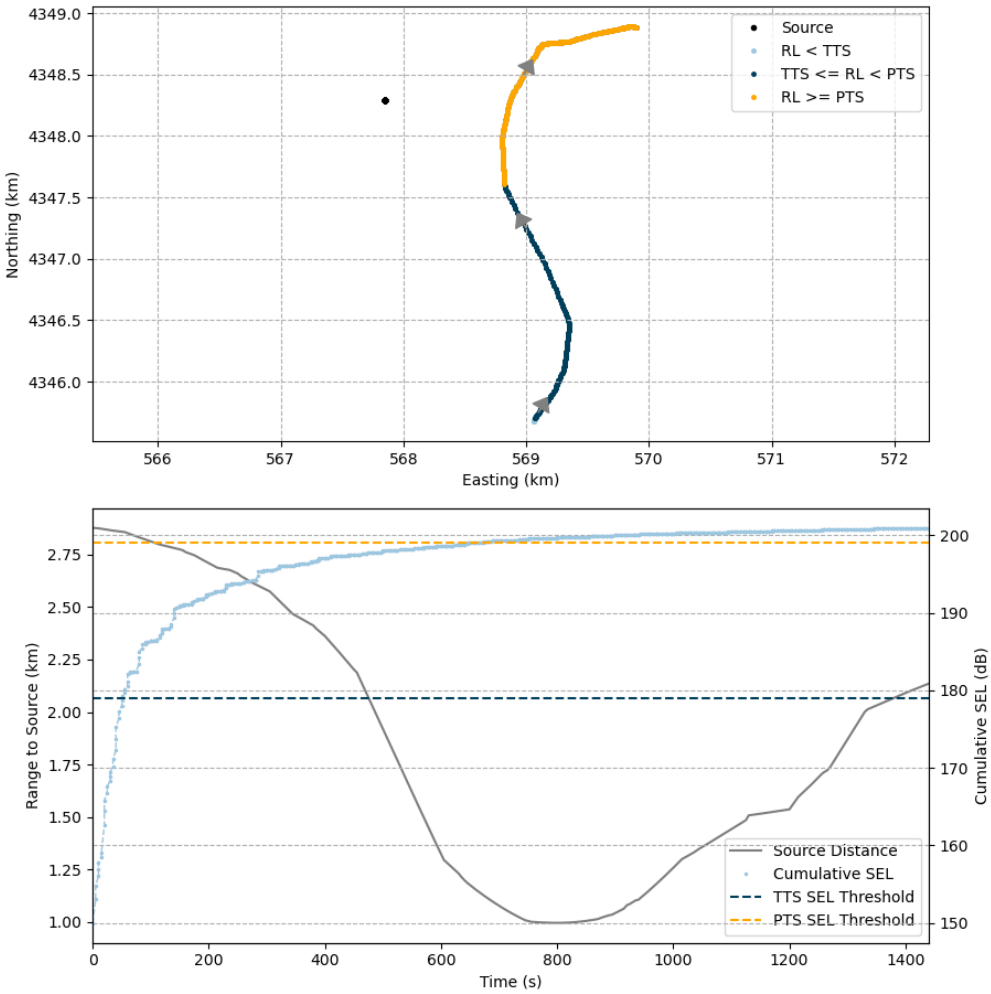

Figure 6. Animat track from an example simulation showing northward movement over a 1400 s duration. The upper panel shows a plan view of both a stationary point source and a foraging animat. Animat steps are coloured to indicate whether the accumulated sound energy at that point has exceeded either TTS or PTS threshold criteria. The lower panel shows horizontal distance in kilometres to the source (grey line; left y-axis) and cumulative 24-h SEL ($L_{E,24h}$, dB re 1 µPa²·s; right y-axis) as a function of time. Note that this example does not use data from the current study.

4.6.2. Exposure–based Radial Distance Estimation

The results from the animal movement and exposure modelling provided a way to estimate radial distances to effect thresholds. The distance to the closest point of approach (CPA) for each of the animats was recorded. The $ER_{95\%}$ (95% Exposure Range) is the horizontal distance that includes 95% of the animat CPAs that exceeded a given effect threshold (see Section 3). Within the $ER_{95\%}$, there is generally some proportion of animats that do not exceed threshold criteria. This occurs for several reasons, including the spatial and temporal characteristics of the sound field and the way in which animats sample the sound field over time, both vertically and horizontally. The sound field varies as a function of range, depth, and azimuth based on a variety of factors such as bathymetry, sound speed profile, and geoacoustic parameters. The way the animats sample the sound field depends upon species-typical swimming and diving characteristics (e.g., swim speed, dive depth, surface intervals, and reversals). Furthermore, even within a particular species definition, these characteristics vary with behavioral state (e.g., feeding, migrating). As this results in some animats not exceeding threshold criteria even within the $ER_{95\%}$, the probability that an animat within that distance was exposed above threshold within the $ER_{95\%}$ was also computed (P_{exp}) to provide additional context.

Acoustic ranges are reported for both $R_{95\%}$ and R_{max}, however, exposure ranges are reported for $ER_{95\%}$ only since, statistically, ER_{max} is not defined. JASMINE is a Monte Carlo simulation, and the results are probabilistic in nature. This is in contrast with acoustic modelling, where there is a specific maximum isopleth range for a given source/environment setup.

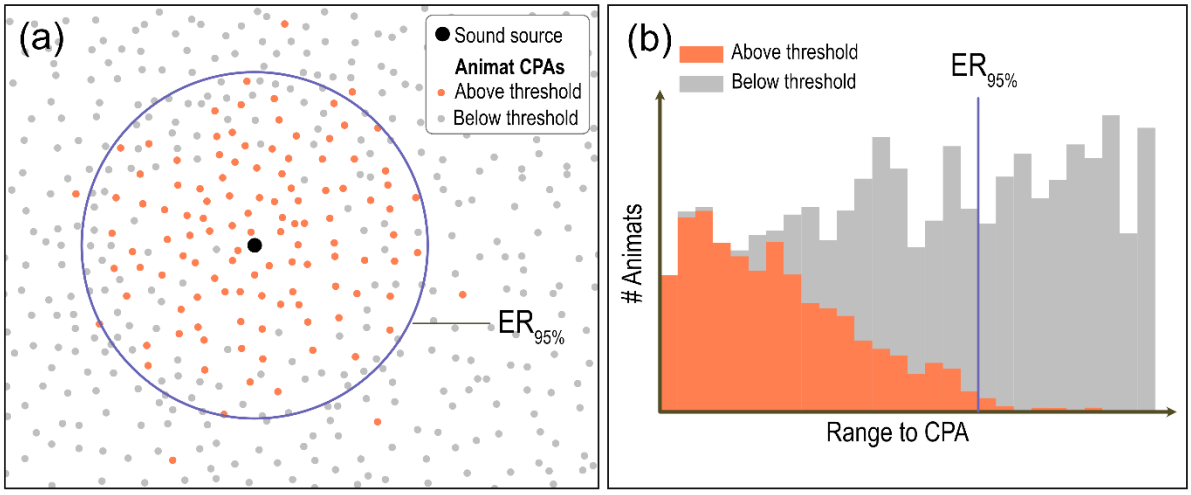

Figure 7. Example distribution of animat closest points of approach (CPAs). Panel (a) shows the horizontal distribution of animats near a sound source. Panel (b) shows the distribution of distances to animat CPAs. The 95% exposure range ($ER_{95\%}$) is indicated in both panels.

4.6.3. Species Specific Behaviour Profile Parameterisation

4.6.3.1. Pygmy Blue Whale Behaviour Profile

The project area overlaps with a known foraging BIA for pygmy blue whales (DoE (AU) 2015-2025). Therefore, only foraging behaviours were considered in the species profile.

Data on fine-scale foraging behaviour are not currently available for pygmy blue whales. Therefore, data from multi-sensor tags deployed on blue whales from the North Pacific were used to inform the feeding behaviours. Irvine et al. (2019) used intermediate-duration archival tags (SPLASH MK10) attached to eight blue whales off the coast of California and was able to determine two feeding modes based on depth: shallow and deep. These two feeding behaviours differed further between males and females, with females generally diving deeper than males during both shallow and deep feeding. In order to account for these differences, female and male pygmy blue whales were modelled separately, with values derived from Irvine et al. (2019). The remaining parameters for feeding behaviour were primarily sourced from Goldbogen et al. (2011), who deployed 25 multi-sensor suction cup tags (DTAGs) on blue whales off the coast of California. The exceptions were the values for travel speed, which was derived from satellite tags deployed on pygmy blue whales off southern Australia (Möller et al. 2020), and surface interval, which was derived from a satellite tag deployed on a pygmy blue whale off western Australia (Davenport et al. 2022).

4.6.3.2. Southern Right Whale Behaviour Profile

The project area is located in the known core range for southern right whales, and overlaps with a coastal aggregation BIA for this species. In aggregation areas, southern right whales concentrate from days to weeks before continuing to migrate along the coast (DCCEEW 2022). Animals of all demographics use these areas, including mothers with new calves. As such, two behavioural profiles were considered for southern right whales: migrating and aggregating.

The end of the year corresponds closest to the end of their calving/breeding season and the start of their migration (McCauley 2021). At this time, most pregnant females will likely have given birth, and sightings of mother/calf pairs have been documented in this area (Stamation et al. 2020). The behaviour of southern right whale mother/calf pairs can be dramatically different from other demographics, particularly in regards to the amount of time spent resting at the surface (Cusano et al. 2019, Nielsen et al. 2019). Therefore, separate behavioural profiles were modelled for mother/calf pairs and for all other demographics, resulting in four behavioural profiles for southern right whales: mother/calf migrating, mother/calf aggregating, non-mother/calf migrating, and non-mother/calf aggregating.

The behaviour of migrating southern right whales was modelled to reflect animats transiting through the known core range area on a 293º track to correspond with the tow direction. This reflects the animals migrating along the southern coast of Australia in a westerly or counter-clockwise direction (Burnell et al. 2001). Fine-scale behavioural data on southern right whales are limited, however migrating travel speed was derived from satellite-tagged southern right whales (Mackay et al. 2020). The remaining parameters used for the migrating species profiles were primarily sourced from multi-sensor tags (DTAGs and/or TDRs) deployed on North Atlantic right whales (Baumgartner and Mate 2003) (Dombroski et al. 2021).

Reproductive BIAs for southern right whales act as aggregation areas for mothers with new calves and for other demographics between additional known habitats. For the aggregating behavioural profiles, behaviours reflect those observed in North Atlantic right whales on calving grounds due to limited data on southern right whales: resting, travelling, and surface active. Additionally, the mother/calf profile includes nursing behaviour. The parameters used for the aggregating species profiles were again primarily sourced from North Atlantic right whales with the exception of behavioural probabilities, which were available from studies of southern right whales in South America (Thomas et al. 1984 and Lundquist et al. 2008).

5. Results

5.1. Acoustic Source Levels and Directivity

AASM (Section 4.2) was used to predict the horizontal and vertical overpressure signatures and corresponding power spectrum levels for the seismic sources, with results provided in Appendix B.3 along with the horizontal directivity plots for the selected source.

Table 11 shows the PK and per-pulse SEL source levels in the horizontal-plane broadside (perpendicular to the tow direction), endfire (along the tow direction), and vertical directions for the modelled array signature (2820 in^3 source). The vertical source level that accounts for the "surface ghost" (the out of phase reflected pulse from the water surface) is also presented to make it easier to compare the output of other seismic source models.

Figure B-2 in Appendix B.3 shows the broadside, endfire, and vertical overpressure signature and corresponding power spectrum levels for the source. The signature consists of a strong primary peak, related to the initial release of high-pressure air, followed by a series of pulses associated with bubble oscillations. Most energy was produced at frequencies below 500 Hz. Frequency-dependent peaks and nulls in the spectrum result from interference among airguns in the source and correspond with the volumes and relative locations of the airguns to each other.

Table 11. Far-field source level specifications for 2820 in^3 source, for 7 m tow depth. Source levels are for a point-like acoustic source with equivalent far-field acoustic output in the specified direction. Sound level metrics are per-pulse and unweighted.

Direction	Peak source pressure level ($L_{S,pk}$; dB re 1 µPa m)	Per-pulse source SEL ($L_{S,E}$; dB 1 µPa²m²s)	
		10–2000 Hz	2000–25000 Hz
Broadside	248.6	224.2	185.8
Endfire	244.7	222.7	186.3
Vertical	254.8	227.8	194.0
Vertical (surface affected source level)	254.8	230.5	196.9

5.2. Per-pulse Sound Fields

This section presents the per-pulse sound fields in terms of maximum-over-depth SPL, SEL, PK, and seafloor PK and PK-PK. The different metrics are presented for the following reasons:

- SPL sound fields were used to determine the distances to marine mammal and turtle behavioural thresholds (see Sections 3.1 and 3.3).
- Per-pulse SEL sound fields are used as inputs into the 24 h SEL scenario and to provide context for the range to 160 dB re 1 $\mu Pa^2 \cdot s$, relevant for the EPBC Act Policy Statement 2.1 (DEWHA 2008).
- PK metrics within the water column are relevant to thresholds and guidelines for marine mammals, sea turtles, fish, fish eggs and larvae (as well as plankton; Sections 3.1–3.3).
- PK metrics at the seafloor are relevant to guidelines for fish, fish eggs and larvae (Section 3.3) and the sound level for no effect on corals and sponges.

- PK-PK metrics at the seafloor are relevant to sound levels used in the assessment of effect on benthic invertebrates (Section 3.5.1).

The maximum and 95% distances to per-pulse SEL and SPL metrics are presented in Tables12–13. The SPL sound fields, and distances to relevant isopleths can be visualised on the contour maps presented in Figures 8–18. The SPL sound fields are also presented as vertical slices for selected azimuths along the endfire and broadside directions out to 50 km, with the airgun array in the centre (Figures 19–23).

Maximum distances to maximum-over-depth water column PK thresholds were calculated for five modelled single impulse sites, Sites 2, 3, 5, 8, and ,10, this was done at the sites where FWRAM was applied to calculate the SEL-SPL conversion (Appendix C.2 and D.2), and presented in Table 15. Seafloor sound levels were assessed considering eleven different representative water depths (40, 50, 60, 70, 80, 90, 100, 120, 140, 160 and 170 m). Tables 16 and 17 present the PK and PK-PK result Particle motion was also calculated considering these water depths, results are presented in Table 18.

5.2.1. Tabulated Results

5.2.1.1. Entire Water Column

Table 12. *Sites 1-11, 2820 in³ source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) from the seismic source to modelled maximum-over-depth and maximum-over-tow direction unweighted per-pulse sound exposure level (SEL) isopleths from the modelled single impulse sites, with water depth indicated. The results presented are the maximum ranges from the set of modelled tow directions for each site, as described in Table 6.

Per-pulse SEL (L_E; dB re 1 µPa²·s)	Site 1 (40 m)		Site 2 (50 m)		Site 3 (55 m)		Site 4 (58 m)		Site 5 (45 m)		Site 6 (81 m)		Site 7 (71 m)		Site 8 (62 m)		Site 9 (125 m)		Site 10 (174 m)		Site 11 (167 m)	
	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$
190	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05
180	0.47	0.39	0.36	0.30	0.32	0.26	0.27	0.23	0.37	0.32	0.26	0.22	0.25	0.21	0.27	0.24	0.29	0.25	0.15	0.13	0.15	0.13
170	2.02	1.69	1.89	1.62	1.35	1.07	0.65	0.56	1.56	1.27	0.67	0.56	0.66	0.56	0.68	0.58	0.68	0.61	0.75	0.63	0.80	0.63
162[1]	4.62	3.82	4.74	3.85	2.95	2.35	1.35	1.17	3.46	2.93	1.47	1.13	1.40	1.18	1.43	1.24	1.44	1.29	2.90	2.20	2.84	2.35
160[2]	5.53	4.51	5.56	4.56	3.48	2.85	1.63	1.38	4.17	3.52	1.56	1.42	1.56	1.39	1.75	1.39	1.83	1.59	3.89	3.02	3.73	3.12
150	12.3	9.12	12.3	9.57	9.05	6.91	3.48	2.93	9.42	7.56	4.01	3.15	3.59	3.01	3.66	2.96	4.15	3.62	8.81	6.91	9.98	7.48
140	27.7	22.4	28.9	20.8	23.1	17.2	6.82	5.61	22.9	15.9	8.22	6.36	7.20	5.75	6.73	5.54	8.95	7.41	29.4	21.9	37.3	20.3
130	48.2	39.9	43.8	35.7	39.9	32.9	11.8	9.29	41.1	33.7	15.9	12.1	11.8	9.4	12.4	9.48	16.1	13.0	>100.0	/	>100.0	/

[1] Startle response level for squid (Fewtrell and McCauley 2012).
[2] Low power zone assessment criteria DEWHA (2008).
A slash indicates that $R_{95\%}$ radius to threshold is not reported when the R_{max} is greater than the maximum modelling extent.

Table 13. *Sites 1-11, 2820 in³ source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) from the seismic source to modelled maximum-over-depth per-pulse sound pressure level (SPL) isopleths from the modelled single impulse sites, with water depth indicated. The results presented are the maximum ranges from the set of modelled tow directions for each site, as described in Table 6.

SPL (L_p; dB re 1 µPa)	Site 1 (40 m)		Site 2 (50 m)		Site 3 (55 m)		Site 4 (58 m)		Site 5 (45 m)		Site 6 (81 m)		Site 7 (71 m)		Site 8 (62 m)		Site 9 (125 m)		Site 10 (174 m)		Site 11 (167 m)	
	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$
200	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.03	0.03	0.05	0.05	0.05	0.05	0.03	0.03	0.03	0.03
190	0.37	0.29	0.30	0.25	0.26	0.22	0.24	0.20	0.32	0.29	0.23	0.20	0.22	0.18	0.23	0.19	0.27	0.23	0.13	0.11	0.13	0.12
180	1.59	1.32	1.48	1.25	1.07	0.90	0.61	0.50	1.30	1.12	0.60	0.51	0.58	0.48	0.58	0.49	0.64	0.56	0.72	0.59	0.69	0.58
175[1]	2.55	2.11	2.41	2.06	1.82	1.44	0.93	0.78	1.97	1.69	0.89	0.80	0.88	0.77	0.91	0.78	1.01	0.89	1.51	1.24	1.43	1.23
170	3.94	3.30	4.05	3.33	2.91	2.31	1.35	1.18	3.11	2.58	1.45	1.14	1.39	1.19	1.42	1.24	1.42	1.28	2.97	2.39	2.96	2.47
166[2]	5.82	4.70	5.97	4.76	4.27	3.43	1.88	1.54	4.44	3.62	1.87	1.55	1.83	1.53	1.91	1.58	2.09	1.86	4.91	3.80	4.60	3.90
160[3]	10.2	7.94	10.3	8.18	8.10	6.17	2.95	2.66	7.76	6.07	3.16	2.67	3.11	2.70	3.04	2.69	3.46	3.01	7.54	5.88	7.59	6.30
150	24.7	19.9	26.2	18.9	20.8	15.6	6.40	5.25	19.6	13.9	7.38	5.65	6.46	5.27	6.34	5.14	8.57	6.72	19.8	14.0	22.4	13.2
145[4]	37.5	29.9	39.3	28.4	31.8	23.9	8.34	6.75	32.5	22.6	10.8	8.05	8.28	6.78	8.38	6.66	12.3	9.35	52.4	37.8	53.0	32.8
140	47.1	39.2	42.9	34.8	38.9	31.9	11.1	8.7	39.8	32.7	14.9	11.4	11.3	8.75	11.7	8.53	14.9	12.2	>100.0	/	>100.0	/

[1] Threshold for turtle behavioural disturbance from impulsive noise.
[2] Threshold for turtle behavioural response to impulsive noise (NSF 2011).
[3] Marine mammal behavioural threshold for impulsive sound sources (NOAA 2019).
[4] Human health assessment threshold derived from (Parvin 2005).
A slash indicates that $R_{95\%}$ radius to threshold is not reported when the R_{max} is greater than the maximum modelling extent.

Table 14. *Sites 1-11, Penguin behavioural threshold, SPL, 2820 in³ source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) from the seismic source to modelled maximum-over-depth per-pulse sound pressure level (SPL) isopleths from the modelled single impulse sites, with water depth indicated. The results presented are the maximum ranges from the set of modelled tow directions for each site, as described in Table 6.

Fauna group	SPL threshold (L_p; re 1 µPa)	Site 1 (40 m)		Site 2 (50 m)		Site 3 (55 m)		Site 4 (58 m)		Site 5 (45 m)		Site 6 (81 m)		Site 7 (71 m)		Site 8 (62 m)		Site 9 (125 m)		Site 10 (174 m)		Site 11 (167 m)	
		R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$
Penguin behavioural response[a]	120	52.1	41.4	46.9	38.6	39.1	33.1	9.43	8.19	38.3	30.9	11.7	9.05	9.52	8.09	9.08	8.06	13.8	11.05	44.6	25.9	37.6	25.6

[a] Penguin behavioural response threshold (Weighted) for impulsive noise (Sørensen et al. (2020)).

Table 15. *2820 in³ source*: Maximum (R_{max}) horizontal distances (in km) from the seismic source to modelled maximum-over-depth peak pressure level (PK) thresholds based on Southall et al. (2019) for marine mammals, and Popper et al. (2014) for fish and Finneran et al. (2017) for sea turtles, for relevant modelled sites with water depth indicated. The results presented are the maximum ranges from the set of modelled tow directions for each site, as described in Table 6.

Hearing group	PK threshold (L_{pk}; dB re 1 µPa)	Distance R_{max} (km)				
		Site 2	Site 3	Site 5	Site 7	Site 10
Low-frequency cetaceans (PTS)	219	0.03	0.03	0.03	0.03	0.03
Low-frequency cetaceans (TTS)	213	0.06	0.09	0.12	0.06	0.06
High-frequency cetaceans (PTS)	230	–	–	–	–	–
High-frequency cetaceans (TTS)	224	–	–	–	–	–
Very-high-frequency cetaceans (PTS)	202	0.37	0.36	0.43	0.33	0.20
Very-high-frequency cetaceans (TTS)	196	0.74	0.63	0.74	0.65	0.37
Otariid Pinnipeds (PTS) Also applied to Penguins	232	–	–	–	–	–
Otariid Pinnipeds (TTS) Also applied to Penguins	226	–	–	–	–	–
Sea turtles (PTS)	232	–	–	–	–	–
Sea turtles (TTS)	226	–	–	–	–	–
Fish: No swim bladder (also applied to sharks)	213	0.06	0.09	0.12	0.06	0.06
Fish: Swim bladder not involved in hearing, Swim bladder involved in hearing Fish eggs, and larvae	207	0.22	0.21	0.23	0.21	0.12

A dash indicates the threshold is not reached within the limits of the modelling resolution (20 m).

5.2.1.2. Seafloor

Ranges presented for seafloor receptors are provided in Tables 16 and 17 for receiver depths of 50 and 5 cm above the seafloor. As an example, the seafloor PK results in Table 16 differ from the maximum-over-depth modelled results presented in Table 15. This is because the model used for the water column results, calculated using FWRAM do not represent the maximum sound levels at the seafloor close to the array. FWRAM is based on a wide-angle parabolic equation (PE) algorithm which is valid to only approximately 70° down angle from the horizontal, and while it provides accurate predictions in the horizontal direction, it cannot predict sound levels directly under the array. VSTACK was used to determine the levels at the seafloor directly under the array and is valid in the very nearfield directly under the source.

Table 16. *2820 in³ source*: Maximum (R_{max}) horizontal distances (in m) from the seismic source to modelled seafloor (receiver located 50 cm above seafloor) peak pressure level thresholds (PK) at eleven representative water depths.

Hearing group/animal type	PK threshold (L_{pk}; dB re 1 µPa)	Water Depth										
		40 m	50 m	60 m	70 m	80 m	90 m	100 m	120 m	140 m	160 m	170 m
		Distance R_{max} (m)										
Sound levels for sponges and corals[1]	226	2	*	*	*	*	*	*	*	*	*	*
Fish: No swim bladder (also applied to sharks)	213	102	110	74	73	73	70	67	56	46	9	*
Fish: Swim bladder not involved in hearing, Swim bladder involved in hearing Fish eggs, and larvae	207	179	190	139	147	152	150	149	148	148	127	122

[1] Heyward et al. (2018)
An asterisk indicates that the sound level was not reached.

Table 17. 2820 *in³ source*: Maximum (R_{max}) horizontal distances (in m) from the seismic source to modelled seafloor (receiver located 5 cm above seafloor) peak-peak pressure levels (PK-PK) at seven representative water depths. Results included in relation to benthic invertebrates.

PK-PK ($L_{pk\text{-}pk}$; dB re 1 µPa)	Water Depth										
	40 m	50 m	60 m	70 m	80 m	90 m	100 m	120 m	140 m	160 m	170 m
	Distance R_{max} (m)										
213[1,2,3]	157	172	132	140	143	146	146	146	140	120	113
212[2,3]	169	179	140	150	157	161	165	163	164	148	141
210[1,2]	250	211	163	168	177	187	195	206	212	212	210
209[1,2]	297	288	173	183	190	199	207	224	234	233	237
202[4]	711	631	295	311	324	340	352	368	386	603	608

[1] Day et al. (2019), lobster
[2] Day et al. (2016a), lobster and scallops
[3] Day et al. (2017), scallops.
[4] Payne et al. (2008), lobster

5.2.1.3. Particle Motion Metrics

The modelling considered receivers positioned at 5 cm off the seafloor. The maximum distance in metres to a peak particle acceleration magnitude of 37.57 ms^{-2} are presented in Table 18. The ranges for the particle acceleration threshold for invertebrates defined by Day et al. (2016a).

Table 18. Maximum (R_{max}) horizontal distances (in m) from the 2820 in^3 to particle motion threshold: Peak acceleration magnitude level (m/s^2) threshold for benthic invertebrates 5 cm above the seafloor, with water depth indicated. Results included in relation to benthic invertebrates (Section 3.5.1).

Hearing group/animal type	Peak Acceleration Magnitude (m/s^2)	Water Depth										
		40 m	50 m	60 m	70 m	80 m	90 m	100 m	120 m	140 m	160 m	170 m
		Distance R_{max} (m)										
Benthic invertebrates	37.57	52	4	*	*	*	*	*	*	*	*	*

An asterisk indicates that the sound level was not reached.

5.2.1.4. Sound Levels at Sensitive Receivers

The received per-pulse SPL sound levels at the sensitive receiver sites identified in Section 2.1 are provided in Table 19. For each receiver location, the maximum level from all modelled sites is shown below. The distance between the receiver and the modelled site that produced the maximum level are also shown.

Table 19. Maximum-over-depth received sound levels (SPL) at the sensitive receivers outlined in Section 2.1 along with the distance between the receiver and associated modelled site.

Receiver ID	Sensitive receiver	SPL (L_p; dB re 1 µPa)	Distance between receiver location and modelled site (km)	Associated Modelled Site
1	Lady Julia Percy Island	153.4	9.35	1
2	Southern Right Whales Migration and resting BIA	133.9	44.5	2
3	Discovery Bay	113.2	72.1	11
4	Portland	87.4	58.6	2
5	Little River and Taylors Beach	153.1	9.58	1
6	Port Fairy Bay	121.5	23.9	3
7	Twelve Apostles Marine Park	124.6	91.7	1
8	Aire River Beach	107.5	103.5	3

5.2.2. Sound Field Maps and Graphs

5.2.2.1. Sound Level Contour Maps

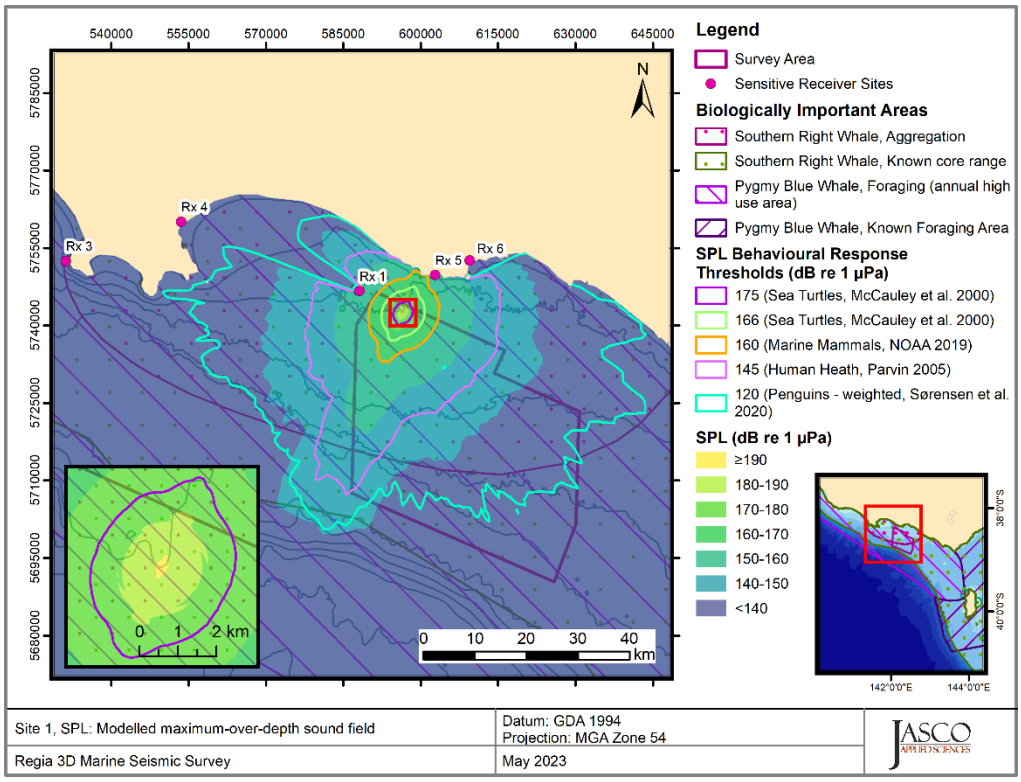

Figure 8. *Site 1, SPL, 2820 in^3 source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

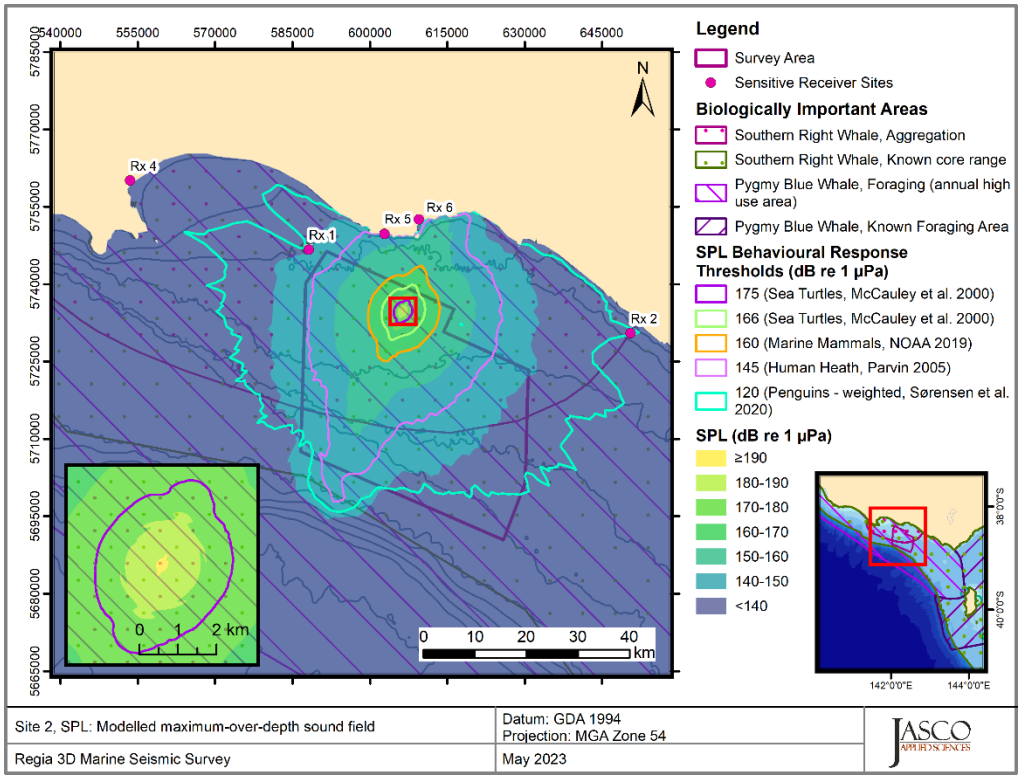

Figure 9. *Site 2, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

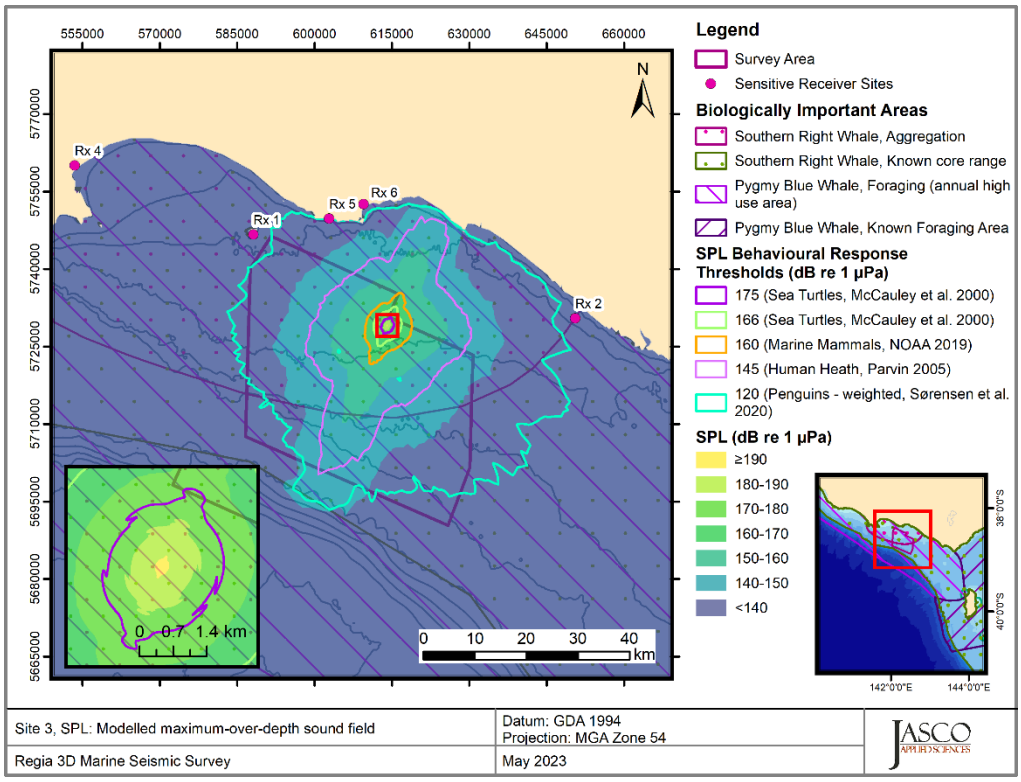

Figure 10. *Site 3, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

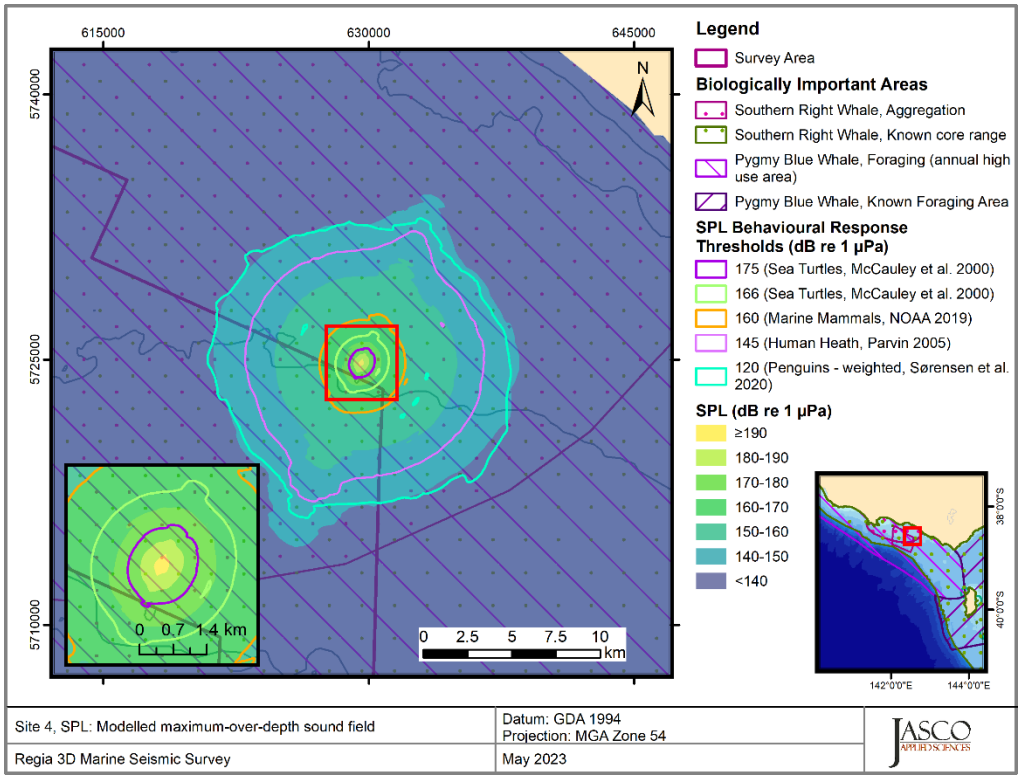

Figure 11. *Site 4, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

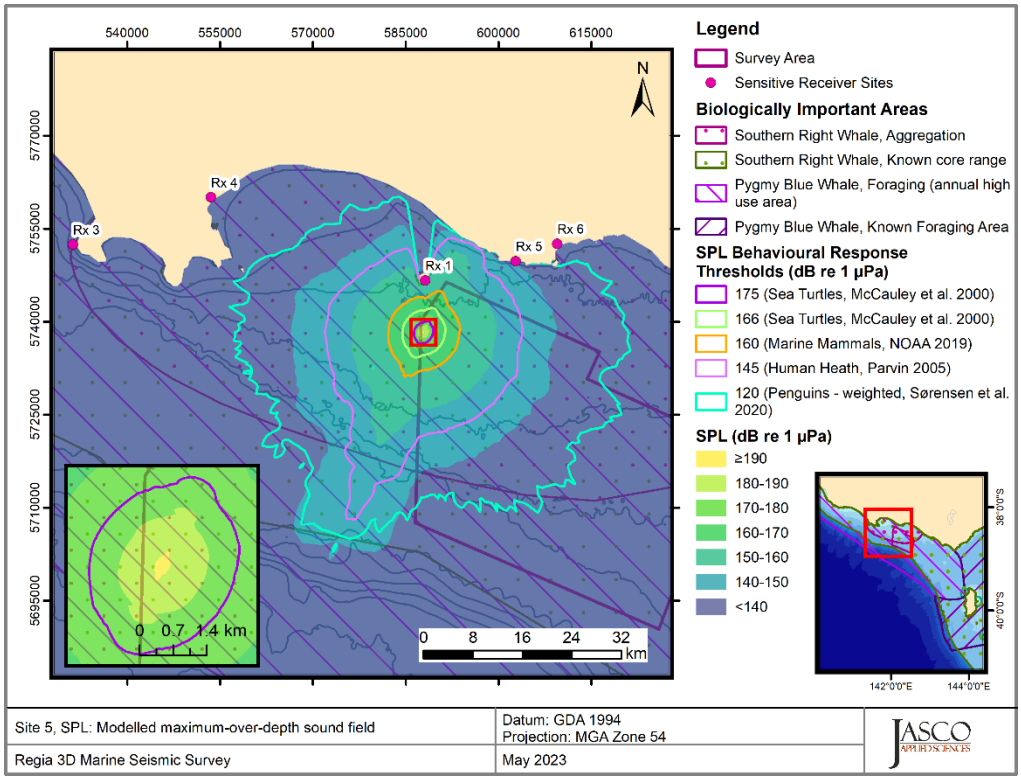

Figure 12. *Site 5, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

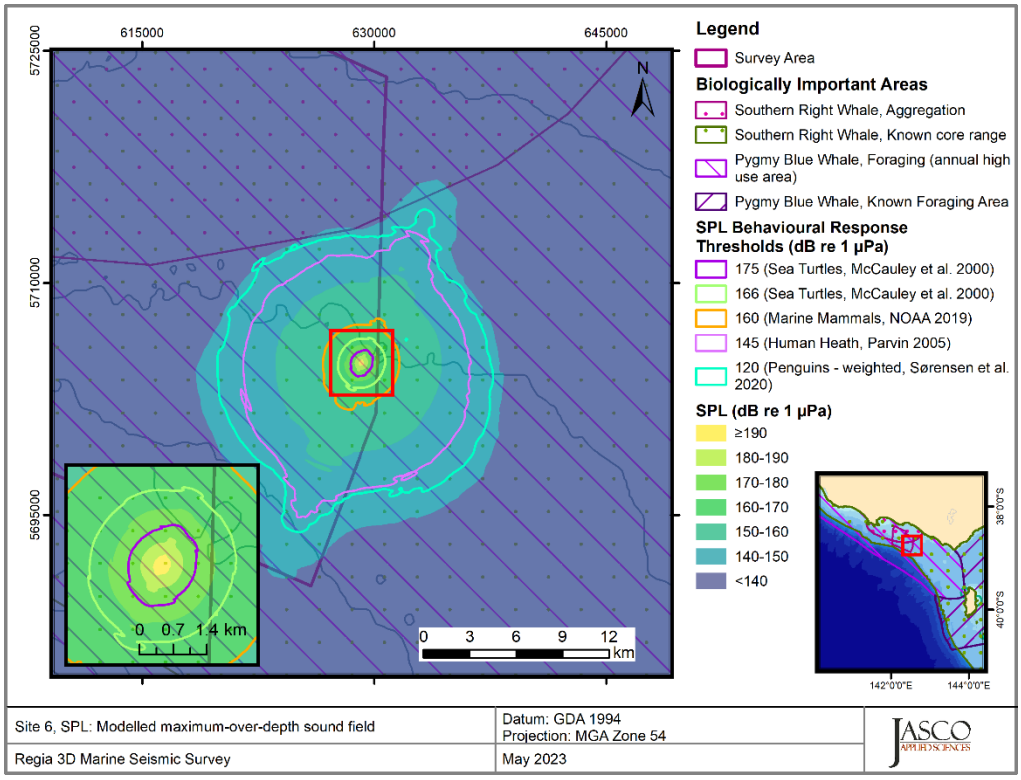

Figure 13. *Site 6, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

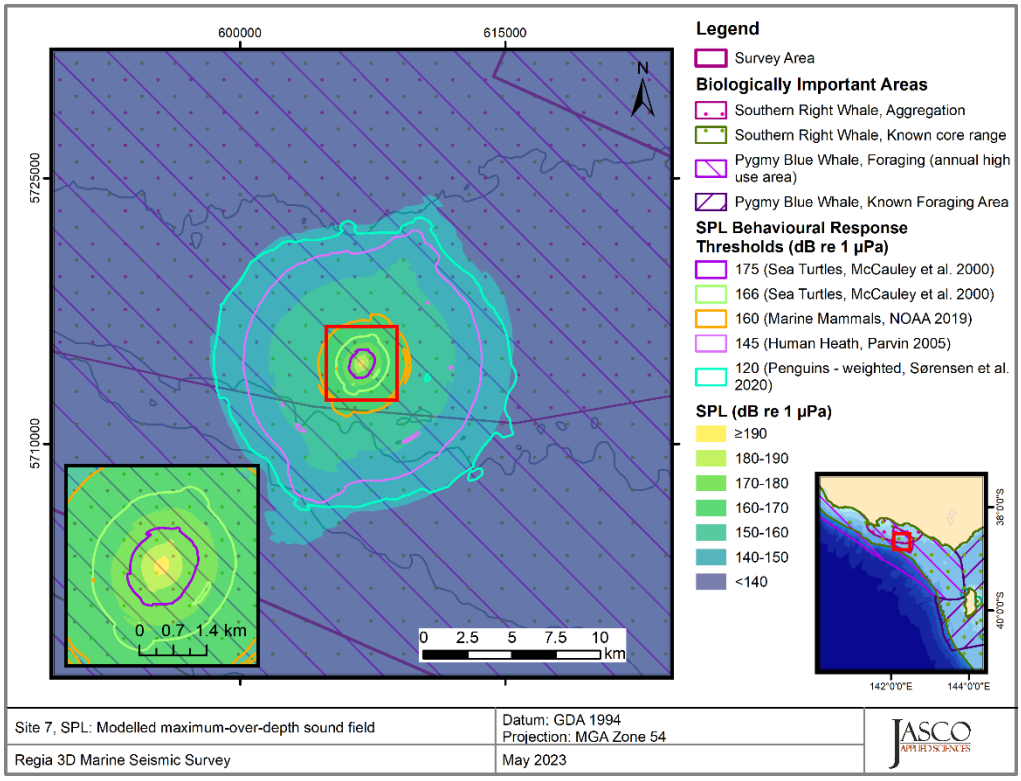

Figure 14. *Site 7, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

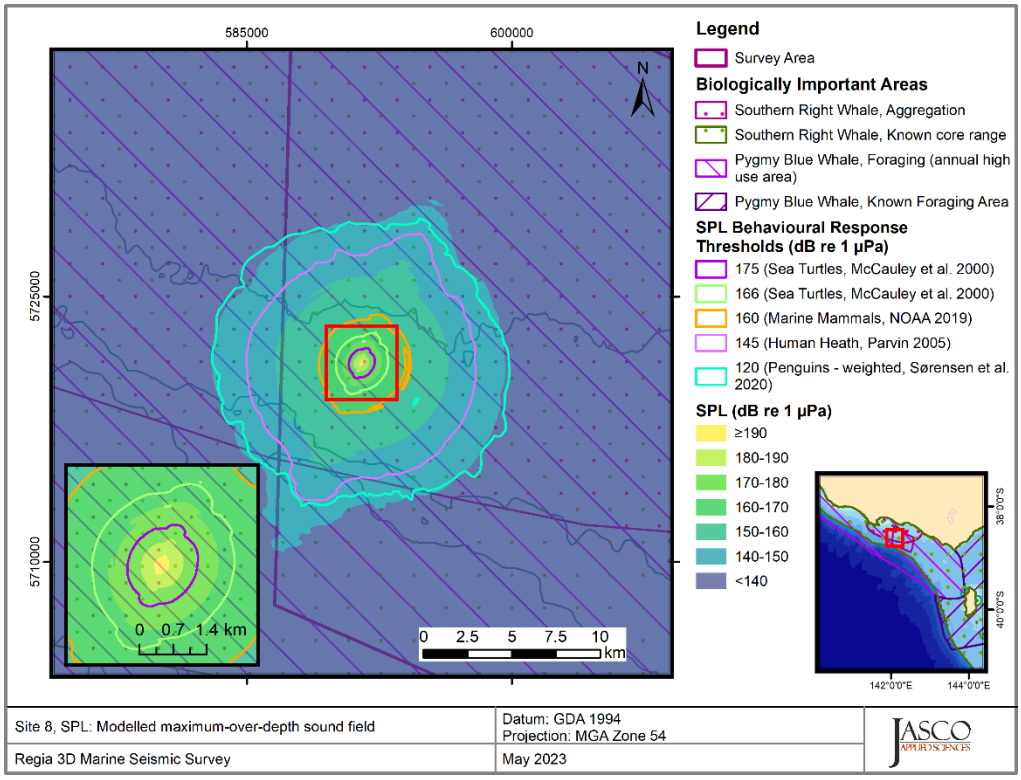

Figure 15. *Site 8, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

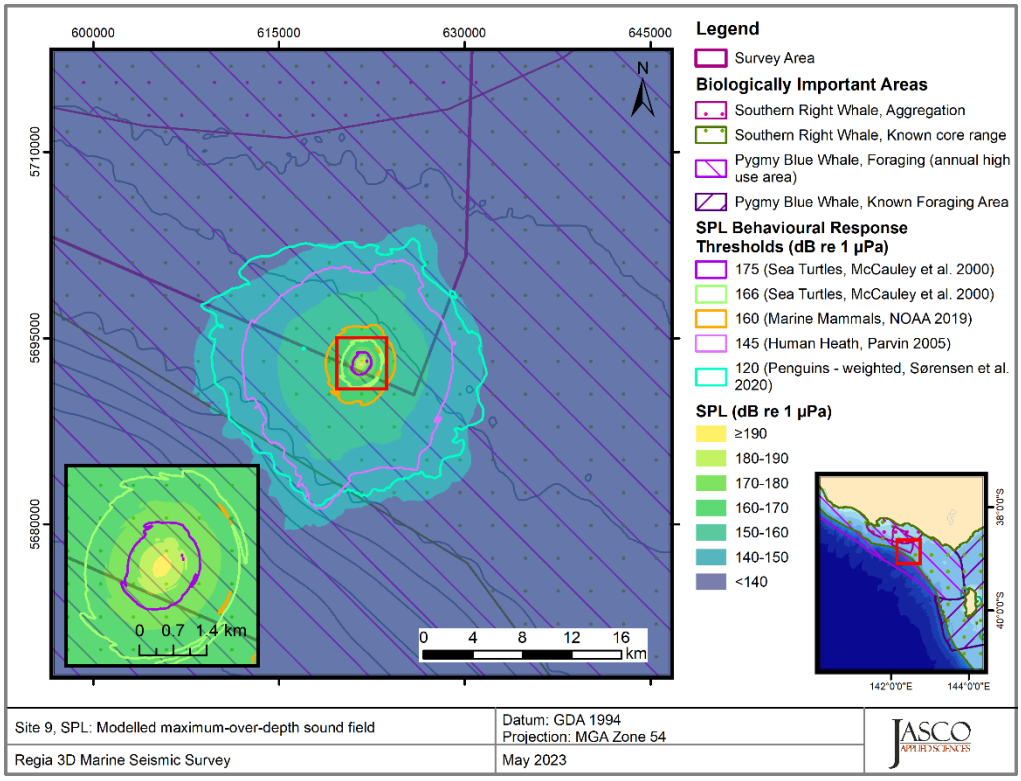

Figure 16. *Site 9, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

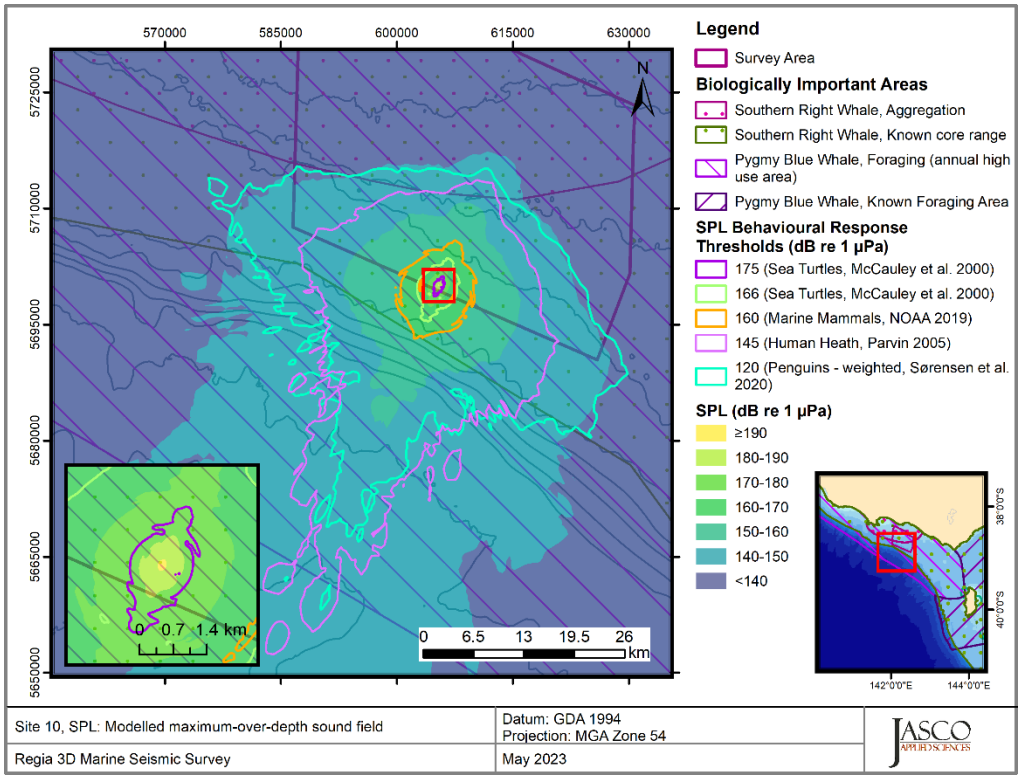

Figure 17. *Site 10, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

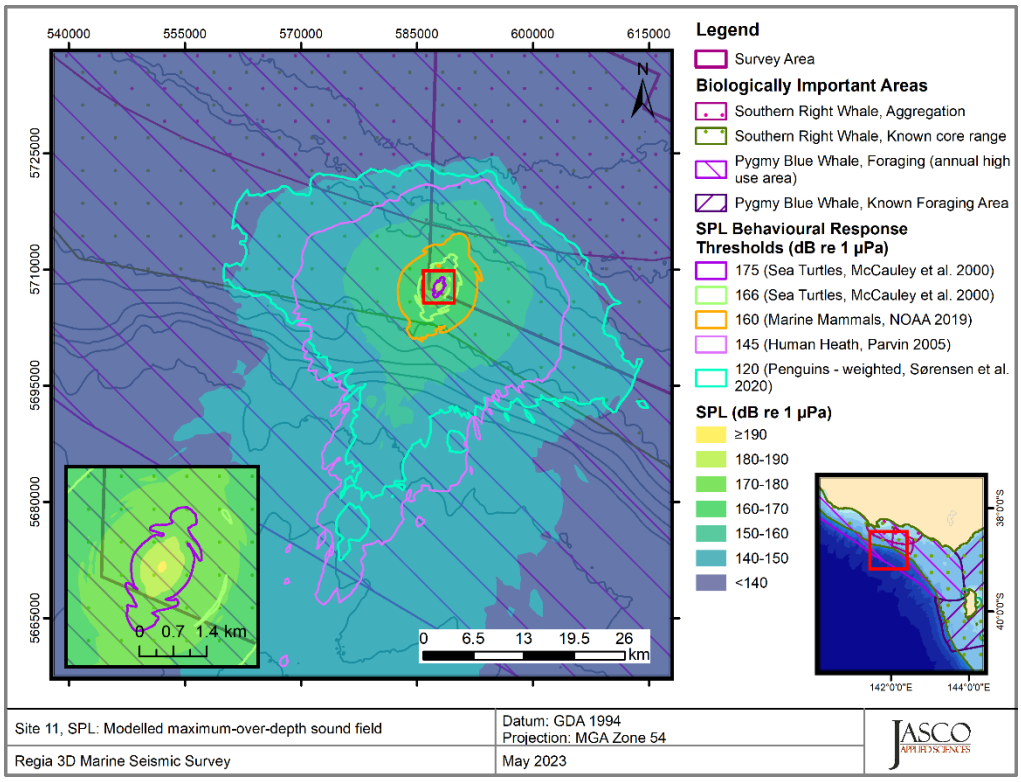

Figure 18. *Site 11, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

5.2.2.2. Vertical Slices of Modelled Sound Fields

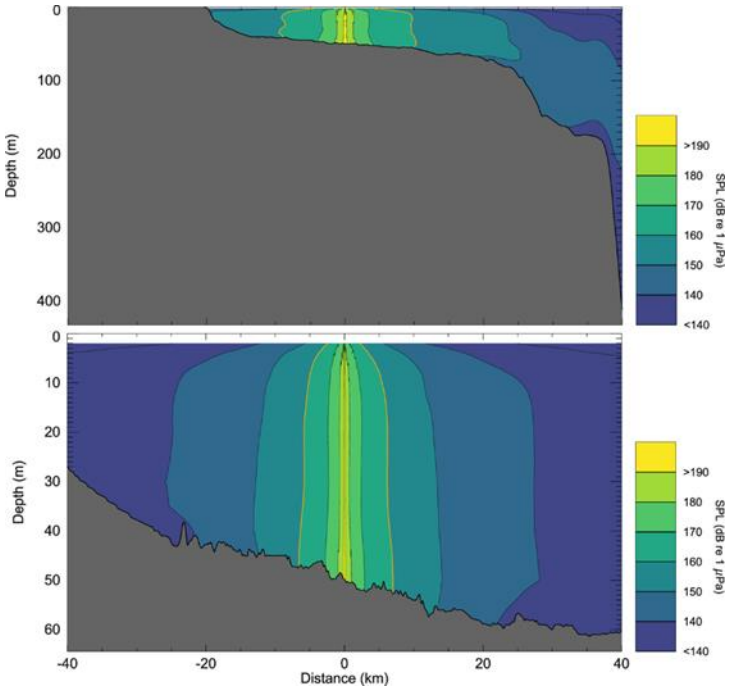

Figure 19. *Site 2, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow azimuth for broadside, and the tow azimuth for the endfire slice.

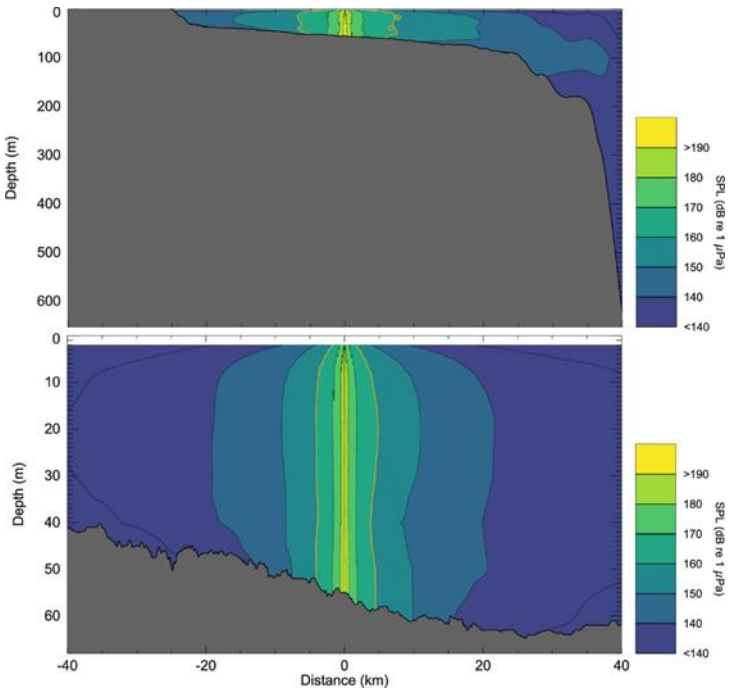

Figure 20. *Site 3, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow azimuth for broadside, and the tow azimuth for the endfire slice.

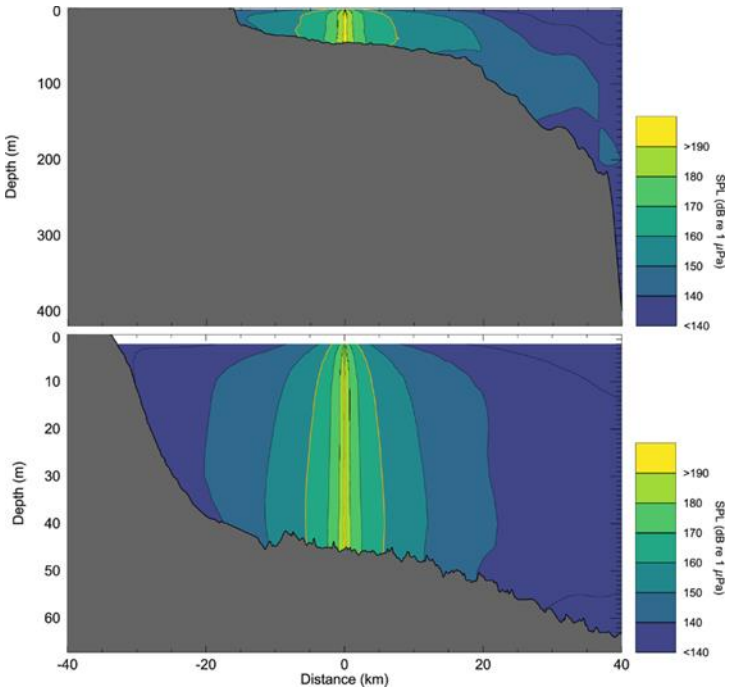

Figure 21. *Site 5, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow azimuth for broadside, and the tow azimuth for the endfire slice.

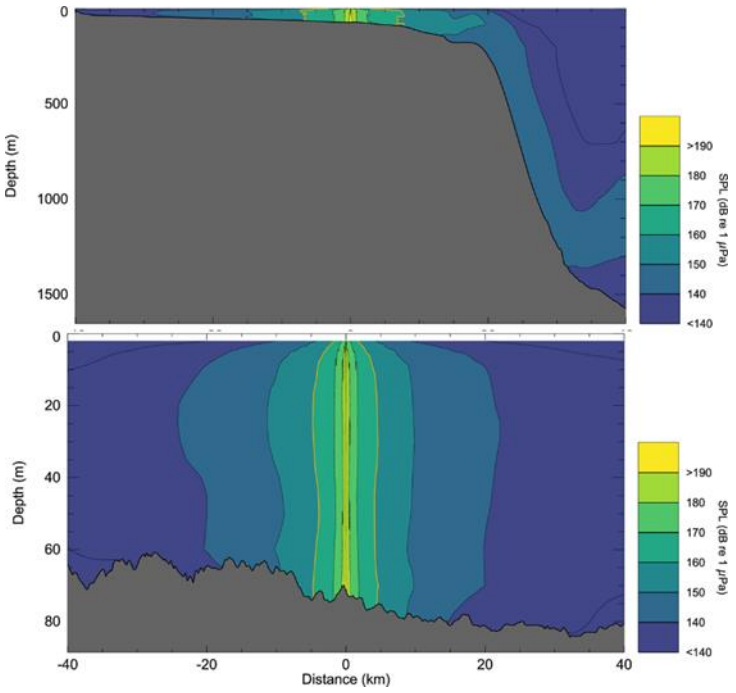

Figure 22. *Site 7, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow azimuth for broadside, and the tow azimuth for the endfire slice.

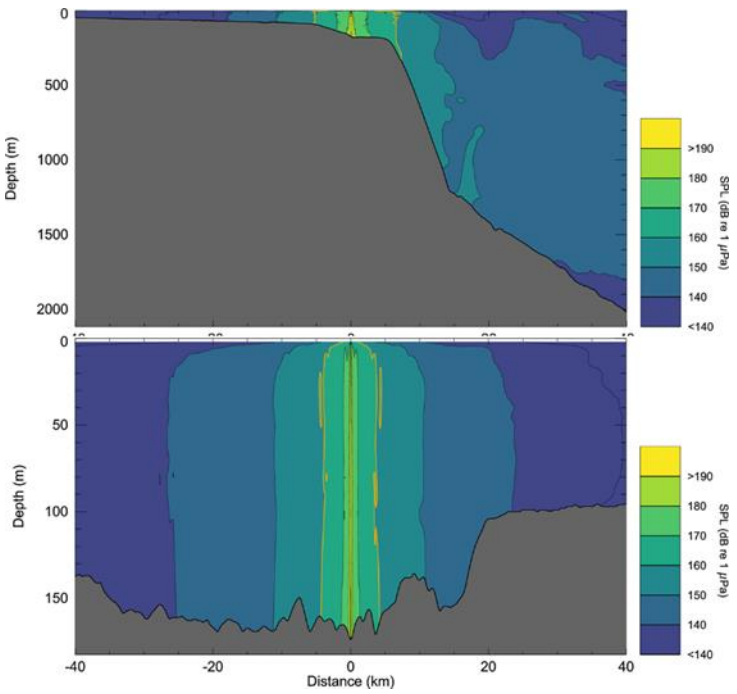

Figure 23. *Site 10, SPL, 2820 in³ source, tow azimuth 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow azimuth for broadside, and the tow azimuth for the endfire slice.

5.3. Multiple Source Fields

This section presents the sound fields in terms of SEL accumulated over 24 h for the modelled scenarios (Section 2). Frequency-weighted SEL_{24h} sound fields were used to estimate the maximum horizontal distances (R_{max}) to marine mammal and sea turtle PTS and TTS thresholds (listed in Table 20), and to estimate maximum distance and the area for injury and TTS guidelines for fish (Table 21).

The SEL_{24h} sound fields are presented as contour maps in Figures 24–26. These figures present the unweighted SEL_{24h} in 10 dB steps, as well as the isopleths corresponding to thresholds or guidelines that are large enough to be resolved on a map.

5.3.1. Tabulated Results

Table 20. Maximum-over-depth distances (in km) to frequency-weighted 24 h sound exposure level (SEL_{24h}) based permanent threshold shift (PTS) and temporary threshold shift (TTS) for marine mammals Southall et al. (2019) and sea turtles (Finneran et al. 2017) using the 2820 in^3 seismic source for all scenarios. Maximum extents are in the broadside direction.

Hearing group	Threshold for SEL_{24h} ($L_{E,24h}$; dB re 1 $\mu Pa^2 \cdot s$)	Scenario A		Scenario B		Scenario C	
		R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)
PTS							
LF cetaceans	183	4.89	401	1.65	232	1.90	186
HF cetaceans	185	–	–	–	–	–	–
VHF cetaceans	155	0.07	7.19	0.07	11.1	0.06	10.5
Otariid Pinnipeds	203	–	–	–	–	–	–
Penguins	203	–	–	–	–	–	–
Sea turtles	204	0.07	8.03	0.07	11.1	0.06	10.6
TTS							
LF cetaceans	168	34.0	2347	14.8	1997	43.5	2144
HF cetaceans	170	0.05	0.50	0.05	0.86	0.04	0.15
VHF cetaceans	140	0.55	76.4	0.29	63.2	0.34	50.9
Otariid Pinnipeds	188	0.05	2.69	0.06	1.66	0.06	2.12
Penguins	188	0.05	2.69	0.06	1.66	0.06	2.12
Sea turtles	189	3.43	313	1.14	171	0.82	125

A dash indicates the threshold was not reached within the limits of the modelling resolution (20 m).

Table 21. *Fish criteria*: Maximum horizontal distances (R_{max}, in km) from the survey lines and area (km^2) to injury and temporary threshold shift (TTS) thresholds considering 24 h of survey activity.

Marine fauna group	Threshold for SEL_{24h} ($L_{E,24h}$; dB re 1 $\mu Pa^2 \cdot s$)	Scenario A		Scenario B		Scenario C	
		R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)
Mortality and potential mortal injury							
Fish I	219	0.06	4.07	0.06	5.53	0.06	7.41
Fish II, fish eggs and fish larvae	210	0.07	9.22	0.07	11.1	0.06	11.4
Fish III	207	0.07	9.52	0.07	11.9	0.07	12.0
Fish recoverable injury							
Fish I	216	0.07	4.94	0.06	8.99	0.06	8.65
Fish II, III	203	0.11	15.1	0.07	14.8	0.07	15.0
Fish TTS							
Fish I, II, III	186	7.86	633	4.23	494	5.31	459

Fish I–No swim bladder; Fish II–Swim bladder not involved with hearing; Fish III–Swim bladder involved with hearing.

5.3.2. Sound Level Contour Maps

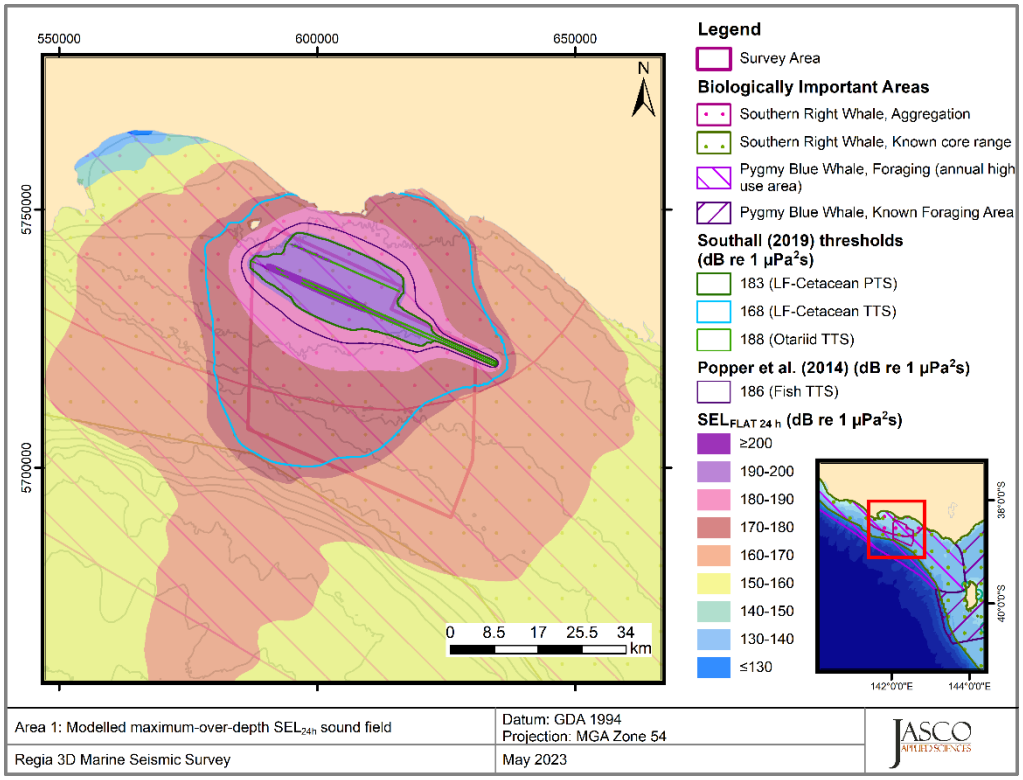

Figure 24. *Scenario A*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. Thresholds omitted here were not reached or not large enough to display graphically. Refer to Tables 20 and 21 for threshold distances.

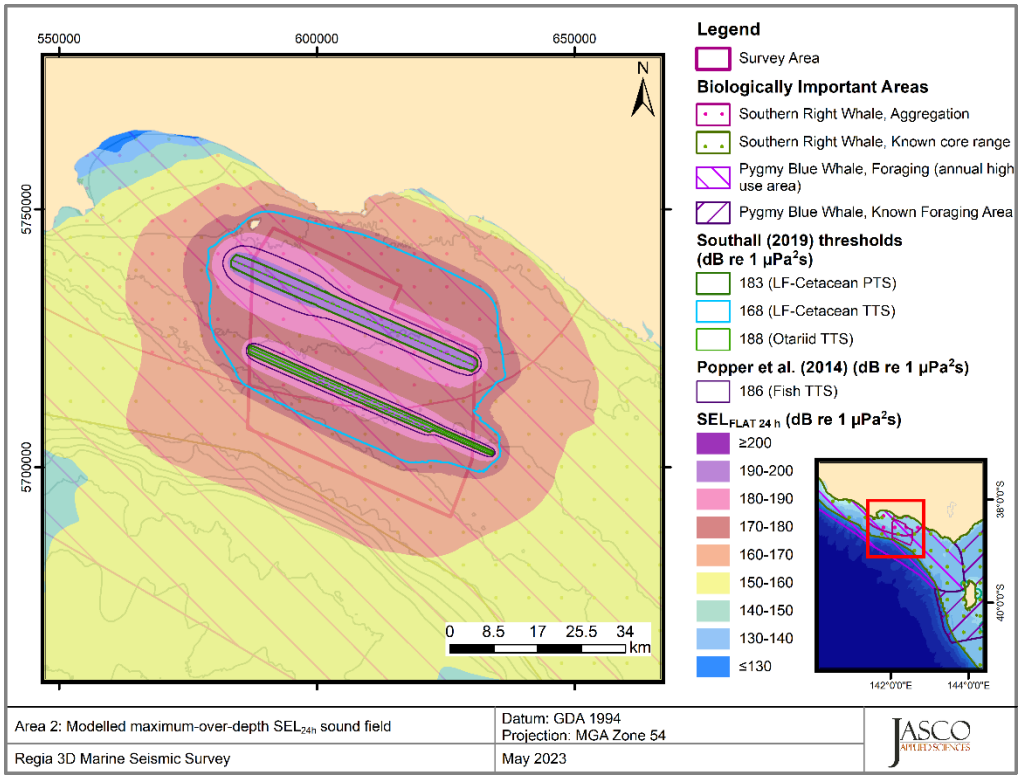

Figure 25. *Scenario B*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. Thresholds omitted here were not reached or not large enough to display graphically. Refer to Tables 20 and 21 for threshold distances.

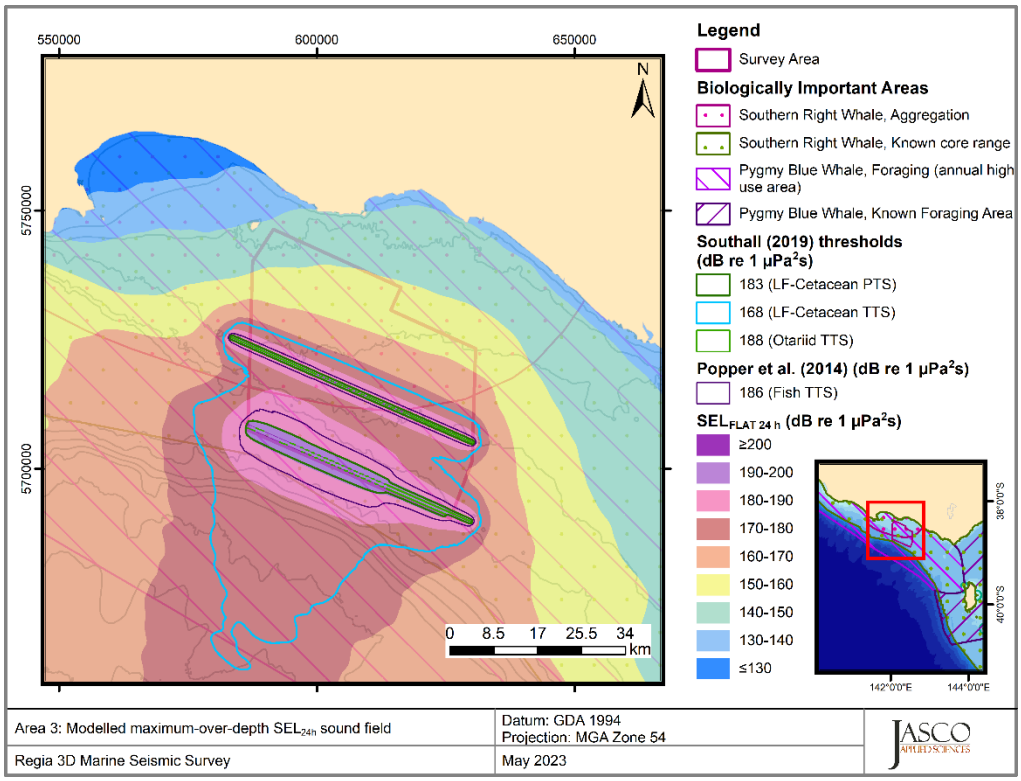

Figure 26. *Scenario C*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. Thresholds omitted here were not reached or not large enough to display graphically. Refer to Tables 20 and 21 for threshold distances.

5.4. Animal Movement Exposure Ranges

A summary of radial distances to exposure thresholds for pygmy blue whales and southern right whales, along with probability of exposure for each modelled scenario (Section 2) are included below. Tables 22 and 23 show results for scenarios with pygmy blue whale animats unrestricted (Seeding A) and restricted to the shelf (Seeding B), respectively, whilst Tables 24 and 25 show results for scenarios with southern right whale animats restricted to the extended aggregation BIA (Seeding A) and known core range area (Seeding B), respectively. Results include $ER_{95\%}$ exposure ranges calculated for the 160 dB behavioural response threshold and SEL_{24h} thresholds for both TTS and PTS, and the probability of an animat being exposed above the threshold within the $ER_{95\%}$.

Exposure ranges for TTS and PTS PK thresholds were not included in the exposure analysis since acoustic modelling predicted no PTS PK exceedance and ranges of less than 150 m for TTS PK (see Table 15). For the per-pulse PK metric, the exceedance distances are small and close enough to the source such that only minor differences are expected between acoustic and animat exposure predictions.

Sections 5.4.1 and 5.4.2 includes histograms of CPA ranges to SEL_{24h} PTS, TTS, and the behavioural response threshold for Scenario A, with results in Tables 22 to 25. Additional histograms for the remaining scenarios can be found in Appendix F.

Table 22. Summary of animat simulation results for pygmy blue whales with animats not restricted to the BIA (Seeding A). The 95th percentile exposures ranges ($ER_{95\%}$) in km and probability of animats being exposed above threshold within the $ER_{95\%}$ (P_{exp} (%)) are provided.

Noise Effect Criteria Description	Scenario A				Scenario B				Scenario C			
	Female		Male		Female		Male		Female		Male	
	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)
PTS (SEL_{24h})[1]	1.34	52	1.38	52	0.44	61	0.51	50	0.26	61	0.26	55
TTS (SEL_{24h})[2]	13.2	57	12.7	59	6.03	60	6.02	59	7.60	60	7.38	60
Behavioural response (SPL)[3]	7.92	87	7.96	87	6.82	93	6.77	93	6.77	92	6.77	91

[1] LF-weighted SEL_{24h} (183 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al. (2019))
[2] LF-weighted SEL_{24h} (168 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al.)
[3] SPL (160 dB re 1 µPa) (NOAA (2019))

Table 23. Summary of animat simulation results for pygmy blue whales with animats restricted to the shelf (Seeding B). The 95th percentile exposures ranges ($ER_{95\%}$) in km and probability of animats being exposed above threshold within the $ER_{95\%}$ (P_{exp} (%)) are provided.

Noise Effect Criteria Description	Scenario A				Scenario B				Scenario C			
	Female		Male		Female		Male		Female		Male	
	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)
PTS (SEL_{24h})[1]	1.40	51	1.25	58	0.44	57	0.53	50	0.34	47	0.28	53
TTS (SEL_{24h})[2]	13.2	58	12.5	60	6.05	60	5.91	60	5.93	67	5.75	68
Behavioural response (SPL)[3]	7.89	88	8.09	86	6.80	93	6.79	93	6.50	93	6.54	93

[1] LF-weighted SEL_{24h} (183 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al. (2019))
[2] LF-weighted SEL_{24h} (168 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al.)
[3] SPL (160 dB re 1 µPa) (NOAA (2019))

Table 24. Summary of animat simulation results for southern right whales with animats restricted to the adjusted aggregation BIA (Seeding A). The 95th percentile exposures ranges ($ER_{95\%}$) in km and probability of animats being exposed above threshold within the $ER_{95\%}$ (P_{exp} (%)) are provided.

Noise Effect Criteria Description	Scenario A								Scenario B								Scenario C							
	Migrating				Aggregating				Migrating				Aggregating				Migrating				Aggregating			
	Mother & Calf		No Calf		Mother & Calf		No Calf		Mother & Calf		No Calf		Mother & Calf		No Calf		Mother & Calf		No Calf		Mother & Calf		No Calf	
	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)
PTS (SEL_{24h})[1]	1.50	50	0.79	52	1.38	51	1.12	56	0.45	53	0.52	36	0.42	52	0.38	48	0.20	63	0.21	80	0.15	66	0.14	66
TTS (SEL_{24h})[2]	11.6	60	8.63	75	10.2	60	9.77	61	6.04	52	5.73	45	5.52	57	4.88	60	6.70	41	6.64	39	6.71	37	6.62	37
Behavioural response (SPL)[3]	8.17	82	8.43	85	7.66	81	7.78	83	6.65	89	6.81	92	6.39	88	6.47	91	6.61	87	6.66	87	6.58	84	6.58	89

[1] LF-weighted SEL_{24h} (183 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al. (2019))
[2] LF-weighted SEL_{24h} (168 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al.)
[3] SPL (160 dB re 1 µPa) (NOAA (2019))

Table 25. Summary of animat simulation results for southern right whales with animats restricted to the known core range area (Seeding B). The 95th percentile exposures ranges ($ER_{95\%}$) in km and probability of animats being exposed above threshold within the $ER_{95\%}$ (P_{exp} (%)) are provided.

Noise Effect Criteria Description	Scenario A								Scenario B								Scenario C							
	Migrating				Aggregating				Migrating				Aggregating				Migrating				Aggregating			
	Mother & Calf		No Calf		Mother & Calf		No Calf		Mother & Calf		No Calf		Mother & Calf		No Calf		Mother & Calf		No Calf		Mother & Calf		No Calf	
	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)
PTS (SEL_{24h})[1]	1.48	50	0.79	53	1.32	52	1.14	56	0.54	49	0.47	40	0.50	45	0.38	50	0.25	37	0.18	44	0.19	51	0.13	53
TTS (SEL_{24h})[2]	11.6	60	8.59	76	10.4	59	9.92	60	5.98	51	5.66	45	5.43	57	4.93	60	6.38	60	5.88	66	5.90	60	5.55	61
Behavioural response (SPL)[3]	8.22	81	8.38	86	7.67	81	7.83	84	6.66	89	6.80	92	6.46	87	6.50	91	6.85	88	7.58	85	6.45	87	6.49	91

[1] LF-weighted SEL_{24h} (183 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al. (2019))
[2] LF-weighted SEL_{24h} (168 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al.)
[3] SPL (160 dB re 1 µPa) (NOAA (2019))

5.4.1. Exposure Range Histograms: Pygmy Blue Whales

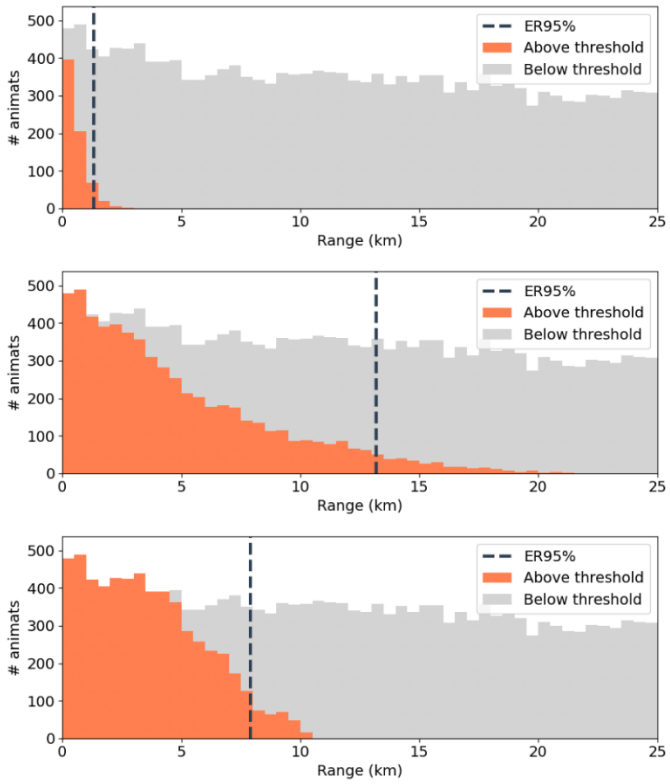

Figure 27. *Scenario A, female pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

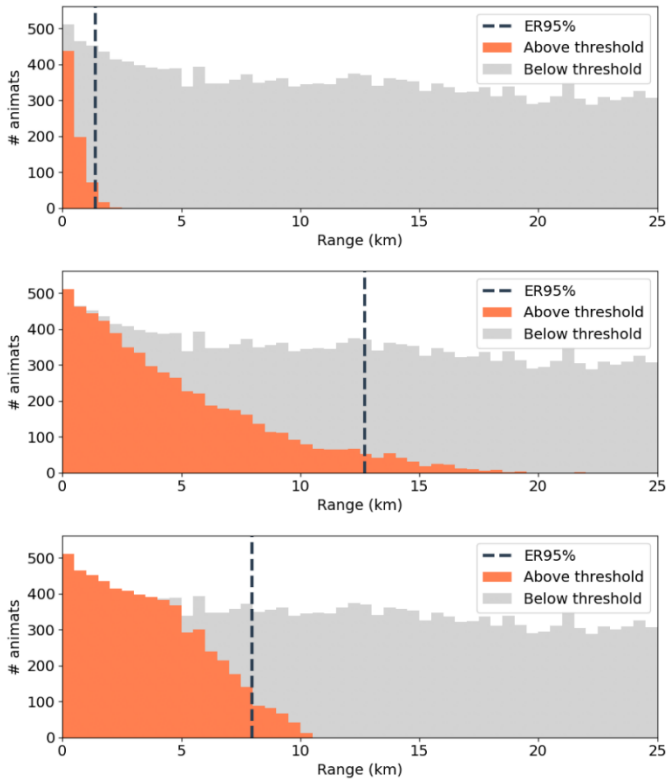

Figure 28. *Scenario A, male pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

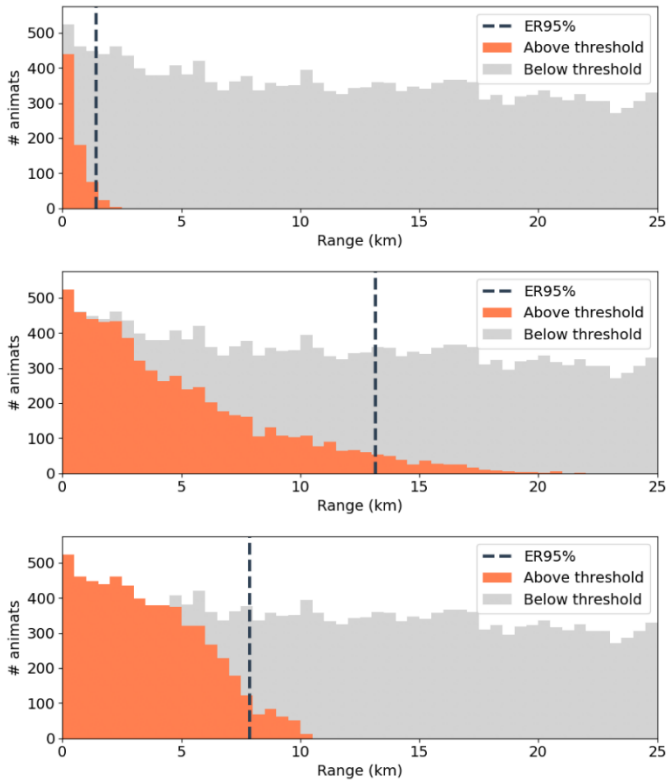

Figure 29. *Scenario A, female pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

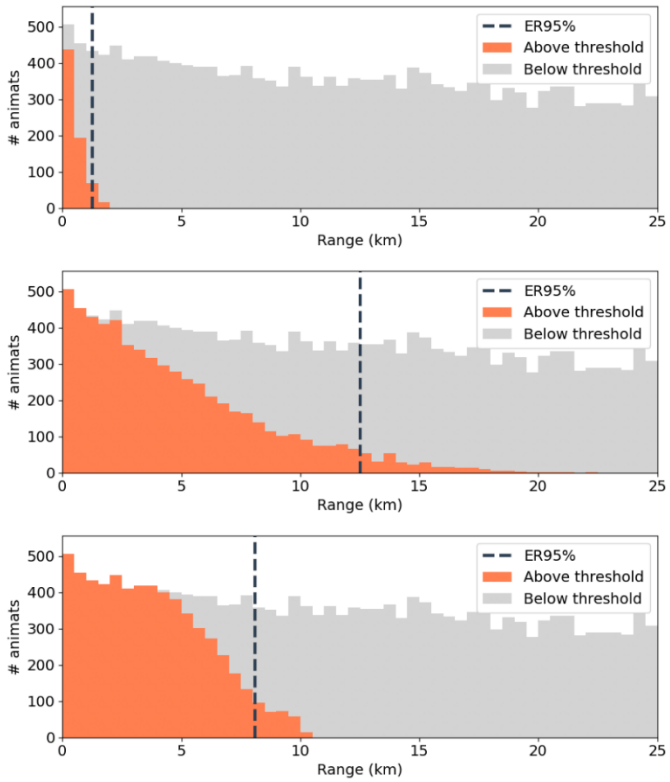

Figure 30. *Scenario A, male pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

5.4.2. Exposure Range Histograms: Southern Right Whales

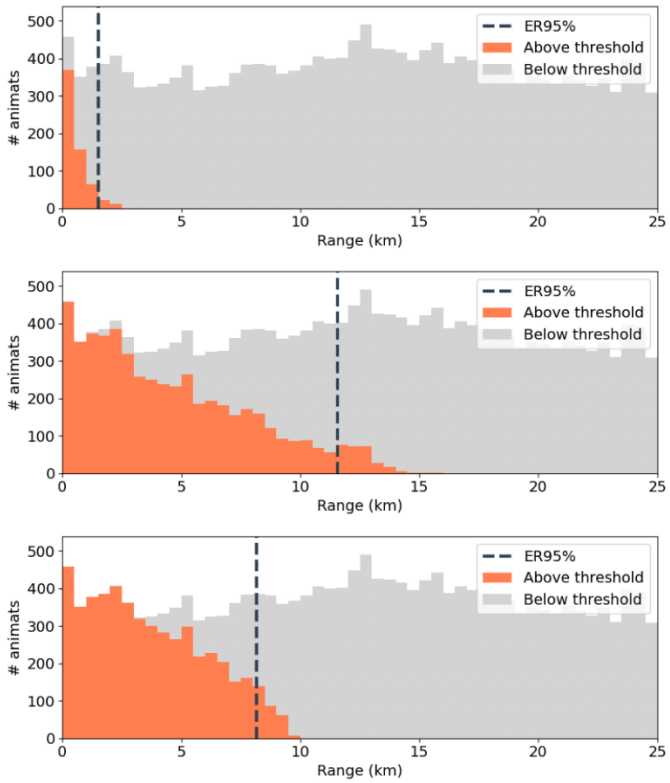

Figure 31. *Scenario A, migrating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

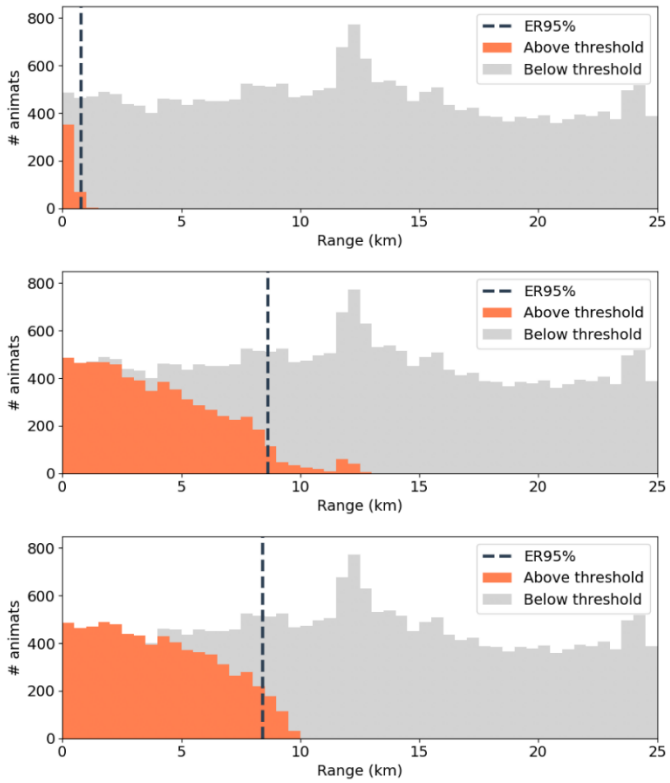

Figure 32. *Scenario A, migrating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

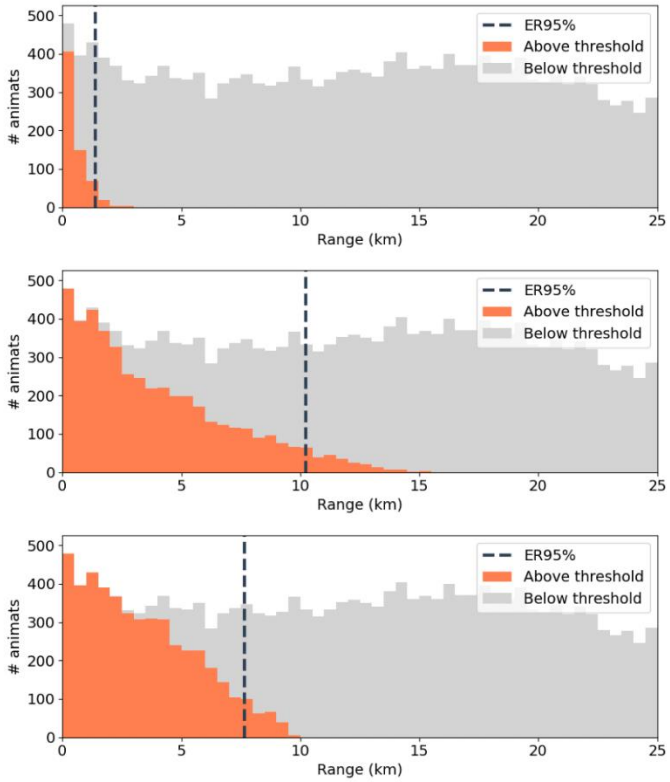

Figure 33. *Scenario A, aggregating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

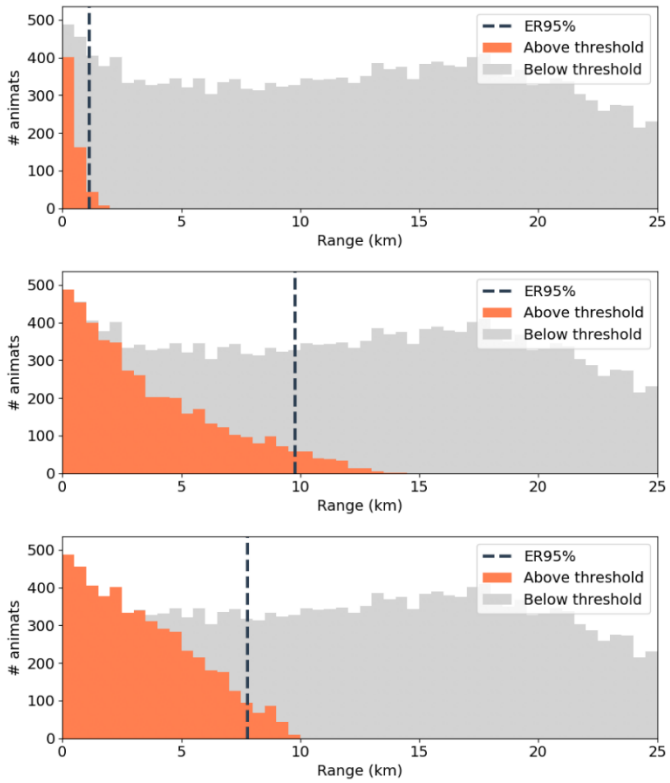

Figure 34. *Scenario A, aggregating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

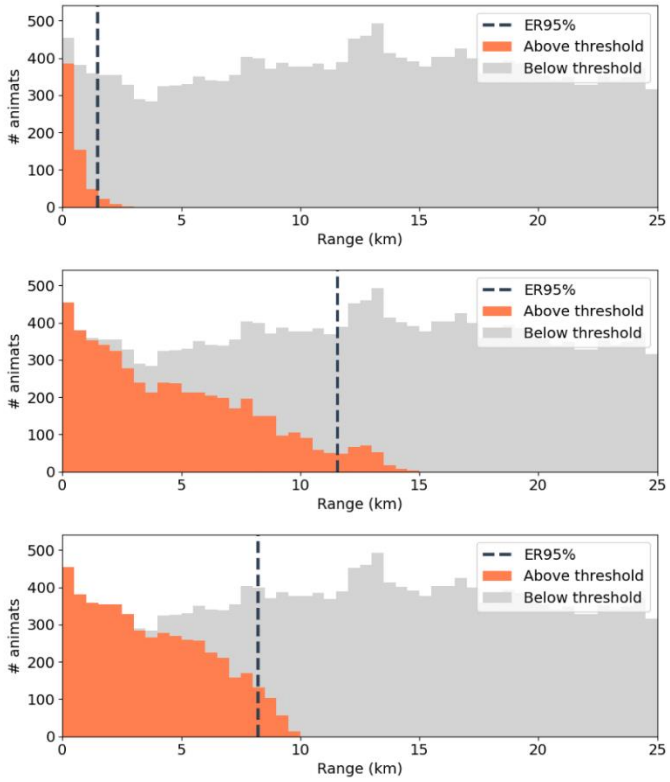

Figure 35. *Scenario A, migrating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

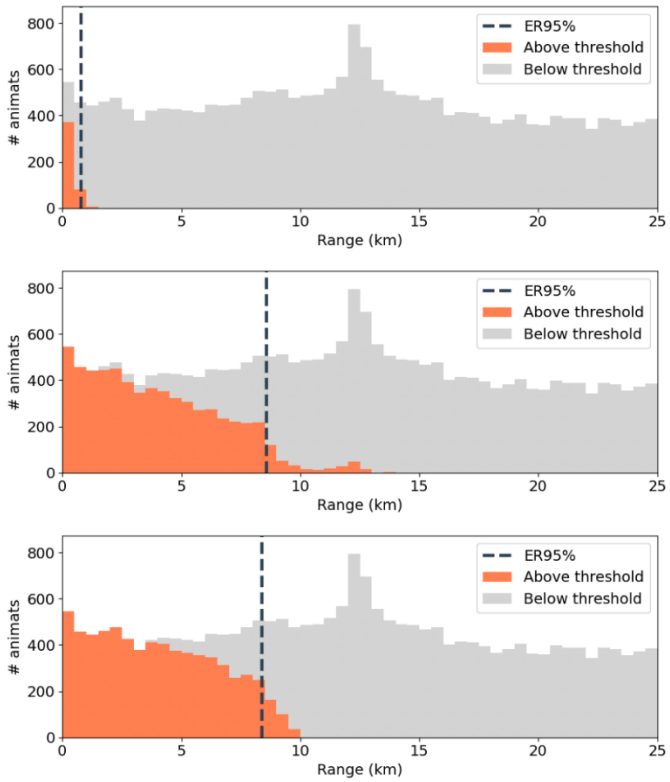

Figure 36. *Scenario A, migrating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

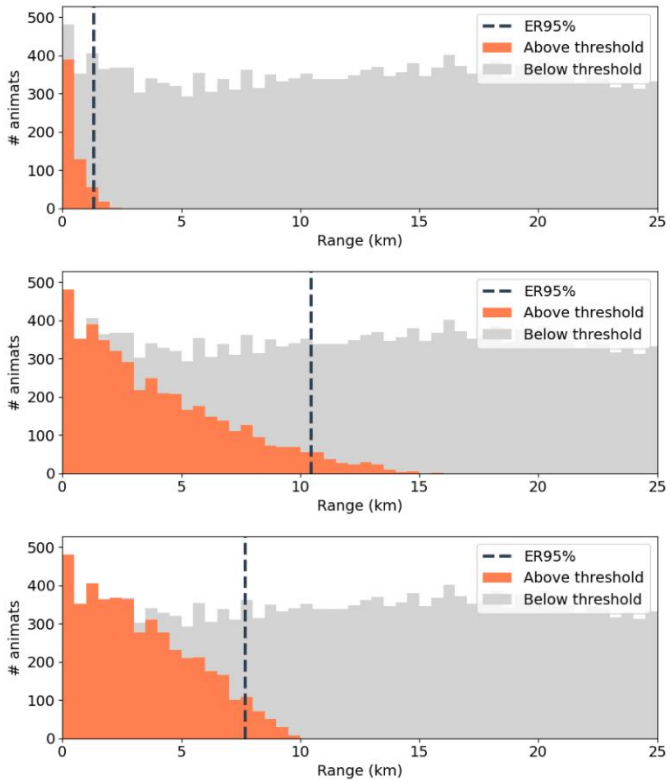

Figure 37. *Scenario A, aggregating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

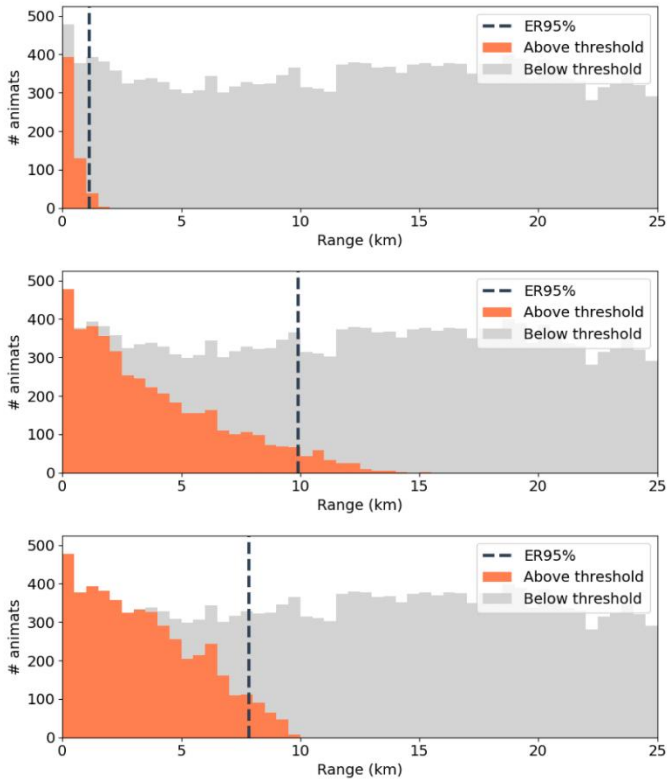

Figure 38. *Scenario A, aggregating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

6. Discussion and Summary

The modelling study predicted underwater sound levels associated with the planned Regia MSS. The underwater sound field from a 2820 in^3 seismic source was modelled (Appendix B.2). An analysis of seasonal sound speed profiles and associated sensitivity comparison indicated that December was likely to be the month most conductive to sound propagation. Only a subset of months when the survey could occur were consisted in the comparison. As such December was selected to ensure a conservative estimation of distances to received sound level thresholds over the potential survey periods (Appendix D.3.2). Modelling also accounted for site-specific bathymetric variations (Appendix D.3.1) and local geoacoustic properties (Appendix D.3.3).

Most acoustic energy from a seismic source is output at lower frequencies, in the tens to hundreds of hertz. The modelled array had a pronounced broadside directivity for decidecade bands between ~100 to 400 Hz (Appendix B.3), which caused a noticeable axial bulge in the modelled acoustic footprints. The overall broadband (10–25000 Hz) unweighted per-pulse SEL and peak pressure source levels of the seismic source operating at 7 m depth are detailed in Table 11.

6.1. Per-Pulse Sound Fields

The per-pulse modelled sites span water depths from about depths of 40–174 m across three different geological regions. The bathymetry within the vicinity of the survey varied between approximately 20–150 m; however, along a south-westward transect the environment generally transitions from shallower water of the Otway Shelf to the significantly deeper waters of the continental slope and abyssal plane (>1000 m). The frequency content of the seismic sources coupled with the bathymetry had a considerable effect on propagation at longer distances, with larger lobes of sound energy extending into the deeper waters. The maximum-over-depth sound footprint maps and vertical slice plots (Sections 5.2.2.1 and 5.2.2.2) assist in demonstrating the influence of the bathymetry and seabed composition on the sound field.

For the sites modelled in shallow water, less than 50 m depth, where the seabed was modelled as a sand layer underlain by variably cemented limestone (calcarenite). Literature suggests that this layer likely begins to thin as water depths increase in an offshore direction, and for water depths greater than 50 m it was considered absent with only the variably cemented calcarenite present at the seafloor interface. Modelled sites located in environments where the seabed was modelled as bare calcarenite generally displayed higher rates of loss at distance away from the source as compared to sites where a layer of sand overlies calcarenite.

The presence of unconsolidated coarse sand overlying semi-cemented calcarenite led to a more reflective seabed and likely led to large isopleths for low level thresholds, particularly in the offshore direction. This is most evident for the marine mammal behavioural threshold of 160 dB re 1 µPa (SPL) for impulsive sound sources. However, the distribution of sand layer is not well known and if the thickness of the sand layer is not as uniform as modelled then this variability could potentially lead to smaller radii.

The array directionality and frequency content coupled with the bathymetry had a considerable effect on propagation at longer distances, with larger lobes of sound energy extending into the deeper waters for all modelled sites. This is particularly evident for modelled Sites 9, 10 and 11 which are situated along the continental shelf break and continental slope. For source locations close to the continental shelf break modelling indicates that significant amounts energy reflected from the seabed slope can be trapped in the deep sound channel and propagate for large distances within the ocean interior. This phenomenon is evident in the slice plots showing the sound field in the broadside direction, where greater ranges to all isopleths are predicted to occur in the downward sloping

offshore direction. The vertical slice plots in Section 5.2.2.2 assist in demonstrating the influence of the sloping bathymetry on the sound field.

6.2. Multiple Pulse Sound Fields

The accumulated SEL over 24 hours of seismic source operation was modelled considering three acoustic scenarios and three animal movement modelling scenarios, each with a realistic acquisition pattern based on provided survey designs. The modelling predicted the accumulation of sound energy, considering the change in location and the azimuth of the source at each pulse point, which was used to assess possible injury in marine mammals and the SEL_{24h} based fish criteria. The results were presented as maps of the accumulated exposure levels and tabulated values of ranges to threshold levels and exposure areas for the given effects criteria (Section 3).

The footprints and range maxima for all accumulated SEL thresholds are influenced by the seabed compositions along acquisition lines. The discussion above regarding ranges to isopleths also applies to the accumulated SEL calculations. The farthest ranges to thresholds for PTS and TTS were driven by the source orientation and bathymetry, particularly in the broadside and offshore directions.

6.3. Acoustic Results Summary

This section presents summary of the distances to the noise effect criteria applied in this study (Section 3) as relevant to the impact assessment. The effect criteria for impairment of marine mammals, fish and sea turtles use dual metrics (PK and SEL_{24h}), and the longest distance associated with either metric is required to be applied, and thus is presented in this summary.

The SEL_{24h} is a cumulative metric that reflects the dosimetric effect of noise levels within 24 h based on the assumption that an animal is consistently exposed to such noise levels at a fixed position. Where the corresponding SEL_{24h} radii are larger than those for peak pressure criteria, they often represent an unlikely worst-case scenario. More realistically, marine mammals, fish, and sea turtles would not remain in the same location for 24 hours, but rather a shorter period, depending upon their behaviour, the proximity and movements of the source. Therefore, a reported radius for SEL_{24h} criteria does not mean that marine fauna travelling within this radius of the source will be impaired, but rather that an animal could be exposed to the sound level associated with impairment (either PTS or TTS) if it remained in that location for 24 h. A more realistic representation of the potential exposures was undertaken using animal movement modelling (‘animat modelling’), with the results summarised separately below.

A summary of predicted distances to criteria from acoustic modelling are presented below.

Marine Mammals

Table 26 summarises the distances to criteria for marine mammals, note that these distances are primarily associated with the broadside aspect of the array. Results for PK are presented in Table 15, while SEL_{24h} results are in Table 20.

Table 26. Summary of maximum (R_{max}) horizontal distances (in km) from modelled sites or scenarios to behavioural response thresholds and temporary threshold shift (TTS) and permanent threshold shift (PTS) for marine mammals. Maximum extents are in the broadside direction of the 2820 in^3 seismic source.

Hearing group	Maximum modelled distance to effect threshold (R_{max})						
	Behavioural response[1]	Scenario A		Scenario B		Scenario C	
		TTS[2] (km)	PTS[2] (km)	TTS[2] (km)	PTS[2] (km)	TTS[2] (km)	PTS[2] (km)
Low-frequency cetaceans	10.3 (SPL)	34.0 (SEL_{24h})	4.89 (SEL_{24h})	14.8 (SEL_{24h})	1.65 (SEL_{24h})	43.5 (SEL_{24h})	1.90 (SEL_{24h})
High-frequency cetaceans		0.05 (SEL_{24h})	–	0.05 (SEL_{24h})	–	0.04 (SEL_{24h})	–
Very high-frequency cetaceans		0.74 (PK)	0.43 (PK)	0.74 (PK)	0.43 (PK)	0.65 (PK)	0.33 (PK)
Otariid Pinnipeds		0.05 (SEL_{24h})	–	0.06 (SEL_{24h})	–	0.06 (SEL_{24h})	–

Noise exposure criteria: [1] NOAA (2019) and [2] Southall et al. (2019).
A dash indicates the threshold was not reached within the limits of the modelling resolution (20 m).

Sea Turtles

Table 27 summarises the distances to criteria for sea turtles, with the results for behavioural thresholds presented in Table 3 while SEL_{24h} results are in Table 20.

Table 27. Summary of horizontal distances (in km) to turtle behavioural response criteria, temporary threshold shift (TTS), and permanent threshold shift (PTS).

Hearing group	Maximum modelled distance to effect threshold (R_{max})							
	Behavioural response[1]	Behavioural disturbance[1]	Scenario A		Scenario B		Scenario C	
			TTS[2]	PTS[2]	TTS[2]	PTS[2]	TTS[2]	PTS[2]
Sea Turtles	5.97 (SPL)	2.55 (SPL)	3.43 (SEL_{24h})	0.07 (SEL_{24h})	1.14 (SEL_{24h})	0.07 (SEL_{24h})	0.82 (SEL_{24h})	0.06 (SEL_{24h})

Noise exposure criteria: [1] McCauley et al. (2000), and [2] Finneran et al. (2017)

Penguins

- The maximum distance to the OCW-weighted penguin TTS SEL_{24h} threshold of 188 dB re 1 μPa^2s was reached between 0.05 and 0.06 km for all scenarios was. PTS and PK thresholds were not resolved withing the modelled resolution of 20 m. As is the case with marine mammals, a reported radius for SEL_{24h} criteria does not mean that a penguin underwater travelling within this radius of the source will be injured, but rather that an animal could be exposed to the sound level associated with either PTS or TTS if it remained in that location for 24 hours.

- The maximum distance where the OCW-weighted penguin behavioural response threshold of 120 dB re 1 µPa (SPL) for impulsive noise could be exceeded varied between 9.08 and 52.1 km for the 2820 in^3 seismic source, depending on modelled site.

Fish, fish eggs, and fish larvae

- This modelling study assessed the ranges for quantitative criteria based on Popper et al. (2014) and considered both PK (seafloor and water column) and SEL_{24h} metrics associated with mortality and potential mortal injury as well as impairment in the following groups:
  - Fish without a swim bladder (also appropriate for sharks in the absence of other information),
  - Fish with a swim bladder that do not use it for hearing,
  - Fish that use their swim bladders for hearing,
  - Fish eggs and fish larvae.
- Table 28 summarises distances to effect criteria for fish, fish eggs, and fish larvae along with the relevant metric. Results for PK are presented in Tables 15 whilst SEL_{24h} results are in Tables 21.

Table 28. Summary of maximum fish, fish eggs, and larvae injury and temporary threshold shift (TTS) onset distances for single impulse and 24 hour sound exposure level (SEL_{24h}) modelled scenarios.

Relevant hearing group	Effect criteria	Water column	
		Metric associated with longest distance to criteria	R_{max} (km)
Fish: No swim bladder	Recoverable injury	SEL_{24h}	0.07
	TTS	SEL_{24h}	7.86
Fish: Swim bladder not involved in hearing and Swim bladder involved in hearing	Recoverable injury	PK	0.22
	TTS	SEL_{24h}	7.86
Fish eggs, and larvae (relevant to plankton)	Injury	PK	0.22

Benthic invertebrates, Sponges, and Coral

To assist with assessing the potential effects on these receptors, the following results were determined:

- Crustaceans: The sound level of 202 dB re 1 µPa PK-PK from Payne et al. (2008), which is representative of no effects, was considered for seafloor sound levels; the sound level was reached at ranges between 295 and 711 m for the 2820 in^3 source.
- Bivalves: The distance where a particle acceleration of 37.57 ms^{-2} at the seafloor could occur was determined for comparing to results presented in Day et al. (2016a). This particle acceleration was reached at a range of 52 m for depth 40 m, 4 m for a depth of 50 m, and was not reached at any greater depth.
- Sponges and coral: The PK sound level at the seafloor directly underneath the seismic source was estimated at all modelled sites and compared to the sound level of 226 dB re 1 µPa PK for

sponges and corals (Heyward et al. 2018); the threshold was reached at a range of 2 m for depth 40 m and was not reached at any greater depth.

Divers and Swimmers

An SPL human health assessment of 145 dB re 1 µPa (SPL; L_P) derived from (Parvin 2005) was considered for people swimming and diving. At the closest separation between considered modelled sites and receiver locations a sound level of 153.1 dB re 1 µPa (SPL; L_P) was predicted at Little River and Taylors Beach. It is important to review the provided contour maps to contextualise levels at coast areas to understand where the human health assessment level may be reached.

6.4. Animal Movement Modelling

The estimated sound fields produced by source and propagation models for the planned Regia MSS were incorporated into an animat sound exposure model for pygmy blue whales to estimate the radial distance within which 95% of the exposure exceedances occur ($ER_{95\%}$), along with the probability that an animat with the closest point of approach within that distance would be exposed above the relevant threshold (P_{exp}).

For the exposure analysis, all three acquisition scenarios were run with different animat seeding approaches. Survey lines from all nominal acquisition scenarios overlap with the foraging BIA for pygmy blue whales. Survey lines from Scenario A fully and from Scenarios B and C partially overlap with the aggregation BIA for southern right whales.

Sections 6.4.1 and 6.4.2 summarise the PTS, TTS, and behavioural exposure range results, with the tabulated results presented in Tables 22 to 25. Table 29 summarises the maximum exposure range results for pygmy blue whales and southern right whales across the different species profiles considered. Figure 39 summarises results for each modelled scenario and species profile, with pygmy blue and southern right whales considered.

Table 29. Summary of animat simulation results for PTS, TTS and SPL behavioural response criteria for pygmy blue whales and southern right whales Maximum Exposure ranges show $ER_{95\%}$ (km) first and probability of exposure of animats travelling within the $ER_{95\%}$ (P_{exp} (%)) in parentheses.

Species	Scenario	Behavioural response (SPL)[4]	TTS (SEL24h)[3]	PTS (SEL24h)[3]
		160[2]	168[1]	183[1]
Pygmy blue whale	A	8.09 (86%)	13.2 (58%)	1.40 (51%)
	B	6.82 (93%)	6.05 (60%)	0.53 (50%)
	C	6.77 (92%)	7.60 (60%)	0.34 (47%)
Southern right whale	A	8.43 (85%)	11.6 (60%)	1.50 (50%)
	B	6.81 (92%)	6.04 (52%)	0.54 (49%)
	C	7.58 (85%)	6.71 (37%)	0.25 (37%)

[1] LF-weighted SEL_{24h} ($L_{E,24h}$; dB re 1 µPa^2·s)
[2] SPL (L_p; dB re 1 µPa)
[3] Southall et al. (2019) criteria for marine fauna.
[4] NOAA (2019) recommended unweighted behavioural threshold for marine mammals.

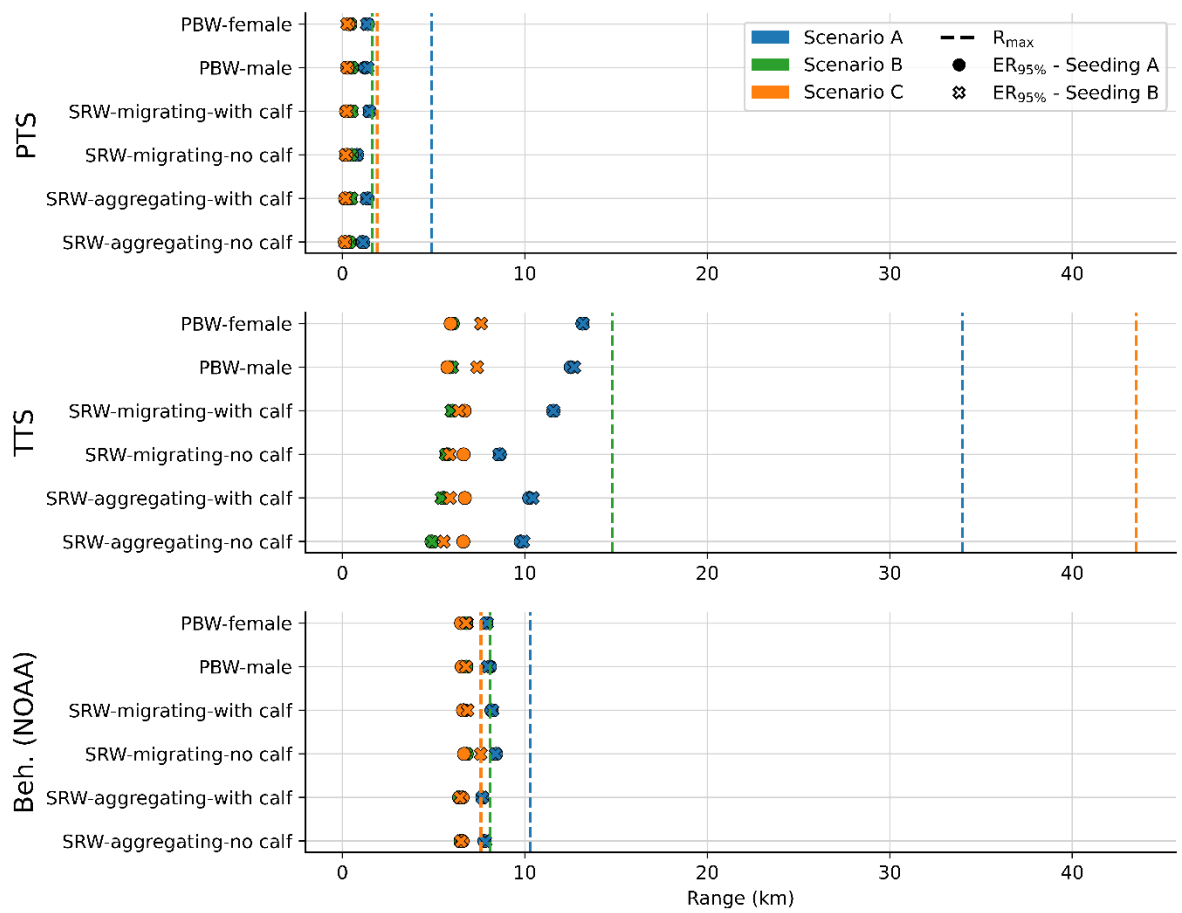

Figure 39. Acoustic (R_{max}) and exposure ranges ($ER_{95\%}$) for TTS/PTS and the behavioural thresholds (NOAA), shown for each species. Colour represents the acoustic modelled scenario. Seeding A and B refer to the different seeding areas for pygmy blue whales and southern right whales, presented in Figure 2.

6.4.1. PTS and TTS

Exposure ranges from animal movement modelling for PTS and TTS criteria are typically shorter than those predicted using acoustic propagation modelling because of the generally shorter time ('dwell time') to accumulate sound energy of the moving animats. In this study, PTS and TTS exposure ranges were substantially shorter than acoustic ranges to threshold, as shown in Figure 39.

All considered scenarios resulted in exposures above the PTS and TTS thresholds, and therefore exposure ranges.

The maximum $ER_{95\%}$ for pygmy blue whale scenarios was 13.2 and 1.4 km for TTS and PTS, respectively. The probability of exposure within $ER_{95\%}$ varied between 47 and 68%. For southern right whales, the maximum $ER_{95\%}$ for TTS and PTS were 11.6 and 1.5 km, respectively, with probability of exposure varying between 36 and 80%. The range of probabilities indicates that some, but not all, animats exposed within the 95th percentile range were exposed above threshold. This is because animats can move in and out of the modelling range as well as their vertical position in the water column, thus potentially limiting the length of time they are within the exposure radius. For example, an animat might approach within the predicted exposure range but if they are traveling more quickly on average than other animats, they may not accumulate as much exposure, or they may be spending more time at depths with quieter sound levels.

For this reason, female pygmy blue whale scenarios resulted in slightly larger exposure ranges than the corresponding male pygmy blue whale scenarios. Based on the vertical distribution of the sound

field (see Section 5.2.2.2), female pygmy blue whale animats accumulate more exposures than the males since females generally dive deeper than males (Section 4.6.3.1) and therefore spend more time at depths with higher sound levels.

Exposure ranges are, on average, slightly longer for TTS and PTS for unrestricted vs restricted pygmy blue whale scenarios because unrestricted animats have more opportunities to be seeded in deeper water and further away from the sources, whereas restricted animats have more opportunities to be exposed to sound fields closer to the sources and for a longer time, which effectively lengthens their dwell time. This becomes apparent for the nominal acquisition lines of Scenario C, which are located close to the edge of the shelf. Any restricted foraging pygmy blue whale animats travelling close the survey lines and close to the border of Seeding Area B are forced to stay within the bounds, whereas unrestricted animats can move in and out of the modelling range.

Exposure ranges are, on average, slightly longer for TTS and PTS for mother and calf pair versus no calf southern right whale scenarios as well. This is primarily due to the inclusion of nursing behaviour, where animals spend time stationary at the surface (Thomas et al. 1984), and the long duration of resting periods with slow travel speeds for mother/calf pairs (Hain et al. 2013). As a result, they accumulate more sound energy and are exposed for a longer time.

The animat modelling was included in the scope of work to provide context to possible exposures to pygmy blue and southern right whales over an entire day. The distances to isopleths associated with the effect thresholds for PTS and TTS are more realistic than those from the static sound fields as they consider potential animal movements passing through the operational region.

6.4.2. Behavioural Effects

Exposure ranges ($ER_{95\%}$) for single exposure metrics, such as the SPL behavioural response criteria, are typically comparable to the predicted acoustic ranges. Maximum acoustic ranges (e.g., R_{max}) are conservatively calculated using the maximum-over-depth sound fields and assuming static receivers, while exposure ranges account for animats sampling the sound field vertically and horizontally based on species-specific diving parameters, so exposure ranges are generally slightly lower than the R_{max} acoustic ranges. In this case, exposure ranges were slightly shorter than acoustic ranges to threshold for most modelled scenarios.

Overall, ranges were longest for Scenario C. For all considered pygmy blue whale scenarios, the $ER_{95\%}$ to behavioural threshold ranged from 6.50–8.09 km for pygmy blue whales, with P_{exp} varying between 87 and 93%. For southern right whales, the $ER_{95\%}$ to behavioural threshold ranged from 6.39-8.43 km, with P_{exp} varying between 81 and 92%.

Glossary

Unless otherwise stated in an entry, these definitions are consistent with ISO 80000-3 (2017).

1/3-octave

One third of an octave. *Note*: A one-third octave is approximately equal to one decidecade (1/3 oct ≈ 1.003 ddec).

1/3-octave-band

Frequency band whose bandwidth is one one-third octave. *Note*: The bandwidth of a one-third octave-band increases with increasing centre frequency.

A-weighting

Frequency-selective weighting for human hearing in air that is derived from the inverse of the idealized 40-phon equal loudness hearing function across frequencies.

absorption

The reduction of acoustic pressure amplitude due to acoustic particle motion energy converting to heat in the propagation medium.

attenuation

The gradual loss of acoustic energy from absorption and scattering as sound propagates through a medium.

auditory frequency weighting

The process of applying an auditory frequency weighting function. In human audiometry, C-weighting is the most commonly used function, an example for marine mammals are the auditory frequency weighting functions published by Southall et al. (2007).

auditory frequency weighting function

Frequency weighting function describing a compensatory approach accounting for a species' (or functional hearing group's) frequency-specific hearing sensitivity. Example hearing groups are low-, mid-, and high-frequency cetaceans, phocid and otariid pinnipeds.

azimuth

A horizontal angle relative to a reference direction, which is often magnetic north or the direction of travel. In navigation it is also called bearing.

bandwidth

The range of frequencies over which a sound occurs. Broadband refers to a source that produces sound over a broad range of frequencies (e.g., seismic airguns, vessels) whereas narrowband sources produce sounds over a narrow frequency range (e.g., sonar) (ANSI S1.13-2005 (R2010)).

bar

Unit of pressure equal to 100 kPa, which is approximately equal to the atmospheric pressure on Earth at sea level. 1 bar is equal to 10^5 Pa or 10^{11} µPa.

boxcar averaging

A signal smoothing technique that returns the averages of consecutive segments of a specified width.

broadband level

The total level measured over a specified frequency range.

broadside direction

Perpendicular to the travel direction of a source. Compare with endfire direction.

cetacean

Any animal in the order Cetacea. These are aquatic species and include whales, dolphins, and porpoises.

compressional wave

A mechanical vibration wave in which the direction of particle motion is parallel to the direction of propagation. Also called primary wave or P-wave.

conductivity-temperature-depth (CTD)

Measurement data of the ocean's conductivity, temperature, and depth; used to compute sound speed and salinity.

decade

Logarithmic frequency interval whose upper bound is ten times larger than its lower bound (ISO 80000-3:2006).

decidecade

One tenth of a decade. *Note*: An alternative name for decidecade (symbol ddec) is "one-tenth decade". A decidecade is approximately equal to one third of an octave (1 ddec ≈ 0.3322 oct) and for this reason is sometimes referred to as a "one-third octave".

decidecade band

Frequency band whose bandwidth is one decidecade. *Note*: The bandwidth of a decidecade band increases with increasing centre frequency.

decibel (dB)

Unit of level used to express the ratio of one value of a power quantity to another on a logarithmic scale. Unit: dB.

duty cycle

The time when sound is periodically recorded by an acoustic recording system.

endfire direction

Parallel to the travel direction of a source. Also see **broadside direction**.

energy source level

A property of a sound source obtained by adding to the sound exposure level measured in the far field the propagation loss from the acoustic centre of the source to the receiver position. Unit: decibel (dB). Reference value: 1 μPa^2m^2s.

energy spectral density source level

A property of a sound source obtained by adding to the energy spectral density level of the sound pressure measured in the far field the propagation loss from the acoustic centre of the source to the receiver position. Unit: decibel (dB). Reference value: 1 $\mu Pa^2m^2s/Hz$.

ensonified

Exposed to sound.

far field

The zone where, to an observer, sound originating from an array of sources (or a spatially distributed source) appears to radiate from a single point.

Fourier transform (or Fourier synthesis)

A mathematical technique which, although it has varied applications, is referenced in the context of this report as a method used in the process of deriving a spectrum estimate from time-series data (or the reverse process, termed the inverse Fourier transform). A computationally efficient numerical algorithm for computing the Fourier transform is known as fast Fourier transform (FFT).

flat weighting

Term indicating that no frequency weighting function is applied. Synonymous with unweighted.

frequency

The rate of oscillation of a periodic function measured in cycles-per-unit-time. The reciprocal of the period. Unit: hertz (Hz). Symbol: *f*. 1 Hz is equal to 1 cycle per second.

frequency weighting

The process of applying a frequency weighting function.

frequency-weighting function

The squared magnitude of the sound pressure transfer function. For sound of a given frequency, the frequency weighting function is the ratio of output power to input power of a specified filter, sometimes expressed in decibels. Examples include the following:

- *Auditory frequency weighting function*: compensatory frequency weighting function accounting for a species' (or functional hearing group's) frequency-specific hearing sensitivity.
- *System frequency weighting function*: frequency weighting function describing the sensitivity of an acoustic acquisition system, typically consisting of a hydrophone, one or more amplifiers, and an analogue to digital converter.

geoacoustic

Relating to the acoustic properties of the seabed.

harmonic

A sinusoidal sound component that has a frequency that is an integer multiple of the frequency of a sound to which it is related. For example, the second harmonic of a sound has a frequency that is double the fundamental frequency of the sound.

hearing group

Category of animal species when classified according to their hearing sensitivity and to the susceptibility to sound. Examples for marine mammals include very low-frequency (VLF) cetaceans, low-frequency (LF) cetaceans, mid-frequency (MF) cetaceans, high-frequency (HF) cetaceans, very high-frequency (VHF) cetaceans, otariid pinnipeds in water (OPW), phocid pinnipeds in water (PPW), sirenians (SI), other marine carnivores in air (OCA), and other marine carnivores in water (OCW) (NMFS 2018, Southall et al. 2019). See **auditory frequency weighting functions**, which are often applied to these groups. Examples for fish include species for which the swim bladder is involved in hearing, species for which the swim bladder is not involved in hearing, and species without a swim bladder (Popper et al. 2014).

hearing threshold

The sound pressure level for any frequency of the hearing group that is barely audible for a given individual for specified background noise during a specific percentage of experimental trials.

hertz (Hz)

A unit of frequency defined as one cycle per second.

high-frequency (HF) cetacean

See **hearing group**.

intermittent sound

A sound whose level abruptly drops below the background noise level several times during an observation period.

impulsive sound

Qualitative term meaning sounds that are typically transient, brief (less than 1 second), broadband, with rapid rise time and rapid decay. They can occur in repetition or as a single event. Examples of impulsive sound sources include explosives, seismic airguns, and impact pile drivers.

isopleth

A line drawn on a map through all points having the same value of some quantity.

knot

One nautical mile per hour. Symbol: kn.

level

A measure of a quantity expressed as the logarithm of the ratio of the quantity to a specified reference value of that quantity. Examples include sound pressure level, sound exposure level, and peak sound pressure level. For example, a value of sound exposure level with reference to 1 μPa^2 s can be written in the form *x* dB re 1 μPa^2 s.

low-frequency (LF) cetacean

See **hearing group**.

median

The 50th percentile of a statistical distribution.

mid-frequency (MF) cetacean

See **hearing group**.

M-weighting

See **auditory frequency weighting function** (as proposed by Southall et al. 2007).

mysticete

A suborder of cetaceans that use baleen plates to filter food from water. Members of this group include rorquals (Balaenopteridae), right whales (Balaenidae), and grey whales (*Eschrichtius robustus*).

non-impulsive sound

Sound that is not an impulsive sound. A non-impulsive sound is not necessarily a continuous sound.

octave

The interval between a sound and another sound with double or half the frequency. For example, one octave above 200 Hz is 400 Hz, and one octave below 200 Hz is 100 Hz.

otariid

A common term used to describe members of the Otariidae, eared seals, commonly called sea lions and fur seals. Otariids are adapted to a semi-aquatic life; they use their large fore flippers for propulsion. Their ears distinguish them from phocids. Otariids are one of the three main groups in the superfamily Pinnipedia; the other two groups are phocids and walrus.

otariid pinnipeds in water (OPW)

See **hearing group**.

other marine carnivores in air (OCA)

See **hearing group**.

other marine carnivores in water (OCW)

See **hearing group**.

parabolic equation method

A computationally efficient solution to the acoustic wave equation that is used to model propagation loss. The parabolic equation approximation omits effects of back-scattered sound, simplifying the computation of propagation loss. The effect of back-scattered sound is negligible for most ocean-acoustic propagation problems.

peak sound pressure level (zero-to-peak sound pressure level)

The level ($L_{p,pk}$ or L_{pk}) of the squared maximum magnitude of the sound pressure (p_{pk}^2).
Unit: decibel (dB). Reference value (p_0^2) for sound in water: 1 μPa^2.

$$L_{p,\mathrm{pk}} := 10\log_{10}\left(p_{\mathrm{pk}}^2/p_0^2\right)\mathrm{dB} = 20\log_{10}\left(p_{\mathrm{pk}}/p_0\right)\mathrm{dB}$$

The frequency band and time window should be specified. Abbreviation: PK or L_{pk}.

peak-to-peak sound pressure

The difference between the maximum and minimum sound pressure over a specified frequency band and time window. Unit: pascal (Pa).

permanent threshold shift (PTS)

An irreversible loss of hearing sensitivity caused by excessive noise exposure. PTS is considered auditory injury.

phocid

A common term used to describe all members of the family Phocidae. These true/earless seals are more adapted to in-water life than are otariids, which have more terrestrial adaptations. Phocids use their hind flippers to propel themselves. Phocids are one of the three main groups in the superfamily Pinnipedia; the other two groups are otariids and walrus.

phocid pinnipeds in water (PPW)

See **hearing group**.

pinniped

A common term used to describe all three groups that form the superfamily Pinnipedia: phocids (true seals or earless seals), otariids (eared seals or fur seals and sea lions), and walrus.

point source

A source that radiates sound as if from a single point.

pressure, acoustic

The deviation from the ambient pressure caused by a sound wave. Also called sound pressure. Unit: pascal (Pa).

pressure, hydrostatic

The pressure at any given depth in a static liquid that is the result of the weight of the liquid acting on a unit area at that depth, plus any pressure acting on the surface of the liquid. Unit: pascal (Pa).

propagation loss (PL)

Difference between a source level (SL) and the level at a specified location, PL(x) = SL − L(x). Also see **transmission loss**.

received level

The level measured (or that would be measured) at a defined location. The type of level should be specified.

reference values

standard underwater references values used for calculating sound **levels**, e.g., the reference value for expressing sound pressure level in decibels is 1 µPa.

Quantity	Reference value
Sound pressure	1 µPa
Sound exposure	1 μPa^2 s
Sound particle displacement	1 pm
Sound particle velocity	1 nm/s
Sound particle acceleration	1 $\mu m/s^2$

rms

abbreviation for root-mean-square.

shear wave

A mechanical vibration wave in which the direction of particle motion is perpendicular to the direction of propagation. Also called a secondary wave or S-wave. Shear waves propagate only in solid media,

such as sediments or rock. Shear waves in the seabed can be converted to compressional waves in water at the water-seabed interface.

sound

A time-varying disturbance in the pressure, stress, or material displacement of a medium propagated by local compression and expansion of the medium.

sound exposure

Time integral of squared sound pressure over a stated time interval. The time interval can be a specified time duration (e.g., 24 hours) or from start to end of a specified event (e.g., a pile strike, an airgun pulse, a construction operation). Unit: Pa^2 s.

sound exposure level

The level (L_E) of the sound exposure (E). Unit: decibel (dB). Reference value (E_0) for sound in water: 1 μPa^2 s.

$$L_E := 10 \log_{10}(E/E_0)\,\mathrm{dB} = 20 \log_{10}\left(E^{1/2}/E_0^{1/2}\right)\,\mathrm{dB}$$

The frequency band and integration time should be specified. Abbreviation: SEL.

sound exposure spectral density

Distribution as a function of frequency of the time-integrated squared sound pressure per unit bandwidth of a sound having a continuous spectrum. Unit: Pa^2 s/Hz.

sound field

Region containing sound waves.

sound intensity

Product of the sound pressure and the sound particle velocity. The magnitude of the sound intensity is the sound energy flowing through a unit area perpendicular to the direction of propagation per unit time.

sound particle acceleration

The rate of change of sound particle velocity. Unit: metre per second squared (m/s^2). Symbol: *a*.

sound particle motion

smallest volume of a medium that represents its mean physical properties.

sound particle displacement

Displacement of a material element caused by the action of sound, where a material element is the smallest element of the medium that represents the medium's mean density.

sound particle velocity

The velocity of a particle in a material moving back and forth in the direction of the pressure wave. Unit: metre per second (m/s). Symbol: *v*.

sound pressure

The contribution to total pressure caused by the action of sound.

sound pressure level (rms sound pressure level)

The level ($L_{p,\mathrm{rms}}$) of the time-mean-square sound pressure (p^2_{rms}). Unit: decibel (dB). Reference value (p_0^2) for sound in water: 1 μPa^2.

$$L_{p,\mathrm{rms}} := 10\log_{10}(p^2_{\mathrm{rms}}/p_0^2)\ \mathrm{dB} = 20\log_{10}(p_{\mathrm{rms}}/p_0)\ \mathrm{dB}$$

The frequency band and averaging time should be specified. Abbreviation: SPL or Lrms.

sound speed profile

The speed of sound in the water column as a function of depth below the water surface.

soundscape

The characterization of the ambient sound in terms of its spatial, temporal, and frequency attributes, and the types of sources contributing to the sound field.

source level (SL)

A property of a sound source obtained by adding to the sound pressure level measured in the far field the propagation loss from the acoustic centre of the source to the receiver position. Unit: decibel (dB). Reference value: 1 μPa^{2}m^2.

spectrum

An acoustic signal represented in terms of its power, energy, mean-square sound pressure, or sound exposure distribution with frequency.

surface duct

The upper portion of a water column within which the sound speed profile gradient causes sound to refract upward and therefore reflect off the surface resulting in relatively long-range sound propagation with little loss.

temporary threshold shift (TTS)

Reversible loss of hearing sensitivity. TTS can be caused by noise exposure.

thermocline

The depth interval near the ocean surface that experiences temperature gradients due to warming or cooling by heat conduction from the atmosphere and by warming from solar heating.

transmission loss (TL)

The difference between a specified level at one location and that at a different location, TL(x1,x2) = L(x1) − L(x2). Also see **propagation loss**.

unweighted

Term indicating that no frequency weighting function is applied. Synonymous with flat weighting.

very high-frequency (VHF) cetacean

See **hearing group**.

very low-frequency (VLF) cetacean

See **hearing group**.

wavelength

Distance over which a wave completes one cycle of oscillation. Unit: metre (m). Symbol: λ.

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Appendix A. Acoustic Metrics

A.1. Pressure Related Acoustic Metrics

Underwater sound pressure amplitude is measured in decibels (dB) relative to a fixed reference pressure of p_0 = 1 µPa. Because the perceived loudness of sound, especially pulsed sound such as from seismic airguns, pile driving, and sonar, is not generally proportional to the instantaneous acoustic pressure, several sound level metrics are commonly used to evaluate sound and its effects on marine life. Here we provide specific definitions of relevant metrics used in the accompanying report. Where possible, we follow the American National Standard Institute and International Organization for Standardization definitions and symbols for sound metrics (e.g., ISO 2017, ANSI R2013), but these standards are not always consistent.

The zero-to-peak sound pressure, or peak sound pressure (PK or $L_{p,pk}$; dB re 1 µPa), is the decibel level of the maximum instantaneous acoustic pressure in a stated frequency band attained by an acoustic pressure signal, $p(t)$:

$$L_{p,\mathrm{pk}} = 10\log_{10}\frac{\max|p^2(t)|}{p_0^2} = 20\log_{10}\frac{\max|p(t)|}{p_0} \tag{A-1}$$

PK is often included as a criterion for assessing whether a sound is potentially injurious; however, because it does not account for the duration of an acoustic event, it is generally a poor indicator of perceived loudness.

The peak-to-peak sound pressure (PK-PK or $L_{p,pk\text{-}pk}$; dB re 1 µPa) is the difference between the maximum and minimum instantaneous sound pressure, possibly filtered in a stated frequency band, attained by an impulsive sound, $p(t)$:

$$L_{p,\mathrm{pk\text{-}pk}} = 10\log_{10}\frac{[\max(p(t)) - \min(p(t))]^2}{p_0^2} \tag{A-2}$$

The sound pressure level (SPL or L_p; dB re 1 µPa) is the root-mean-square (rms) pressure level in a stated frequency band over a specified time window (T; s). It is important to note that SPL always refers to an rms pressure level and therefore not instantaneous pressure:

$$L_p = 10\log_{10}\left(\frac{1}{T}\int_T g(t)\,p^2(t)\,dt \Big/ p_0^2\right) \tag{A-3}$$

where $g(t)$ is an optional time weighting function. In many cases, the start time of the integration is marched forward in small time steps to produce a time-varying SPL function. For short acoustic events, such as sonar pulses and marine mammal vocalizations, it is important to choose an appropriate time window that matches the duration of the signal. For in-air studies, when evaluating the perceived loudness of sounds with rapid amplitude variations in time, the time weighting function $g(t)$ is often set to a decaying exponential function that emphasizes more recent pressure signals. This function mimics the leaky integration nature of mammalian hearing. For example, human-based fast time-weighted SPL ($L_{p,fast}$) applies an exponential function with time constant 125 ms. A related simpler approach used in underwater acoustics sets $g(t)$ to a boxcar (unity amplitude) function of width 125 ms; the results can be referred to as $L_{p,boxcar\ 125ms}$. Another approach, historically used to evaluate SPL of impulsive signals underwater, defines $g(t)$ as a boxcar function with edges set to the times corresponding to 5% and 95% of the cumulative square pressure function encompassing the duration of an impulsive acoustic event. This calculation is applied individually to each impulse signal, and the results are referred to as 90% SPL ($L_{p,90\%}$).

The sound exposure level (SEL or L_E; dB re 1 µPa²·s) is the time-integral of the squared acoustic pressure over a duration (T):

$$L_E = 10 \log_{10} \left(\int_T p^2(t)\, dt \Big/ T_0 p_0^2 \right) \quad \text{(A-4)}$$

where T_0 is a reference time interval of 1 s. SEL continues to increase with time when non-zero pressure signals are present. It is a dose-type measurement, so the integration time applied must be carefully considered for its relevance to impact to the exposed recipients.

SEL can be calculated over a fixed duration, such as the time of a single event or a period with multiple acoustic events. When applied to pulsed sounds, SEL can be calculated by summing the SEL of the N individual pulses. For a fixed duration, the square pressure is integrated over the duration of interest. For multiple events, the SEL can be computed by summing (in linear units) the SEL of the N individual events:

$$L_{E,N} = 10 \log_{10} \sum_{i=1}^{N} 10^{\frac{L_{E,i}}{10}} \quad \text{(A-5)}$$

If applied, the frequency weighting of an acoustic event should be specified, as in the case of weighted SEL (e.g., $L_{E,LF,24h}$; see Appendix A.5) or auditory-weighted SPL ($L_{p,ht}$). The use of fast, slow, or impulse exponential-time-averaging or other time-related characteristics should also be specified.

A.2. Particle Acceleration and Velocity Metrics

Since sound is a mechanical wave, it can also be measured in terms of the vibratory motion of fluid particles. Particle motion can be measured in terms of three different (but related) quantities: displacement, velocity, or acceleration. Acoustic particle velocity is the time derivative of particle displacement, and likewise acceleration is the time derivative of velocity. For the present study, acoustic particle motion has been reported in terms of acceleration and velocity.

The particle velocity (v) is the physical speed of a particle in a material moving back and forth in the direction of the pressure wave. It can be derived from the pressure gradient and Euler's linearised momentum equation where ρ_0 is the density of the medium:

$$v = -\int \nabla p(t) dt / \rho_0 \quad \text{(A-6)}$$

The particle acceleration (a) is the rate of change of the velocity with respect to time, and it can be obtained from equation A-6 as:

$$a = \frac{dv}{dt} = -\frac{\nabla p(t)}{\rho_0} \quad \text{(A-7)}$$

Unlike sound pressure, particle motion is a vector quantity, meaning that it has both magnitude and direction: at any given point in space, acoustic particle motion has three different time-varying components (x, y, and z). Given the particle velocity in the x, y, and z, directions, v_x, v_y, and v_z, the particle velocity magnitude $|v|$ is computed per the Pythagorean equation:

$$|v| = \sqrt{v_x + v_y + v_z} \quad \text{(A-8)}$$

The magnitude of particle acceleration is calculated similarly from the particle acceleration in the *x*, *y*, and *z* directions.

A.3. Decidecade Band Analysis

The distribution of a sound's power with frequency is described by the sound's spectrum. The sound spectrum can be split into a series of adjacent frequency bands. Splitting a spectrum into 1 Hz wide bands, called passbands, yields the power spectral density of the sound. This splitting of the spectrum into passbands of a constant width of 1 Hz, however, does not represent how animals perceive sound.

Because animals perceive exponential increases in frequency rather than linear increases, analysing a sound spectrum with passbands that increase exponentially in size better approximates real-world scenarios. In underwater acoustics, a spectrum is commonly split into decidecade bands, which are one tenth of a decade wide. They are approximately one third of an octave (base 2) wide and are therefore often referred to as 1/3-octave-bands. Each octave represents a doubling in sound frequency. The centre frequency of the ith band, $f_c(i)$, is defined as:

$$f_c(i) = 10^{\frac{i}{10}} \text{ kHz} \tag{A-9}$$

and the low (f_{lo}) and high (f_{hi}) frequency limits of the ith decade band are defined as:

$$f_{lo,i} = 10^{\frac{-1}{20}} f_c(i) \quad \text{and} \quad f_{hi,i} = 10^{\frac{1}{20}} f_c(i) \tag{A-10}$$

The decidecade bands become wider with increasing frequency, and on a logarithmic scale the bands appear equally spaced (Figure A-1). The acoustic modelling spans from band 7 (f_c (7) = 5 Hz) to band 44 ($f_c(44)$ = 25 kHz).

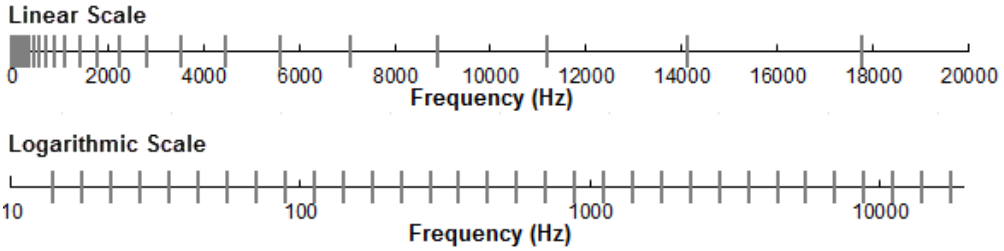

Figure A-1. Decidecade frequency bands (vertical lines) shown on a linear frequency scale and a logarithmic scale.

The sound pressure level in the ith band ($L_{p,i}$) is computed from the spectrum $S(f)$ between $f_{lo,i}$ and $f_{hi,i}$:

$$L_{p,i} = 10 \log_{10} \int_{f_{lo,i}}^{f_{hi,i}} S(f)\, df \tag{A-11}$$

Summing the sound pressure level of all the bands yields the broadband sound pressure level:

$$\text{Broadband SPL} = 10 \log_{10} \sum_i 10^{\frac{L_{p,i}}{10}} \tag{A-12}$$

Figure A-2 shows an example of how the decidecade band sound pressure levels compare to the sound pressure spectral density levels of an ambient noise signal. Because the decidecade bands are wider with increasing frequency, the decidecade band SPL is higher than the spectral levels at higher frequencies. Acoustic modelling of decidecade bands requires less computation time than 1 Hz bands and still resolves the frequency-dependence of the sound source and the propagation environment.

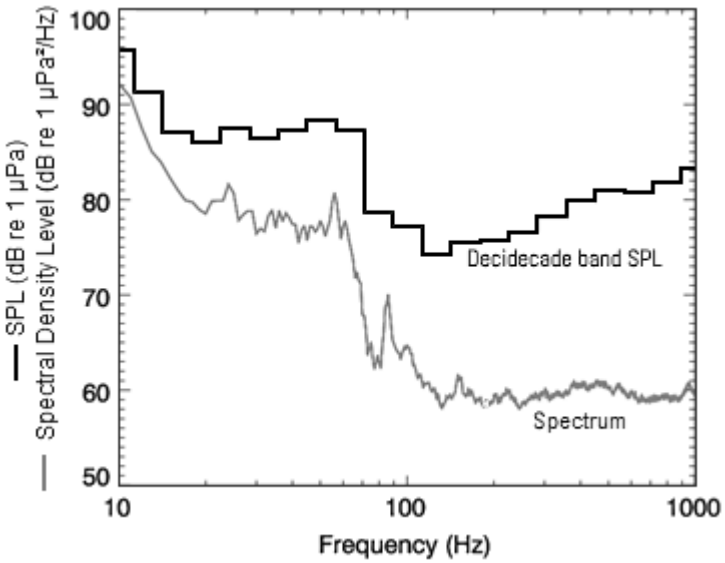

Figure A-2. Sound pressure spectral density levels and the corresponding decidecade band sound pressure levels of example ambient noise shown on a logarithmic frequency scale.

A.4. Marine Mammal Impact Criteria

It has been long recognised that marine mammals can be adversely affected by underwater anthropogenic noise. For example, Payne and Webb (1971) suggested that communication distances of fin whales are reduced by shipping sounds. Subsequently, similar concerns arose regarding effects of other underwater noise sources and the possibility that impulsive sources—primarily airguns used in seismic surveys—could cause auditory injury. This led to a series of workshops held in the late 1990s, conducted to address acoustic mitigation requirements for seismic surveys and other underwater noise sources (NMFS 1998, ONR 1998, Nedwell and Turnpenny 1998, HESS 1999, Ellison and Stein 1999). In the years since these early workshops, a variety of thresholds have been proposed for both injury and disturbance. The following sections summarize the recent development of thresholds; however, this field remains an active research topic.

A.4.1. Injury

In recognition of shortcomings of the SPL-only based injury criteria, in 2005 NMFS sponsored the Noise Criteria Group to review literature on marine mammal hearing to propose new noise exposure criteria. Some members of this expert group published a landmark paper (Southall et al. 2007) that suggested assessment methods similar to those applied for humans. The resulting recommendations introduced dual acoustic injury criteria for impulsive sounds that included peak pressure level thresholds and SEL_{24h} thresholds, where the subscripted 24h refers to the accumulation period for calculating SEL. The peak pressure level criterion is not frequency weighted whereas the SEL_{24h} is frequency weighted according to one of four marine mammal species hearing groups: low-, mid- and high-frequency cetaceans (LF, MF, and HF cetaceans, respectively) and Pinnipeds in Water (PINN). These weighting functions are referred to as M-weighting filters (analogous to the A-weighting filter for human; Appendix A.5). The SEL_{24h} thresholds were obtained by extrapolating measurements of onset levels of Temporary Threshold Shift (TTS) in belugas by the amount of TTS required to produce Permanent Threshold Shift (PTS) in chinchillas. The Southall et al. (2007) recommendations do not specify an exchange rate, which suggests that the thresholds are the same regardless of the duration of exposure (i.e., it implies a 3 dB exchange rate).

Wood et al. (2012) refined Southall et al.'s (2007) thresholds, suggesting lower injury values for LF and HF cetaceans while retaining the filter shapes. Their revised thresholds were based on TTS-onset levels in harbour porpoises from Lucke et al. (2009), which led to a revised impulsive sound PTS threshold for HF cetaceans of 179 dB re 1 $\mu Pa^2 \cdot s$. Because there were no data available for baleen whales, Wood et al. (2012) based their recommendations for LF cetaceans on results obtained from MF cetacean studies. In particular they referenced Finneran and Schlundt (2010) research, which found mid-frequency cetaceans are more sensitive to non-impulsive sound exposure than Southall et al. (2007) assumed. Wood et al. (2012) thus recommended a more conservative TTS-onset level for LF cetaceans of 192 dB re 1 $\mu Pa^2 \cdot s$.

As of present, an optimal approach is not apparent. There is consensus in the research community that an SEL-based method is preferable either separately or in addition to an SPL-based approach to assess the potential for injuries. In August 2016, after substantial public and expert input into three draft versions and based largely on the above-mentioned literature (NOAA 2013, 2015, 2016), NMFS finalised technical guidance for assessing the effect of anthropogenic sound on marine mammal hearing (NMFS 2016). The guidance describes injury criteria with new thresholds and frequency weighting functions for the five hearing groups described by Finneran and Jenkins (2012). The latest revision to this work was published in 2018; with the criteria defined in NMFS (2018). The latest criteria are from Southall et al. (2019) which is applied in this report.

A.4.2. Behavioural Response

Numerous studies on marine mammal behavioural responses to sound exposure have not resulted in consensus in the scientific community regarding the appropriate metric for assessing behavioural reactions. However, it is recognised that the context in which the sound is received affects the nature and extent of responses to a stimulus (Southall et al. 2007, Ellison and Frankel 2012, Southall et al. 2016).

For impulsive noise, NMFS currently uses step function thresholds of 160 dB re 1 µPa SPL (unweighted) to assess and regulate noise-induced behavioural impacts for marine mammals (NOAA 2018, NOAA 2019). The threshold for impulsive sound is derived from the High-Energy Seismic Survey (HESS) panel (HESS 1999) report that, in turn, is based on the responses of migrating mysticete whales to airgun sounds (Malme et al. 1984). The HESS team recognised that behavioural responses to sound may occur at lower levels, but significant responses were only likely to occur above a SPL of 140 dB re 1 µPa. Southall et al. (2007) found varying responses for most marine mammals between a SPL of 140 and 180 dB re 1 µPa, consistent with the HESS (1999) report, but lack of convergence in the data prevented them from suggesting explicit step functions.

A.5. Marine Mammal Frequency Weighting

The potential for noise to affect animals depends on how well the animals can hear it. Noises are less likely to disturb or injure an animal if they are at frequencies that the animal cannot hear well. An exception occurs when the sound pressure is so high that it can physically injure an animal by non-auditory means (i.e., barotrauma). For sound levels below such extremes, the importance of sound components at particular frequencies can be scaled by frequency weighting relevant to an animal's sensitivity to those frequencies (Nedwell and Turnpenny 1998, Nedwell et al. 2007).

A.5.1. Marine Mammal Frequency Weighting Functions

In 2015, a US Navy technical report by Finneran (2015) recommended new auditory weighting functions. The overall shape of the auditory weighting functions is similar to human A-weighting functions, which follows the sensitivity of the human ear at low sound levels. The new frequency-weighting function is expressed as:

$$G(f) = K + 10\log_{10}\left[\left(\frac{(f/f_{lo})^{2a}}{\left[1+(f/f_{lo})^{2}\right]^{a}\left[1+(f/f_{hi})^{2}\right]^{b}}\right)\right] \quad \text{(A-13)}$$

Finneran (2015) proposed five functional hearing groups for marine mammals in water: low-, mid- and high-frequency cetaceans (LF, MF, and HF cetaceans, respectively), phocid pinnipeds, and otariid pinnipeds. The parameters for these frequency-weighting functions were further modified the following year (Finneran 2016) and were adopted in NOAA's technical guidance that assesses acoustic impacts on marine mammals (NMFS 2018), and in the latest guidance by Southall (2019). The updates did not affect the content related to either the definitions of frequency-weighting functions or the threshold values. Table A-1 lists the frequency-weighting parameters for each hearing group. Figure A-3 shows the resulting frequency-weighting curves.

Table A-1. Parameters for the auditory weighting functions used in this project as recommended by Southall et al. (2019).

Hearing group	a	b	f_{lo} (Hz)	f_{hi} (kHz)	K (dB)
Low-frequency cetaceans (baleen whales)	1.0	2	200	19,000	0.13
High-frequency cetaceans (dolphins, plus toothed, beaked, and bottlenose whales)	1.6	2	8,800	110,000	1.20
Very-high-frequency cetaceans (true porpoises, *Kogia*, river dolphins, cephalorhynchid, *Lagenorhynchus cruciger* and *L. australis*)	1.8	2	12,000	140,000	1.36
Other marine carnivores in water (Australian sea lion, Australian fur seal, New Zealand fur seal, Penguins)	2.0	2	940	25,000	0.64

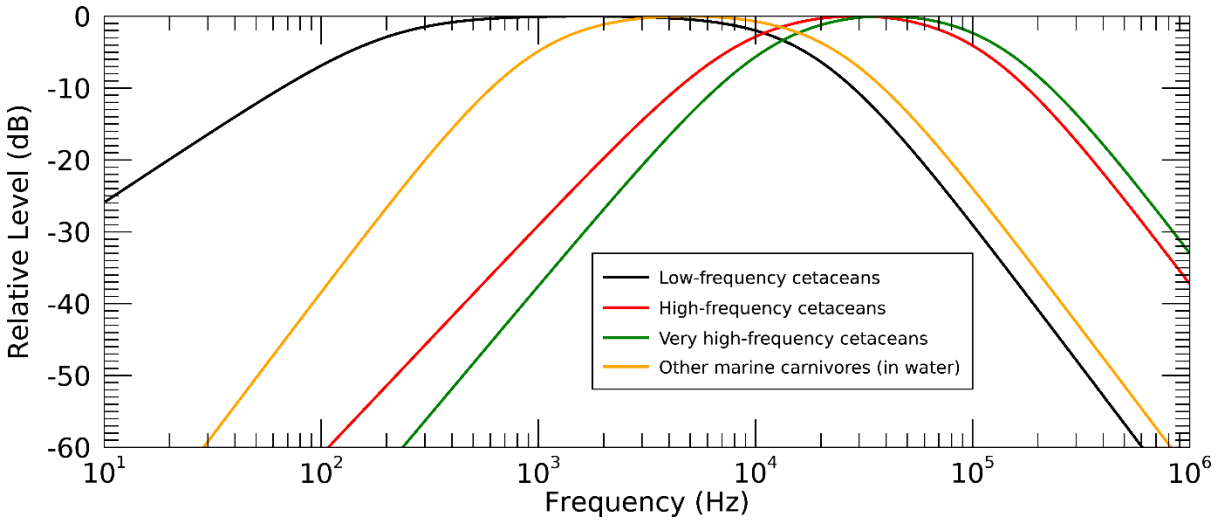

Figure A-3. Auditory weighting functions for functional marine mammal hearing groups used in this project as recommended by Southall et al. (2019).

Appendix B. Acoustic Source Model

B.1. Airgun Array Source Model

The source levels and directivity of the seismic source were predicted with JASCO's Airgun Array Source Model (AASM). AASM includes low- and high-frequency modules for predicting different components of the seismic source spectrum. The low-frequency module is based on the physics of oscillation and radiation of airgun bubbles, as originally described by Ziolkowski (1970), that solves the set of parallel differential equations that govern bubble oscillations. Physical effects accounted for in the simulation include pressure interactions between airguns, port throttling, bubble damping, and generator-injector (GI) gun behaviour discussed by Dragoset (1984), Laws et al. (1990), and Landrø (1992). A global optimisation algorithm tunes free parameters in the model to a large library of airgun source signatures.

While airgun signatures are highly repeatable at the low frequencies, which are used for seismic imaging, their sound emissions have a large random component at higher frequencies that cannot be predicted using a deterministic model. Therefore, AASM uses a stochastic simulation to predict the high-frequency (800−25,000 Hz) sound emissions of individual airguns, using a data-driven multiple-regression model. The multiple-regression model is based on a statistical analysis of a large collection of high quality seismic source signature data recently obtained from the Joint Industry Program (JIP) on Sound and Marine Life (Mattsson and Jenkerson 2008). The stochastic model uses a Monte-Carlo simulation to simulate the random component of the high-frequency spectrum of each airgun in an array. The mean high-frequency spectra from the stochastic model augment the low-frequency signatures from the physical model, allowing AASM to predict airgun source levels at frequencies up to 25,000 Hz.

AASM produces a set of "notional" signatures for each array element based on:

- Array layout
- Volume, tow depth, and firing pressure of each airgun
- Interactions between different airguns in the array

These notional signatures are the pressure waveforms of the individual airguns at a standard reference distance of 1 m; they account for the interactions with the other airguns in the array. The signatures are summed with the appropriate phase delays to obtain the far-field source signature of the entire array in all directions. This far-field array signature is filtered into decidecade-bands to compute the source levels of the array as a function of frequency band and azimuthal angle in the horizontal plane (at the source depth), after which it is considered a directional point source in the far field.

A seismic array consists of many sources and the point source assumption is invalid in the near field where the array elements add incoherently. The maximum extent of the near field of an array (R_{nf}) is:

$$R_{\mathrm{nf}} < \frac{l^2}{4\lambda} \tag{B-1}$$

where λ is the sound wavelength and l is the longest dimension of the array (Lurton 2002, §5.2.4). For example, a seismic source length of l = 21 m yields a near-field range of 147 m at 2 kHz and 7 m at 100 Hz. Beyond this R_{nf} range, the array is assumed to radiate like a directional point source and is treated as such for propagation modelling.

The interactions between individual elements of the array create directionality in the overall acoustic emission. Generally, this directionality is prominent mainly at frequencies in the mid-range between

tens of hertz to several hundred hertz. At lower frequencies, with acoustic wavelengths much larger than the inter-airgun separation distances, the directionality is small. At higher frequencies, the pattern of lobes is too finely spaced to be resolved and the effective directivity is less.

B.2. Seismic Source

The layout of the 2820 in^3 seismic sources used for modelling in this study is provided in Figure B-1. Details of the airgun parameters are provided in Table B-1.

For the modelled array, the layout is presented in a nominal cartesian coordinate system. In this coordinate system the direction of vessel travel determines the relative position of the array elements as plotted and tabulated. The layout used for acoustic modelling was produced by transforming the coordinates of client supplied layouts such that the resultant layouts correspond to a vessel travel direction along the positive X-axis and the array is centred on the X-Y origin. When used with an acoustic model the positive X-axis in this nominal coordinate system aligns with the vessel tow direction or survey line azimuth.

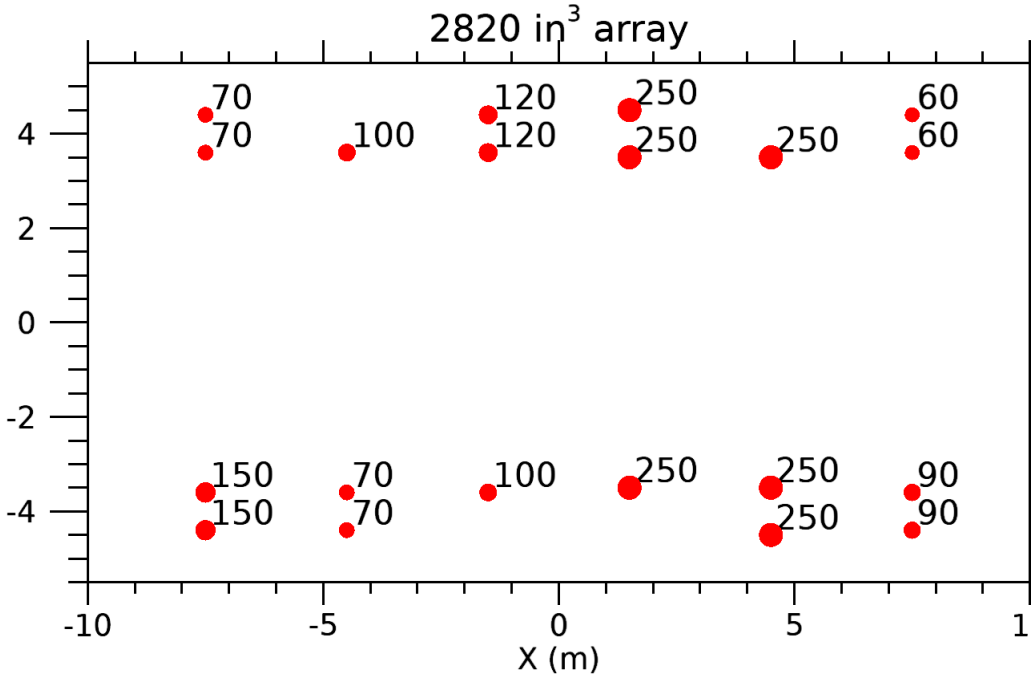

Figure B-1. Layout of the modelled 2820 in^3 seismic source where the plotted layout is such that the array is centred on the origin and vessel travel direction is in the positive x-direction. Tow depth was 7 m. The labels indicate the firing volume (in cubic inches) for each airgun. Also see Table B-1.

Table B-1. Layout of the modelled 2820 in^3 seismic source. Tow depth was 7 m. Firing pressure for all guns was 2000 psi. Greyed out values indicate spares. Also see Figure B-1.

String	Gun	*x* (m)	*y* (m)	*z* (m)	Vol (in^3)	String	Gun	*x* (m)	*y* (m)	*z* (m)	Vol (in^3)
1	1	7.5	-4.4	7	90	2	13	7.5	3.6	7	60
	2	7.5	-3.6	7	90		14	7.5	4.4	7	60
	3	4.5	-4.5	7	250		15	4.5	3.5	7	250
	4	4.5	-3.5	7	250		16	4.5	4.5	7	220
	5	1.5	-4.5	7	250		17	1.5	3.5	7	250
	6	1.5	-3.5	7	250		18	1.5	4.5	7	250
	7	-1.5	-4.4	7	100		19	-1.5	3.6	7	120
	8	-1.5	-3.6	7	100		20	-1.5	4.4	7	120
	9	-4.5	-4.4	7	70		21	-4.5	3.6	7	100
	10	-4.5	-3.6	7	70		22	-4.5	4.4	7	100
	11	-7.5	-4.4	7	150		23	-7.5	3.6	7	70
	12	-7.5	-3.6	7	150		24	-7.5	4.4	7	70

B.3. Array Source Levels and Directivity

Figure B-2 shows the broadside (perpendicular to the tow direction), endfire (parallel to the tow direction) and vertical overpressure signature and corresponding power spectrum levels for the 2820 in^3 seismic source (Appendix B.2). Horizontal decidecade-band source levels are shown as a function of band centre frequency and azimuth in Figure B-3.

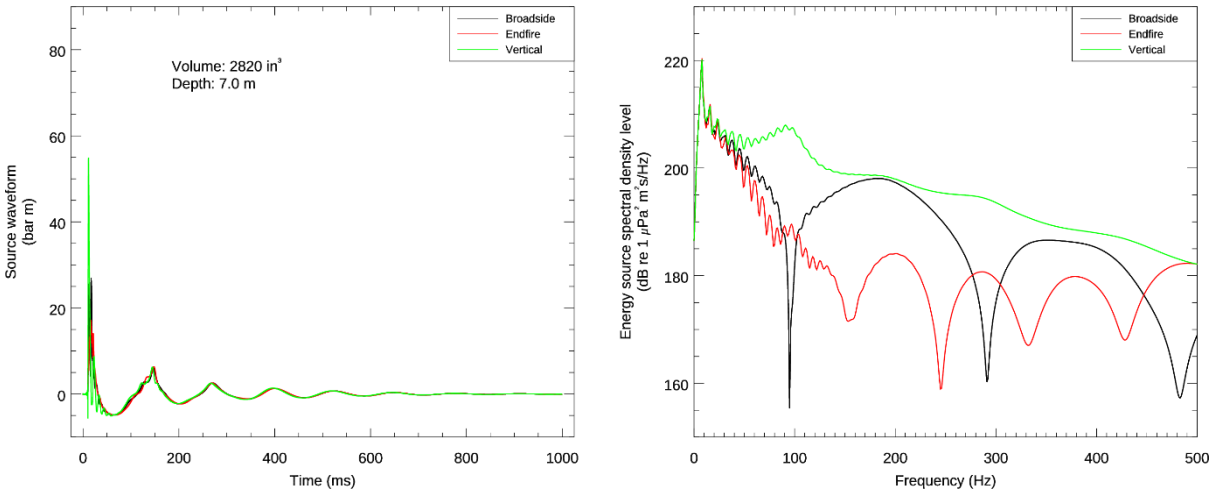

Figure B-2. Predicted source level details for the 2820 in^3 seismic source with a 7 m tow depth. (Left) the overpressure signature and (right) the power spectrum for in-plane horizontal (broadside), perpendicular (endfire), and vertical directions (no surface ghost).

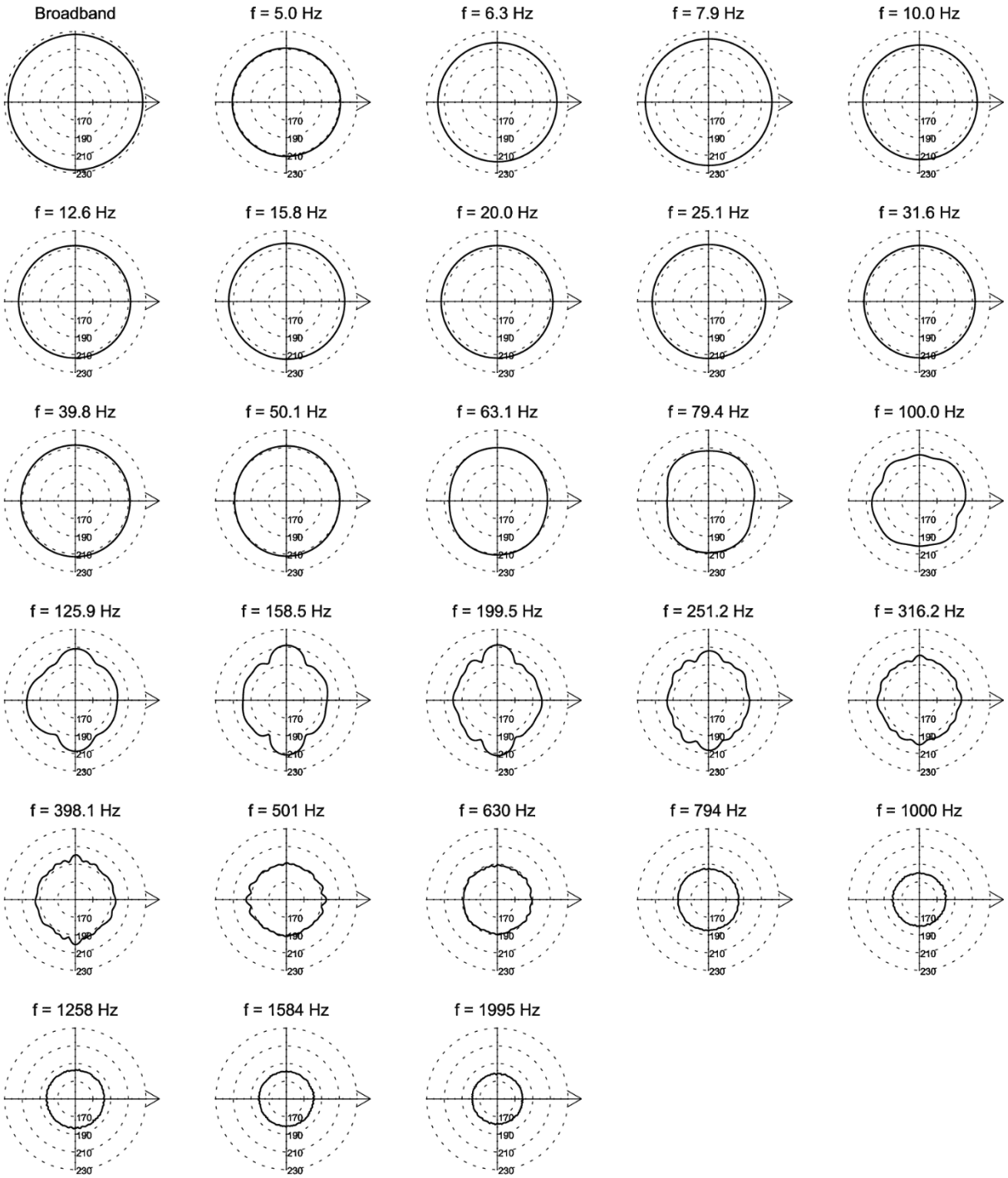

Figure B-3. Directionality of the predicted horizontal source levels for the 2820 in^3 seismic source, 5 Hz to 2 kHz. Source levels (in dB re 1 $\mu Pa^2 \cdot s\ m^2$) are shown as a function of azimuth for the centre frequencies of the decidecade bands modelled; frequencies are shown above the plots. The perpendicular direction to the frame is to the right. Tow depth was 7 m (see Table B-1).

Appendix C. Sound Propagation Models

C.1. MONM-BELLHOP

Long-range sound fields were computed using JASCO's Marine Operations Noise Model (MONM). Compared to VSTACK, MONM less accurately predicts steep-angle propagation for environments with higher shear speed but is well suited for effective longer-range estimation. This model computes sound propagation at frequencies of 5 Hz to 1 kHz via a wide-angle parabolic equation solution to the acoustic wave equation (Collins 1993) based on a version of the US Naval Research Laboratory's Range-dependent Acoustic Model (RAM), which has been modified to account for a solid seabed (Zhang and Tindle 1995). MONM computes sound propagation at frequencies >1 kHz via the BELLHOP Gaussian beam acoustic ray-trace model (Porter and Liu 1994).

The parabolic equation method has been extensively benchmarked and is widely employed in the underwater acoustics community (Collins et al. 1996). MONM accounts for the additional reflection loss at the seabed, which results from partial conversion of incident compressional waves to shear waves at the seabed and sub-bottom interfaces, and it includes wave attenuations in all layers. MONM incorporates the following site-specific environmental properties: a bathymetric grid of the modelled area, underwater sound speed as a function of depth, and a geoacoustic profile based on the overall stratified composition of the seafloor.

This version of MONM accounts for sound attenuation due to energy absorption through ion relaxation and viscosity of water in addition to acoustic attenuation due to reflection at the medium boundaries and internal layers (Fisher and Simmons 1977). The former type of sound attenuation is significant for frequencies higher than 5 kHz and cannot be neglected without noticeably affecting the model results.

MONM computes acoustic fields in three dimensions by modelling transmission loss within two-dimensional (2-D) vertical planes aligned along radials covering a 360° swath from the source, an approach commonly referred to as N×2-D. These vertical radial planes are separated by an angular step size of $\Delta\theta$, yielding N = 360°/$\Delta\theta$ number of planes (Figure C-1).

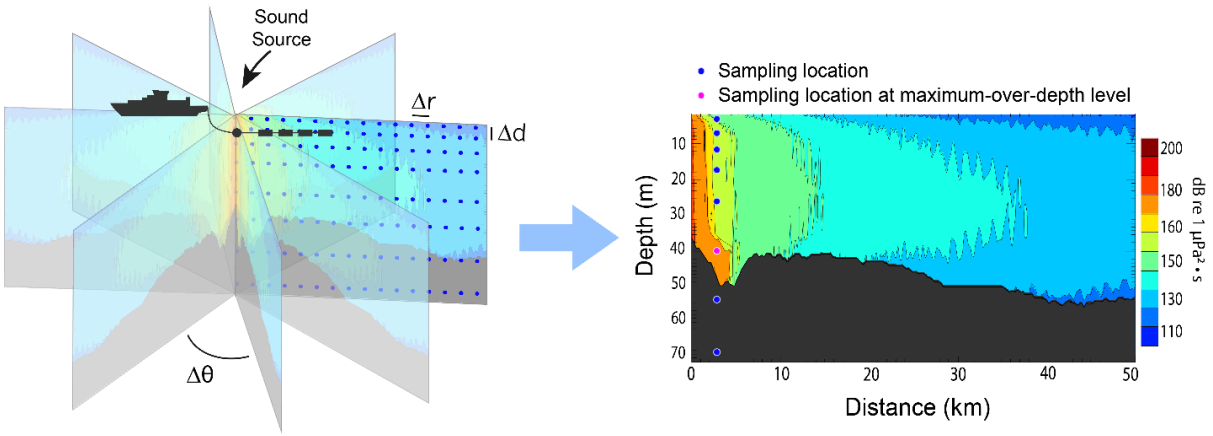

Figure C-1. The N×2-D and maximum-over-depth modelling approach used by MONM.

MONM treats frequency dependence by computing acoustic transmission loss at the centre frequencies of decidecade bands. Sufficiently many decidecade bands, starting at 5 Hz, are modelled to include most of the acoustic energy emitted by the source. At each centre frequency, the transmission loss is modelled within each of the N vertical planes as a function of depth and range from the source. The decidecade band received per-pulse SEL are computed by subtracting the band transmission loss values from the directional source level in that frequency band. Composite

broadband received per-pulse SEL are then computed by summing the received decidecade band levels.

The received per-pulse SEL sound field within each vertical radial plane is sampled at various ranges from the source, generally with a fixed radial step size. At each sampling range along the surface, the sound field is sampled at various depths, with the step size between samples increasing with depth below the surface. The step sizes are chosen to provide increased coverage near the depth of the source and at depths of interest in terms of the sound speed profile. The maximum received per-pulse SEL at many sampling depths are taken over all samples within the water column, i.e., the maximum-over-depth received per-pulse SEL. These maximum-over-depth per-pulse SEL are presented as contours around the source.

C.2. Full Waveform Range-dependent Acoustic Model: FWRAM

For impulsive sounds from the seismic source, time-domain representations of the pressure waves generated in the water are required to calculate SPL and PK. Furthermore, the seismic source must be represented as a distributed source to accurately characterise vertical directivity effects in the near-field zone. For this study, synthetic pressure waveforms were computed using FWRAM, which is a time-domain acoustic model based on the same wide-angle parabolic equation (PE) algorithm as MONM. FWRAM computes synthetic pressure waveforms versus range and depth for range-varying marine acoustic environments, and it takes the same environmental inputs as MONM (bathymetry, water sound speed profile, and seafloor geoacoustic profile). Unlike MONM, FWRAM computes pressure waveforms via Fourier synthesis of the modelled acoustic transfer function in closely spaced frequency bands. FWRAM employs the array starter method to accurately model sound propagation from a spatially distributed source (MacGillivray and Chapman 2012).

Besides providing direct calculations of the PK and SPL, the synthetic waveforms from FWRAM can also be used to convert the SEL values from MONM to SPL.

C.3. Wavenumber Integration Model

Sound pressure levels near the seismic source were modelled using JASCO's VSTACK wavenumber integration model. VSTACK computes synthetic pressure waveforms versus depth and range for arbitrarily layered, range-independent acoustic environments using the wavenumber integration approach to solve the exact (range-independent) acoustic wave equation. This model is valid over the full angular range of the wave equation and can fully account for the elasto-acoustic properties of the sub-bottom. Wavenumber integration methods are extensively used in the field of underwater acoustics and seismology where they are often referred to as reflectivity methods or discrete wavenumber methods. VSTACK computes sound propagation in arbitrarily stratified water and seabed layers by decomposing the outgoing field into a continuum of outward-propagating plane cylindrical waves. Seabed reflectivity in the model is dependent on the seabed layer properties: compressional and shear wave speeds, attenuation coefficients, and layer densities. The output of the model can be post-processed to yield estimates of the SEL, SPL, and PK.

VSTACK accurately predicts steep-angle propagation in the proximity of the source, but it is computationally slow at predicting sound pressures at large distances due to the need for smaller wavenumber steps with increasing distance. Additionally, VSTACK assumes range-invariant bathymetry with a horizontally stratified medium (i.e., a range-independent environment) which is azimuthally symmetric about the source. VSTACK is thus best suited to modelling the sound field near the source.

C.3.1. Particle Motion

VSTACK was also used to compute estimates of particle acceleration and velocity at four sites for the 2820 in^3 seismic source. Particle motion waveforms were modelled, and pulse metrics were computed from the time-domain traces. VSTACK uses the wavenumber integration approach to solve the exact acoustic wave equation for arbitrarily layered range-independent acoustic environments.

The VSTACK model setup for the particle velocity scenarios was identical to that for the peak pressure scenarios (Section 5.2.1.2) in terms of source treatment, frequency range and environmental model. The particle acceleration and velocity waveforms were computed to a maximum distance of 1000 m in the broadside and endfire directions from the centre of the airgun array for a receiver 5 cm above the seafloor.

As discussed above in Appendix A.2, particle velocity (v) is the physical speed of a particle in a material. It can be derived from the pressure gradient and Euler's linearised momentum equation where ρ_0 is the density of the medium. Since the wavenumber integration kernel is a product of analytic expressions in terms of range and depth, VSTACK computes particle velocity by computing the spatial gradient of the pressure field analytically in the frequency domain. Fourier synthesis is applied to compute time series synthetic pressure and/or velocity waveforms at depth and range receivers by convolving the source waveforms with the impulse response of the waveguide. Particle velocity metrics at each receiver location were calculated from the modelled particle motion along three perpendicular axes (horizontal and along the source-receiver path, horizontal and perpendicular to the source-receiver path, and vertical).

The particle velocity results were converted to acceleration by time differentiation. The peak particle acceleration and velocity were calculated from the maximum of the predicted acceleration and velocity magnitude, defined as "peak magnitude".

C.3.2. Limestone Seabed Propagation Loss

For all modelled sites, an additional broadband correction was applied to the propagation loss results from MONM to better account for the additional propagation loss associated with a calcarenite/limestone seabed. The differences between the broadband per-pulse SEL from MONM and VSTACK were extracted at the same modelled ranges and depths for corresponded range independent environments. The 90th percentile of the resultant dB differences in range bins were selected to generate a correction function for representative sites to be modelled. The conversion functions were applied after to the summed decidecade band levels from MONM, but before gridding, and radii calculations for each modelled site in each modelled scenario considered.

Appendix D. Methods and Parameters

D.1. Estimating Range to Thresholds Levels

Sound level contours were calculated based on the underwater sound fields predicted by the propagation models, sampled by taking the maximum value over all modelled depths above the sea floor for each location in the modelled region. The predicted distances to specific levels were computed from these contours. Two distances relative to the source are reported for each sound level: 1) R_{max}, the maximum range to the given sound level over all azimuths, and 2) $R_{95\%}$, the range to the given sound level after the 5% farthest points were excluded (see examples in Figure D-1).

The $R_{95\%}$ is used because sound field footprints are often irregular in shape. In some cases, a sound level contour might have small protrusions or anomalous isolated fringes. This is demonstrated in the image in Figure D-1(a). In cases such as this, where relatively few points are excluded in any given direction, R_{max} can misrepresent the area of the region exposed to such effects, and $R_{95\%}$ is considered more representative. In strongly asymmetric cases such as shown in Figure D-1(b), on the other hand, $R_{95\%}$ neglects to account for significant protrusions in the footprint. In such cases R_{max} might better represent the region of effect in specific directions. Cases such as this are usually associated with bathymetric features affecting propagation. The difference between R_{max} and $R_{95\%}$ depends on the source directivity and the non-uniformity of the acoustic environment.

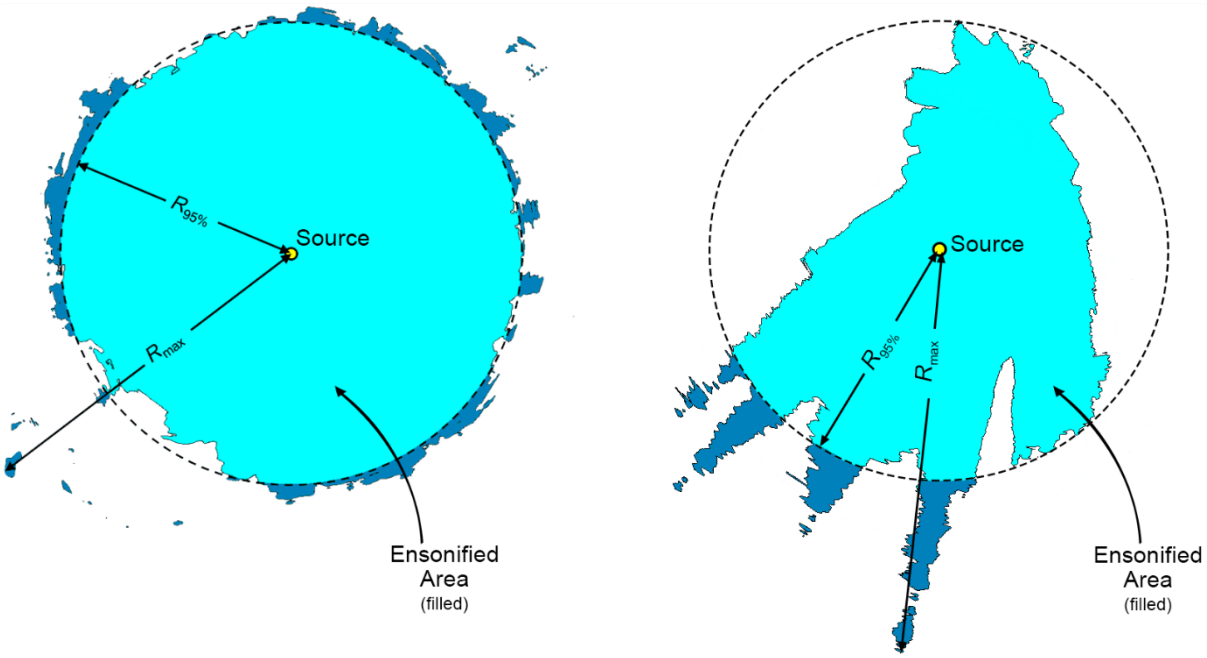

Figure D-1. Sample areas ensonified to an arbitrary sound level with R_{max} and $R_{95\%}$ ranges shown for two scenarios. (a) Largely symmetric sound level contour with small protrusions. (b) Strongly asymmetric sound level contour with long protrusions. Light blue indicates the ensonified areas bounded by $R_{95\%}$; darker blue indicates the areas outside this boundary which determine R_{max}.

D.2. Estimating SPL from Modelled SEL Results

The per-pulse SEL of sound pulses is an energy-like metric related to the dose of sound received over a pulse's entire duration. The pulse SPL on the other hand, is related to its intensity over a specified time interval. Seismic pulses typically lengthen in duration as they propagate away from their source, due to seafloor and surface reflections, and other waveguide dispersion effects. The changes in pulse length, and therefore the time window considered, affect the numeric relationship between SPL and SEL. This study has applied a fixed window duration to calculate SPL (T_{fix} = 125 ms; see Appendix A.1), as implemented in Martin et al. (2017b). Full-waveform modelling was used to estimate SPL, but this type of modelling is computationally intensive, and can be prohibitively time consuming when run at high spatial resolution over large areas.

For the current study, FWRAM (Appendix C.2) was used to model synthetic seismic pulses over the frequency range 5–1024 Hz. This was performed along all broadside and endfire radials at five sites. FWRAM uses Fourier synthesis to recreate the signal in the time domain so that both the SEL and SPL from the source can be calculated. The differences between the SEL and SPL were extracted for all ranges and depths that corresponded to those generated from the high spatial-resolution results from MONM. A 125 ms fixed time window positioned to maximize the SPL over the pulse duration was applied. The resulting SEL-to-SPL offsets were averaged in 0.02 km range bins along each modelled radial and depth, and the 90th percentile was selected at each range to generate a generalised range-dependent conversion function for each site. The range-dependent conversion function was applied to predicted per-pulse SEL results from MONM to model SPL values. Figures D-2 to D-6 show the conversion offsets for Sites 2, 3, 5, 8, and 10 with the 2820 in^3 array; the spatial variation is caused by changes in the received airgun pulse as it propagates from the source. The conversion to SPL from SEL was conducted considering the water depth and seabed geology at a given modelled site.

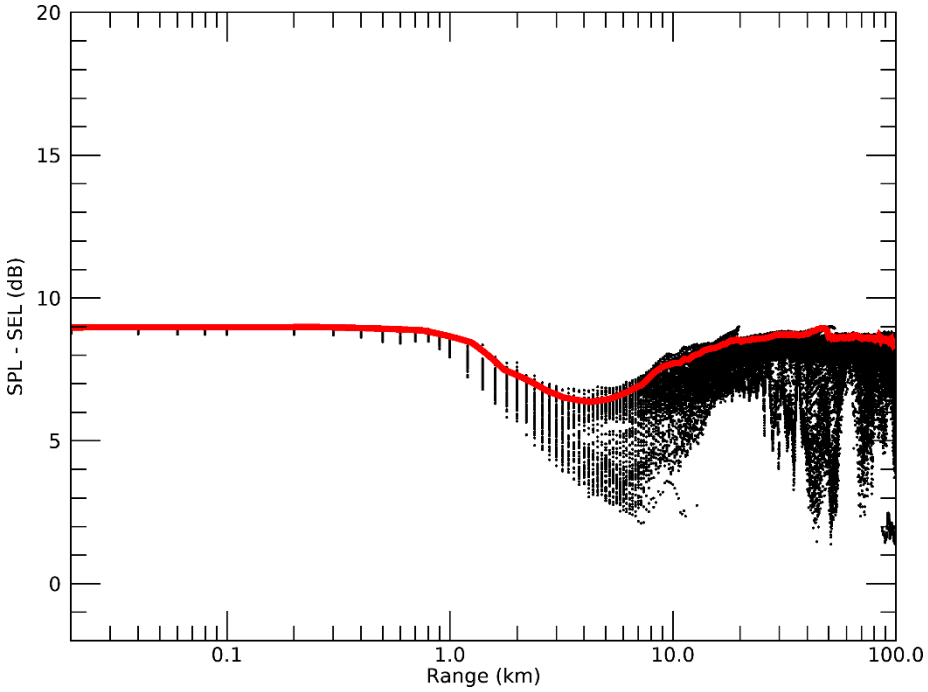

Figure D-2. *Site 2 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. Slices are shown for the 2820 in^3 seismic source. Black lines are the modelled differences between SEL and SPL across different radials and receiver depths; the solid red line is the 90th percentile of the modelled differences at each range.

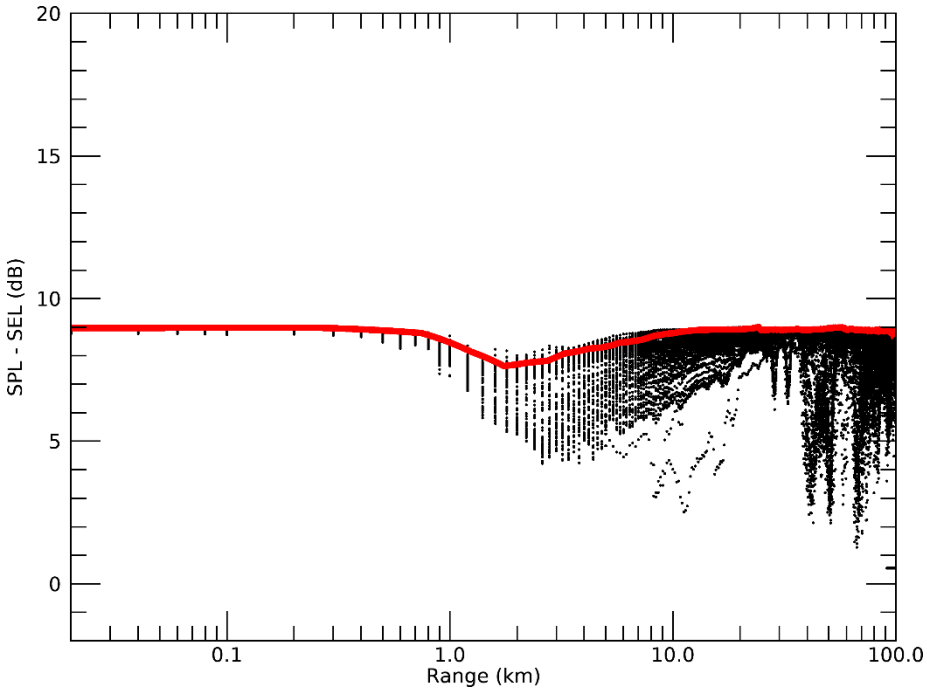

Figure D-3. *Site 3 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. Slices are shown for the 2820 in^3 seismic source. Black lines are the modelled differences between SEL and SPL across different radials and receiver depths; the solid red line is the 90th percentile of the modelled differences at each range.

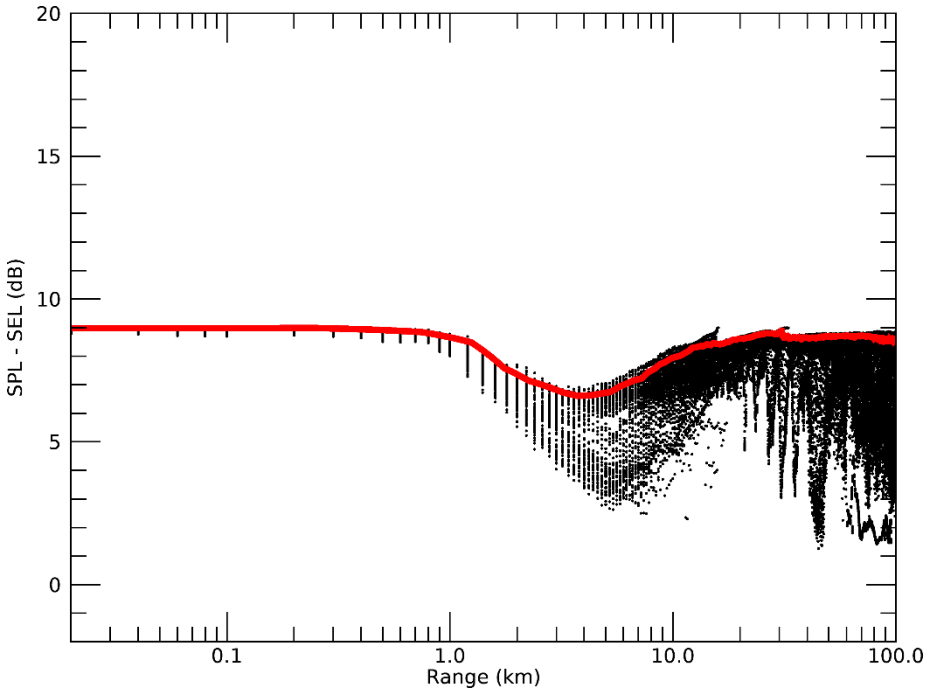

Figure D-4. *Site 5 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. Slices are shown for the 2820 in^3 seismic source. Black lines are the modelled differences between SEL and SPL across different radials and receiver depths; the solid red line is the 90th percentile of the modelled differences at each range.

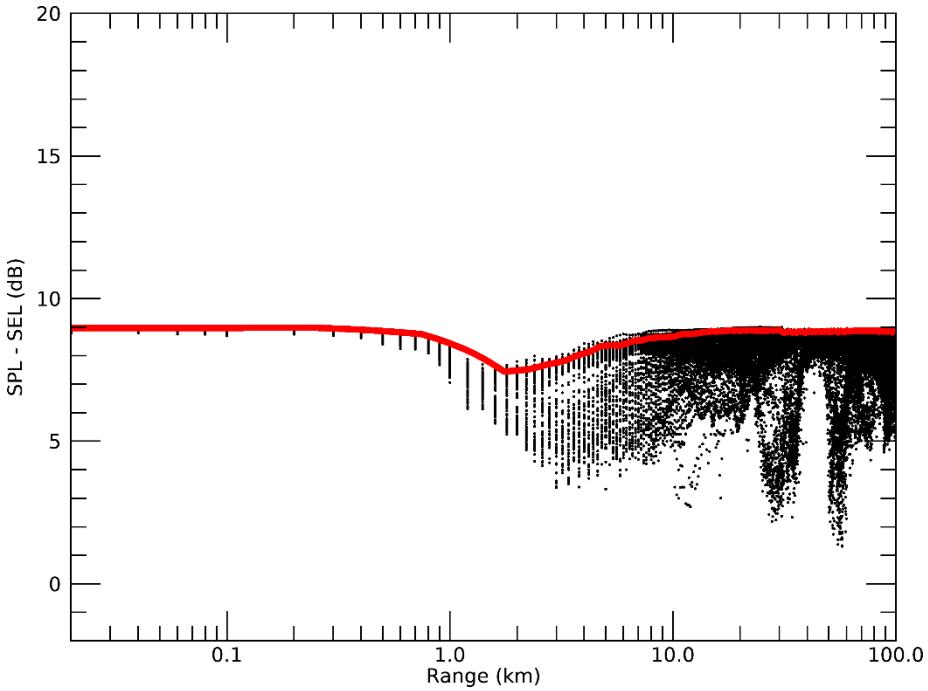

Figure D-5. *Site 8 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. Slices are shown for the 2820 in^3 seismic source. Black lines are the modelled differences between SEL and SPL across different radials and receiver depths; the solid red line is the 90th percentile of the modelled differences at each range.

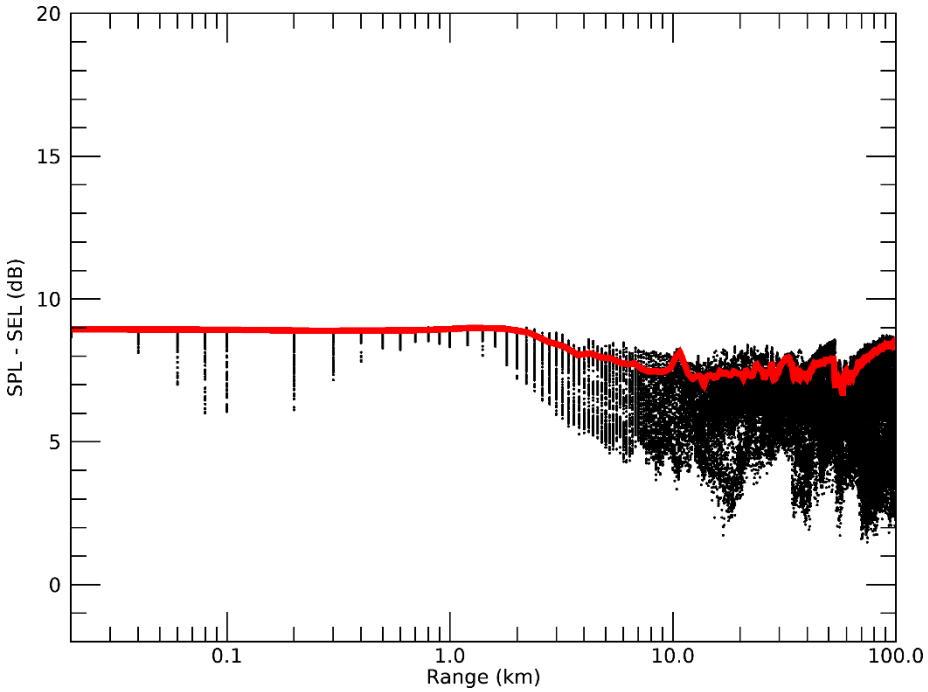

Figure D-6. *Site 10 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. Slices are shown for the 2820 in^3 seismic source. Black lines are the modelled differences between SEL and SPL across different radials and receiver depths; the solid red line is the 90th percentile of the modelled differences at each range.

D.3. Environmental Parameters

D.3.1. Bathymetry

Water depths throughout the modelled area were extracted from Australian Bathymetry and Topography Grid, a 9 arc-second grid rendered for Australian waters (Whiteway 2009). Bathymetry data was extracted and re-gridded onto a Map Grid of Australia (MGA) coordinate projection (Zone 54) with a regular grid spacing of 200 × 200 m to generate the bathymetry in Figure D-7.

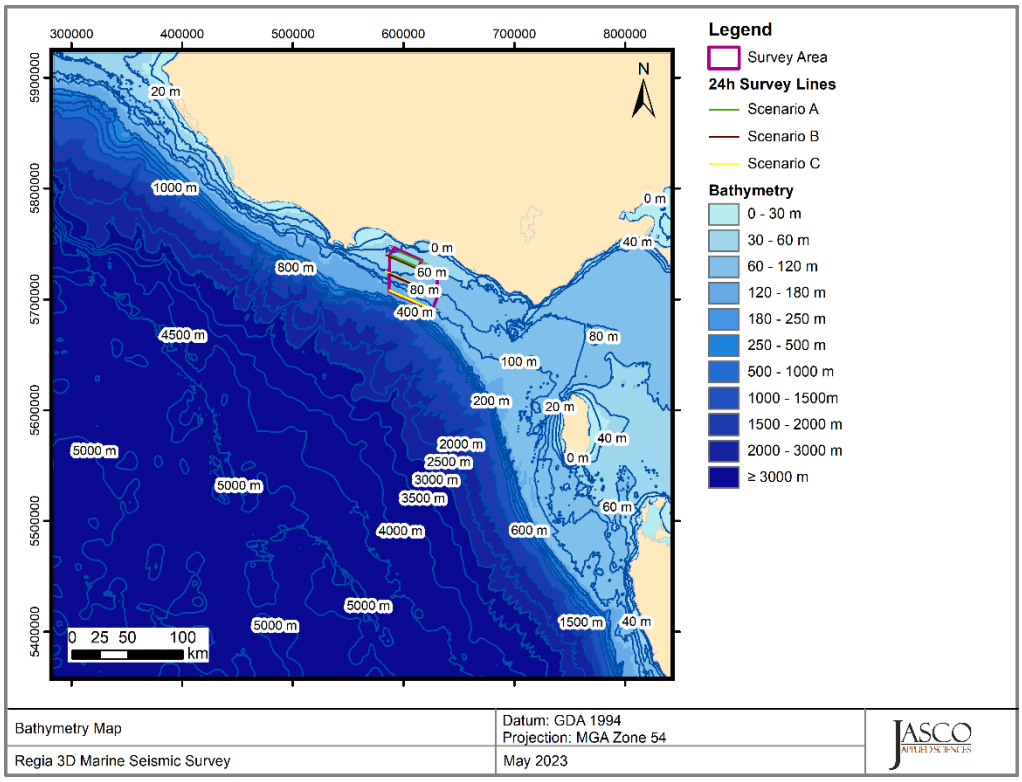

Figure D-7. Bathymetry map of the modelling area for the Regia Marine Seismic Survey.

D.3.2. Sound Speed Profile

The sound speed profiles for the modelled sites were derived from temperature and salinity profiles from the US Naval Oceanographic Office's Generalized Digital Environmental Model V 3.0 (GDEM; Teague et al. 1990, Carnes 2009). GDEM provides an ocean climatology of temperature and salinity for the world's oceans on a latitude-longitude grid with 0.25° resolution, with a temporal resolution of one month, based on global historical observations from the US Navy's Master Oceanographic Observational Data Set (MOODS). The climatology profiles include 78 fixed depth points to a maximum depth of 6800 m (where the ocean is that deep). The GDEM temperature-salinity profiles were converted to sound speed profiles according to Coppens (1981).

Mean monthly sound speed profiles were derived from the GDEM profiles within a 100 km box radius encompassing all modelled sites. The December sound speed profile is expected to be most favourable to longer-range sound propagation during the proposed survey time frame due its upward refracting profile. As such, December was selected for sound propagation modelling to ensure precautionary estimates of distances to received sound level thresholds. Figure D-8 shows the resulting profile used as input to the sound propagation modelling.

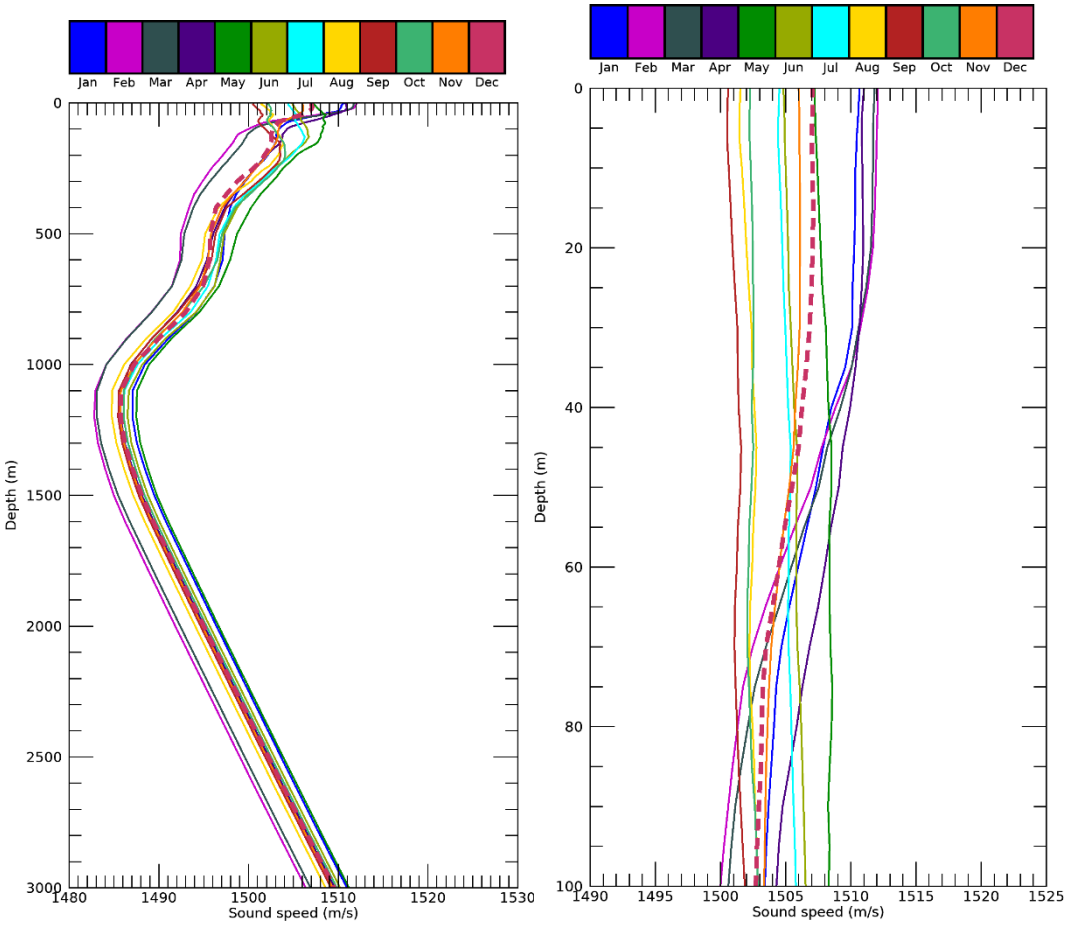

Figure D-8. The sound speed profile (December) used for all modelling, showing the entire water column (left) and the top 100 m within the profile (right). Profiles are calculated from temperature and salinity profiles from GDEM V 3.0 (GDEM; Teague et al. 1990, Carnes 2009).

D.3.3. Geoacoustics

The geoacoustic parameters used for modelling have been sourced from previous public reports completed by Jasco for modelling projects in the surrounding area. Similar to previous modelling studies in the region (Wood and McPherson 2018, Koessler et al. 2020, Matthews et al. 2020, McPherson et al. 2021), several seabed types were considered for modelling. These seabed profiles are indicative of a benthic environment located on the continental shelf and upper slope and are consistent with larger scale geological data and interpretations of the Australian continental shelf environment (James and Bone 2010) within the Otway region.

For the sites modelled in shallow water (less than 50 m depth) the seabed was modelled as a sand layer underlain by variably cemented calcarenite. Literature and public reports suggest that this layer likely begins to thin as water depths increase in an offshore direction (Koessler et al. 2020, Matthews et al. 2020, McPherson et al. 2021), and for water depths greater than 50 m it was considered absent with only the variably calcarenite present at the seafloor interface. These two seabed profiles are consistent with profiles described in association with measurement data (McCauley et al. 2016), and other modelling studies in the region (AIMS 2018).

Sites located above the calcarenite seabed generally displayed higher rates of loss (Duncan et al. 2009) at distance away from the source as compared to sites where a layer of sand overlies calcarenite and as such additional modelling was conducted to account for the propagation loss associated with a limestone seabed and additional modelled was conducted to account for the loss

associated with exposed calcarenite (see Appendix C.3.2). For sites located in water along the shelf, geoacoustic parameters considered for modelling are provided in Tables D-1 and D-2

Table D-1. Geoacoustic profile used in the acoustic propagation models less than 50 m water depth. Within each depth range, each parameter varies linearly within the stated range.

Depth below seafloor (m)	Material	Density (g/cm³)	Compressional wave		Shear wave	
			Speed (m/s)	Attenuation (dB/λ)	S-wave speed (m/s)	S-wave attenuation (dB/λ)
0-5	Fine Carbonate Sand	2.1	1634-1803	0.09-0.73	315	3.65
5-25	Increasingly cemented calcarenite	2.2	2000-2120	0.30-0.34		
25-45		2.3	2120-2240	0.34-0.38		
45-65		2.4	2240-2360	0.38-0.42		
65-85		2.5	2360-2480	0.42-0.46		
85-105		2.6	2480-2600	0.46-0.50		
>105	Well-cemented calcarenite	2.7	2600	0.50		

Table D-2. Geoacoustic profile used in the acoustic propagation models for between 50 m and 150 m water depth.Within each depth range, each parameter varies linearly within the stated range.

Depth below seafloor (m)	Material	Density (g/cm³)	Compressional wave		Shear wave	
			Speed (m/s)	Attenuation (dB/λ)	S-wave speed (m/s)	S-wave attenuation (dB/λ)
0-1	Well-cemented carbonate caprock	2.7	2600	0.5	500	0.4
1-20	Increasingly cemented calcarenite	2.2	2000-2120	0.30-0.34		
20-40		2.3	2120-2240	0.34-0.38		
40-60		2.4	2240-2360	0.38-0.42		
60-80		2.5	2360-2480	0.42-0.46		
80-10		2.6	2480-2600	0.46-0.50		
>100	Well-cemented calcarenite	2.7	2600	0.50		

For sites located along the shelf break/upper continental slope, the geoacoustic parameters used for modelling was derived from sedimentary grain size measurements from the Australian Government's Marine Sediments (MARS) database (Heap 2009). On average, the surficial grain size indicates silty carbonate sand is present. Information on the deeper geological structure was sparse, as such the seabed was assumed to consist of a thick package of unconsolidated sediments. However, this is consistent with the "shaved shelf" model of the discussed in James and Bone 2010, where sediments are transported and deposited from the shelf onto the slope. Representative grain sizes and porosity

were used in the grain-shearing model proposed by Buckingham (2005) to estimate the geoacoustic parameters required by the sound propagation models. Table D-3 lists the geoacoustic parameters used for modelling for sites in water depths greater than 150 m.

Table D-3. Geoacoustic profile used in the acoustic propagation models for all modelled sites greater than 150 m water depth. Within each depth range, each parameter varies linearly within the stated range.

Depth below seafloor (m)	Predicted lithology	Density (g/cm^3)	Compressional wave		Shear wave	
			Speed (m/s)	Attenuation (dB/λ)	Speed (m/s)	Attenuation (dB/λ)
0–10	Silty carbonate sand to semi-cemented carbonate	1.88	1605–1700	0.35–0.70	255	3.65
10–20		1.88–1.89	1700–1755	0.70–0.85		
20–50		1.89–1.90	1755–1850	0.85–1.15		
50–100		1.90–1.92	1850–1950	1.15–1.35		
100–200		1.92–1.96	1950–2100	1.35–1.60		
200–500		1.96–2.05	2100–2355	1.60–1.95		
>500		2.05	2355	1.95		

D.4. Animal Movement and Exposure Modelling

Animal movement and exposure modelling considers the movement of both sound sources and animals over time. Acoustic source and propagation modelling are used to generate 3-D sound fields that vary as a function of distance to source, depth, and azimuth. Sound sources are modelled at representative sites and the resulting sound fields are assigned to source locations using the minimum Euclidean distance. The sound received by an animal at any given time depends on its location relative to the source. Because the true locations of the animals within the sound fields are unknown, realistic animal movements are simulated using repeated random sampling of various behavioural parameters. The Monte Carlo method of simulating many animals within the operations area is used to estimate the sound exposure history of the population of simulated animals (animats).

Monte Carlo methods provide a heuristic approach for determining the probability distribution function (PDF) of complex situations, such as animals moving in a sound field. The probability of an events occurrence is determined by the frequency with which it occurs in the simulation. The greater the number of random samples, in this case the more simulated animats, the better the approximation of the PDF. Animats are randomly placed, or seeded, within the simulation boundary at a specified density (animats/km^2). Higher densities provide a finer PDF estimate resolution but require more computational resources. To ensure good representation of the PDF, the animat density is set as high as practical allowing for computation time. The animat density is much higher than the real-world density to ensure good representation of the PDF. The resulting PDF is scaled using the real-world density.

Several models for marine mammal movement have been developed (Ellison et al. 1987, Frankel et al. 2002, Houser 2006). These models use an underlying Markov chain to transition from one state to another based on probabilities determined from measured swimming behaviour. The parameters may represent simple states, such as the speed or heading of the animal, or complex states, such as likelihood of participating in foraging, play, rest, or travel. Attractions and aversions to variables like anthropogenic sounds and different depth ranges can be included in the models.

The JASCO Animal Simulation Model Including Noise Exposure (JASMINE) was based on the open-source marine mammal movement and behaviour model (3MB, Houser 2006) and used to predict the exposure of animats to sound arising from the anthropogenic activities. Animats are programmed to behave like the species likely to be present in the survey area. The parameters used for forecasting realistic behaviours (e.g., diving, foraging, aversion, surface times, etc.) are determined and interpreted from marine species studies (e.g., tagging studies) where available, or reasonably extrapolated from related species. An individual animats modelled sound exposure levels are summed over the total simulation duration to determine its total received energy, and then compared to the assumed threshold criteria.

JASMINE uses the same animal movement algorithms as 3MB (Houser, 2006), but has been extended to be directly compatible with JASCO's Marine Operations Noise Model (MONM) and Full Waveform Range-dependent Acoustic Model (FRAWM) acoustic field predictions, for inclusion of source tracks, and importantly for animats to change behavioural states based on time and space dependent modelled variables such as received levels for aversion behaviour, although aversion was not considered in this study.

D.4.1. Animal Movement Parameters

JASMINE uses previously measured behaviour to forecast behaviour in new situations and locations. The parameters used for forecasting realistic behaviour are determined (and interpreted) from marine species studies (e.g., tagging studies). Each parameter in the model is described as a probability distribution. When limited or no information is available for a species parameter, a Gaussian or uniform distribution may be chosen for that parameter. For the Gaussian distribution, the user determines the mean and standard deviation of the distribution from which parameter values are drawn. For the uniform distribution, the user determines the maximum and minimum distribution from which parameter values are drawn. When detailed information about the movement and behaviour of a species are available, a user-created distribution vector, including cumulative transition probabilities, may be used (referred to here as a vector model; Houser 2006). Different sets of parameters can be defined for different behaviour states. The probability of an animat starting out in or transitioning into a given behaviour state can in turn be defined in terms of the animats current behavioural state, depth, and the time of day. In addition, each travel parameter and behavioural state has a termination function that governs how long the parameter value or overall behavioural state persists in simulation.

The parameters used in JASMINE describe animal movement in both the vertical and horizontal planes. The parameters relating to travel in these two planes are briefly described below.

Travel sub-models

- **Direction**– determines an animats choice of direction in the horizontal plane. Sub-models are available for determining the heading of animats, allowing for movement to range from strongly biased to undirected. A random walk model can be used for behaviours with no directional preference, such as feeding and playing. In a random walk, all bearings are equally likely at each parameter transition time step. A correlated random walk can be used to smooth the changes in bearing by using the current heading as the mean of the distribution from which to draw the next heading. An additional variant of the correlated random walk is available that includes a directional bias for use in situations where animals have a preferred absolute direction, such as migration. A user-defined vector of directional probabilities can also be input to control animat heading. For more detailed discussion of these parameters, see Houser (2006) and Houser and Cross (1999).
- **Travel rate**–defines an animats rate of travel in the horizontal plane. When combined with vertical speed and dive depth, the dive profile of the animat is produced.

Dive sub-models

- **Ascent rate**–defines an animats rate of travel in the vertical plane during the ascent portion of a dive.
- **Descent rate**–defines an animats rate of travel in the vertical plane during the descent portion of a dive.
- **Depth**–defines an animats maximum dive depth.
- **Reversals**–determines whether multiple vertical excursions occur once an animat reaches the maximum dive depth. This behaviour is used to emulate the foraging behaviour of some marine mammal species at depth. Reversal-specific ascent and descent rates may be specified.
- **Surface interval**–determines the duration an animat spends at, or near, the surface before diving again.

D.4.2. Exposure Integration Time

The interval over which acoustic exposure (L_E) should be integrated and maximal exposure (L_p) determined is not well defined. Both Southall et al. (2007) and the NMFS (2018) recommend a 24 h baseline accumulation period, but state that there may be situations where this is not appropriate (e.g., a high-level source and confined population). Resetting the integration after 24 h can lead to overestimating the number of individual animals exposed because individuals can be counted multiple times during an operation. The type of animal movement engine used in this study simulates realistic movement using swimming behaviour collected over relatively short periods (hours to days) and does not include large-scale movement such as migratory circulation patterns. For this study, a representative 24-hour period was simulated.

Ideally, a simulation area is large enough to encompass the entire range of a population so that any animal that could approach the source during an operation is included. However, there are limits to the simulation area, and computational overhead increases with area. For practical reasons, the simulation area is limited. In the simulation, every animat that reaches a border is replaced by another animat entering at the opposing border—e.g., an animat crossing the northern border of the simulation is replaced by one entering the southern border at the same longitude. When this action places the animat in an inappropriate water depth, the animat is randomly placed on the map at a depth suited to its species definition. The exposures of all animats (including those leaving the simulation and those entering) are kept for analysis. This approach maintains a consistent animat density and allows for longer integration periods with finite simulation areas.

D.4.3. Seeding Density and Scaling

Seeding density refers to the spatial sample rate, in units of animats/km^2, used in the simulation. It is not related to the real-world animal density, but rather is a model parameter that controls how samples are drawn from the model space. The minimum required seeding density for any given project depends on several factors such as bathymetry, source characteristics, and the behavioural profile of the animats, with the main constraint being computation time and resources. Seeding density is adjusted as needed based on model conditions specific to a project or project area.

In the present study, the exposure criteria for impulsive sounds were used to determine the number of animats exceeding exposure thresholds. To generate statistically reliable probability density functions, all simulations were seeded with an animat density of 4 animat/km^2 over the entire simulation area. The modelling results are not related to real-world animal densities and the number of real-world animals potentially exposed was not calculated.

Appendix E. Model Validation Information

Predictions from JASCO's Airgun Array Source Model (AASM) and propagation models (MONM, FWRAM and VSTACK) have been validated against experimental data from a number of underwater acoustic measurement programs conducted by JASCO globally, including the United States and Canadian Artic, Canadian and southern United States waters, Greenland, Russia and Australia (Hannay and Racca 2005, Aerts et al. 2008, Funk et al. 2008, Ireland et al. 2009, O'Neill et al. 2010, Warner et al. 2010, Racca et al. 2012a, Racca et al. 2012b, Matthews and MacGillivray 2013, Martin et al. 2015, Racca et al. 2015, Martin et al. 2017a, Martin et al. 2017b, Warner et al. 2017, MacGillivray 2018, McPherson et al. 2018, McPherson and Martin 2018).

In addition, JASCO has conducted measurement programs associated with a significant number of anthropogenic activities which have included internal validation of the modelling (including McCrodan et al. 2011, Austin and Warner 2012, McPherson and Warner 2012, Austin and Bailey 2013, Austin et al. 2013, Zykov and MacDonnell 2013, Austin 2014, Austin et al. 2015, Austin and Li 2016, Martin and Popper 2016).

Appendix F. Supplemental Results

Histograms of CPA ranges to SEL_{24h} PTS, TTS, and the behavioural response threshold for Scenarios B and C are shown in Figures 1 to 24.

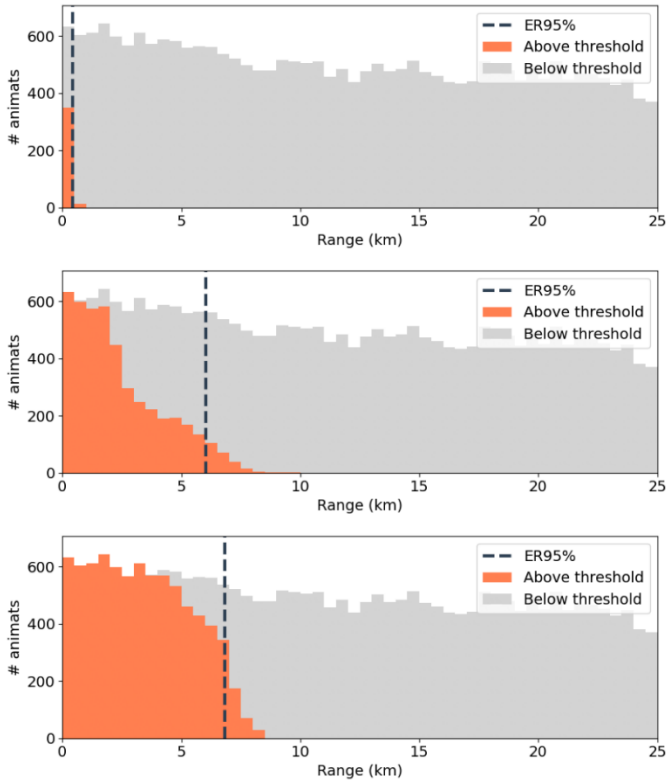

Figure F-1. *Scenario B, female pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

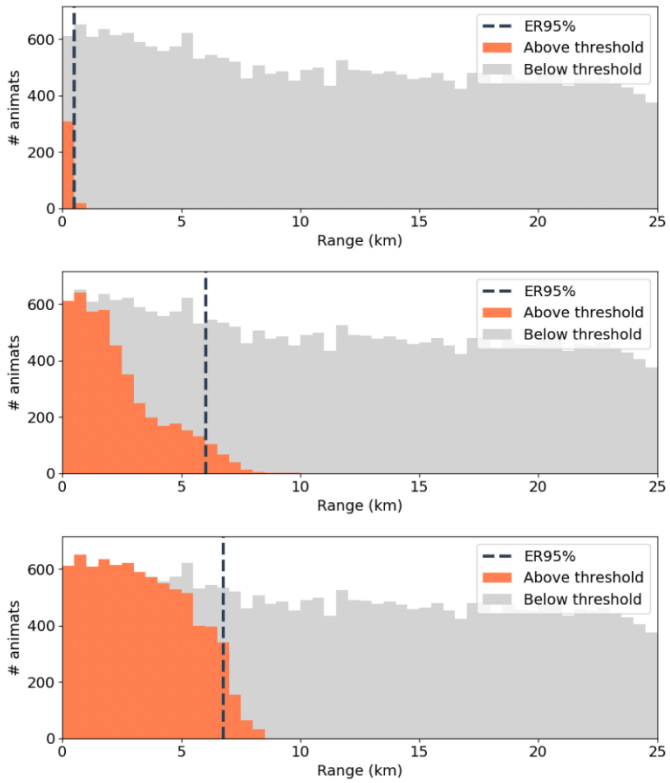

Figure F-2. *Scenario B, male pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

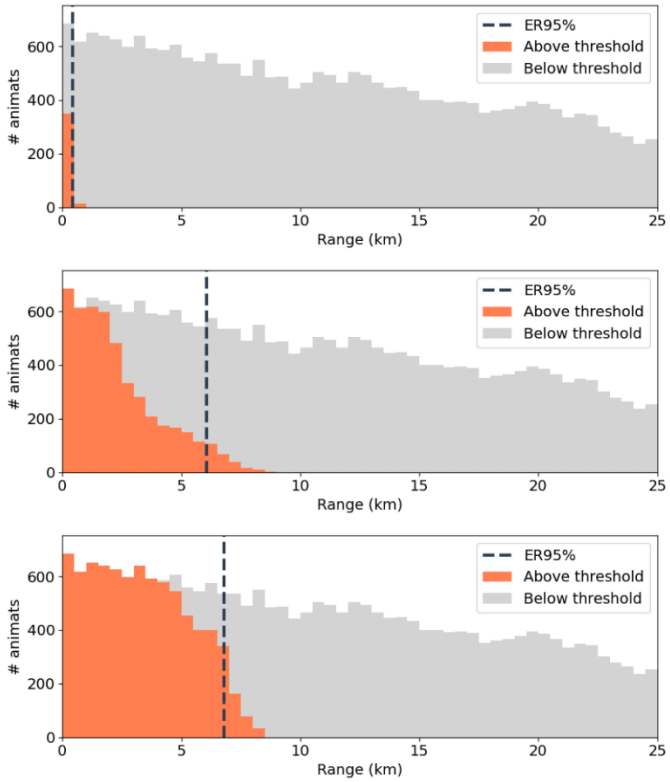

Figure F-3. *Scenario B, female pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

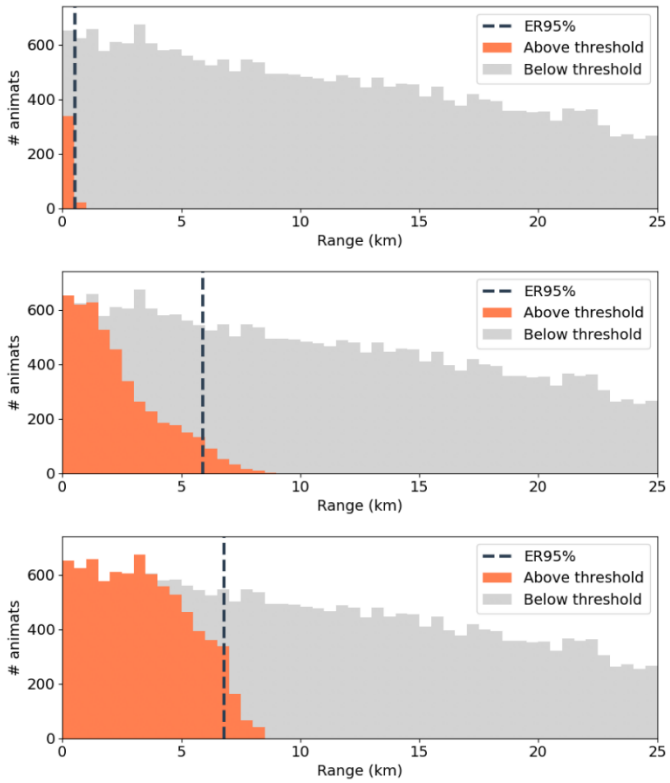

Figure F-4. *Scenario B, male pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

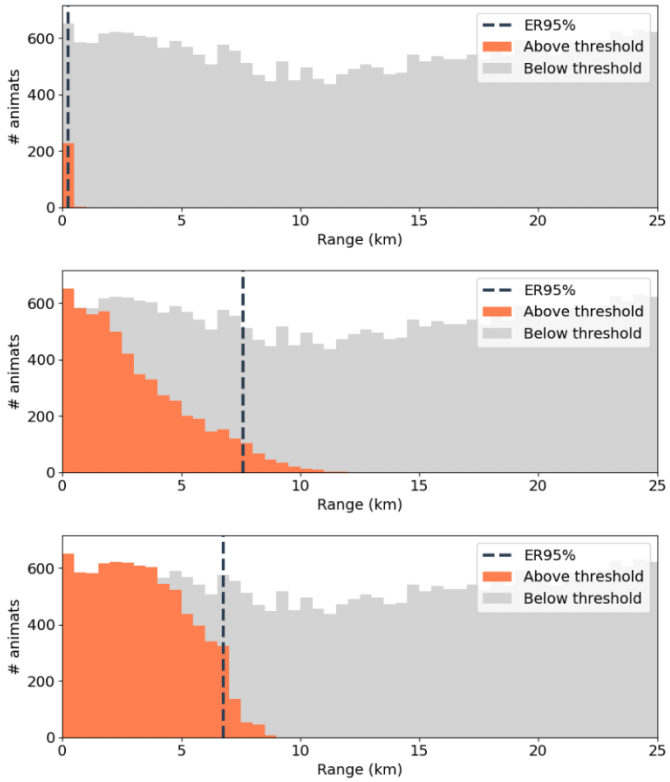

Figure F-5. *Scenario C, female pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

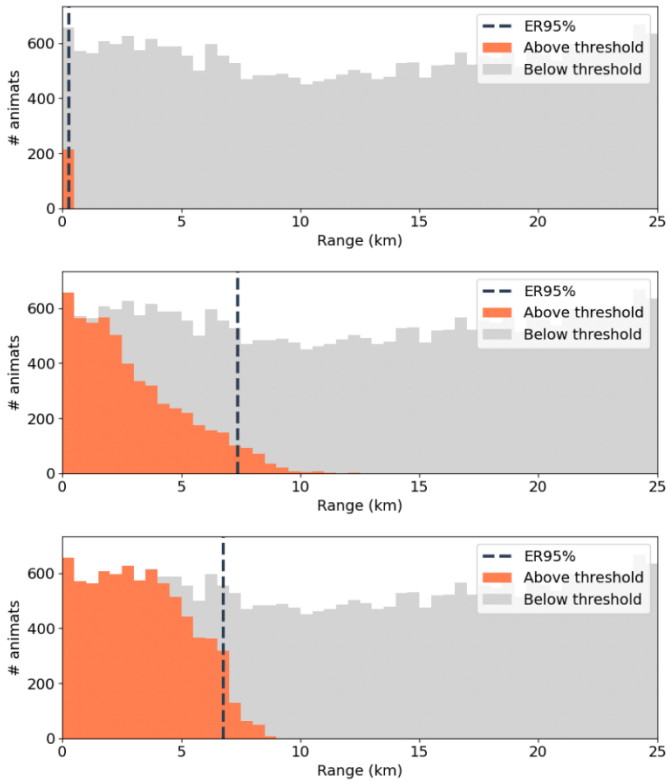

Figure F-6. *Scenario C, male pygmy blue whale animats, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

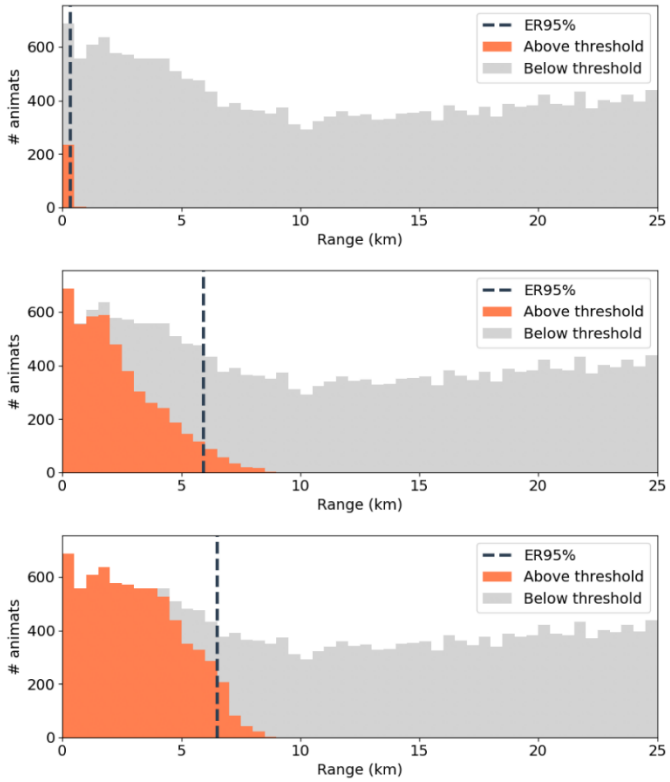

Figure F-7. *Scenario C, female pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

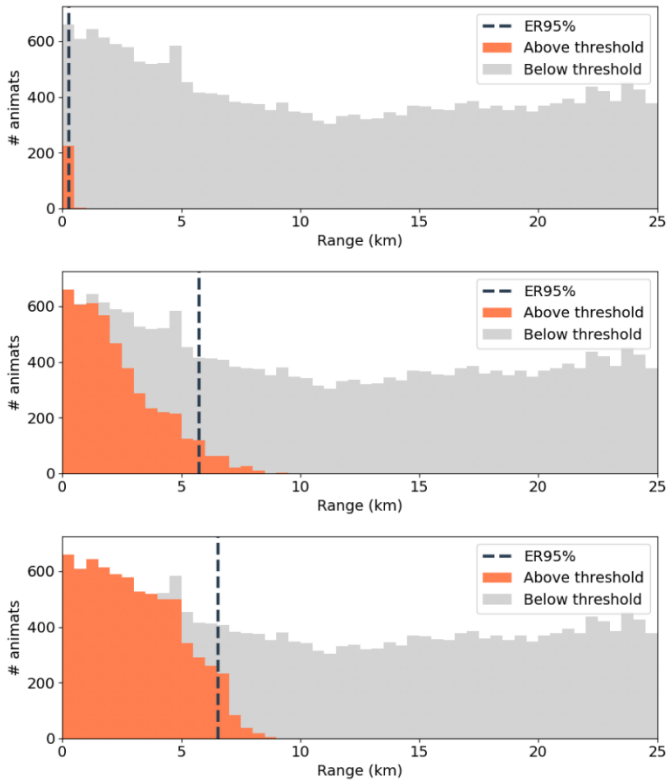

Figure F-8. *Scenario C, male pygmy blue whale animats, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

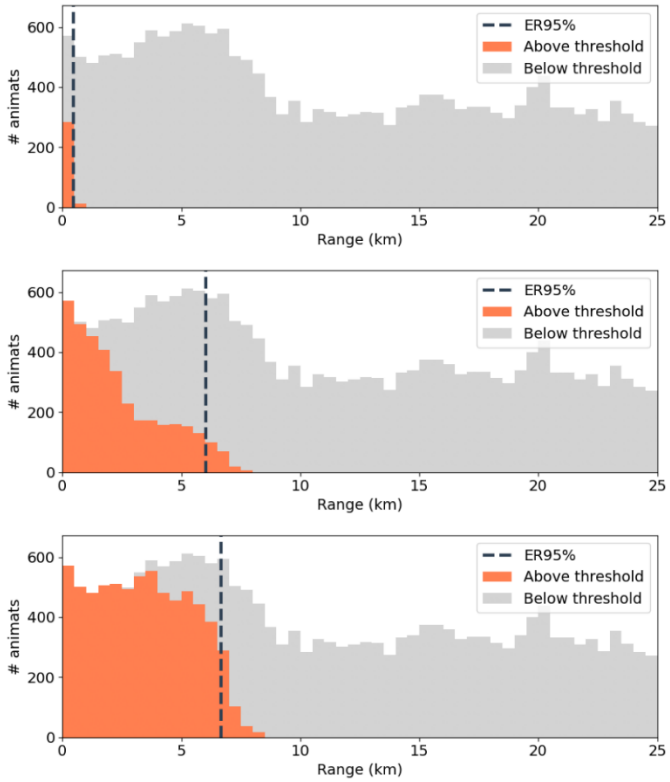

Figure F-9. *Scenario B, migrating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

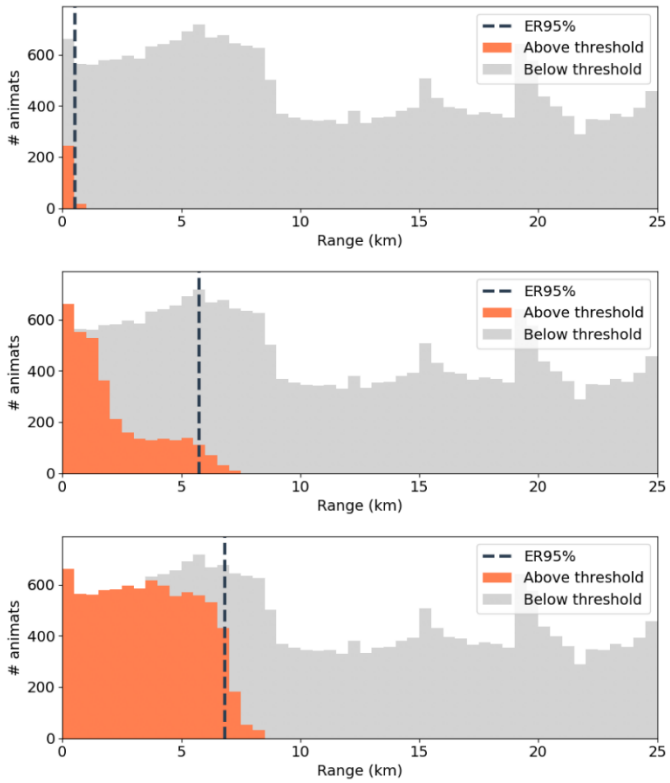

Figure F-10. *Scenario B, migrating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

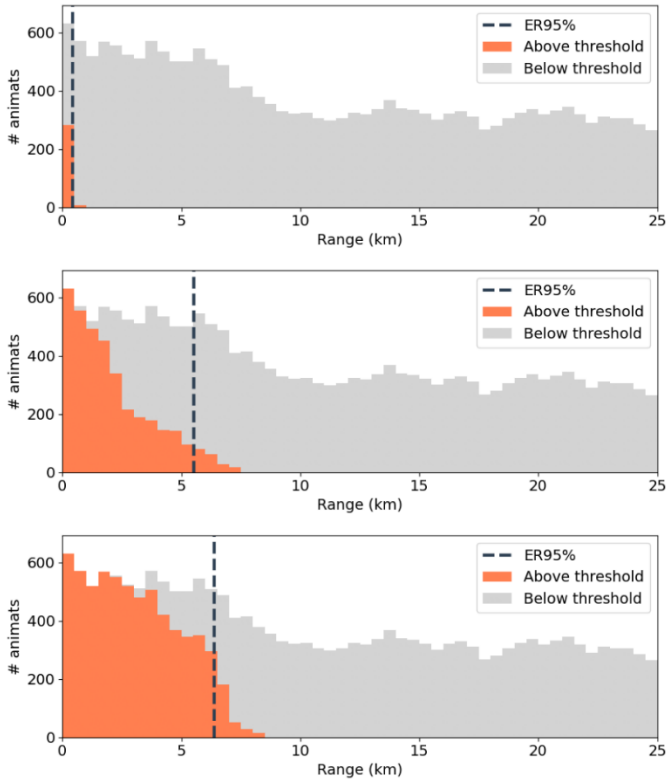

Figure F-11. *Scenario B, aggregating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

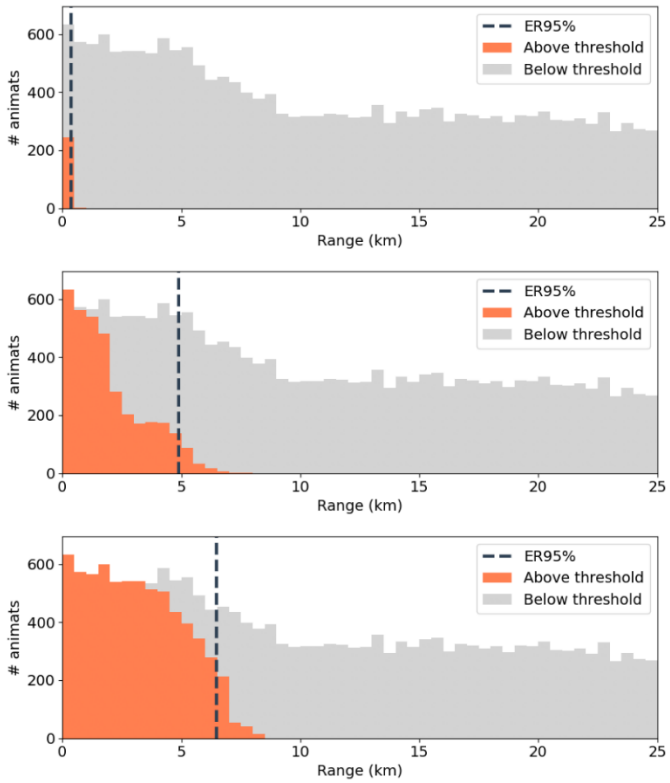

Figure F-12. *Scenario B, aggregating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

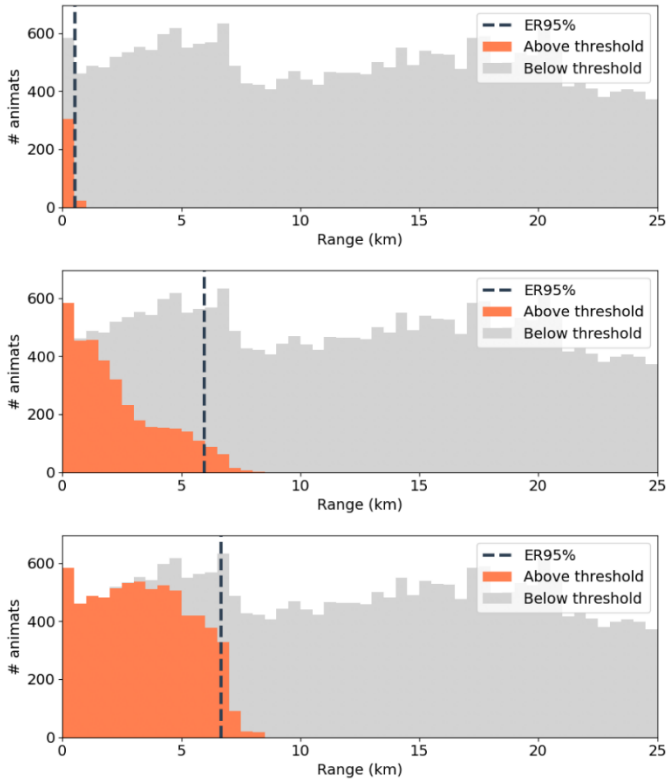

Figure F-13. *Scenario B, migrating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

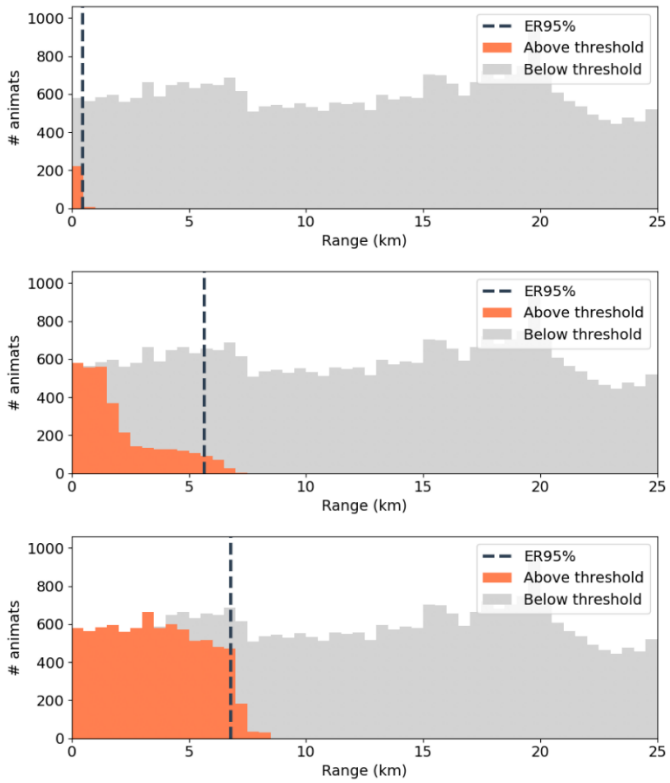

Figure F-14. *Scenario B, migrating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

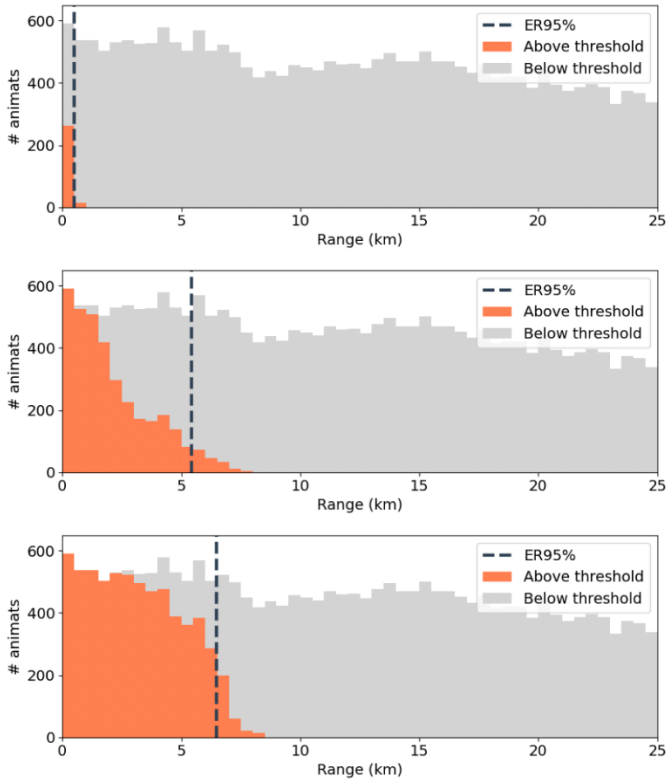

Figure F-15. *Scenario B, aggregating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

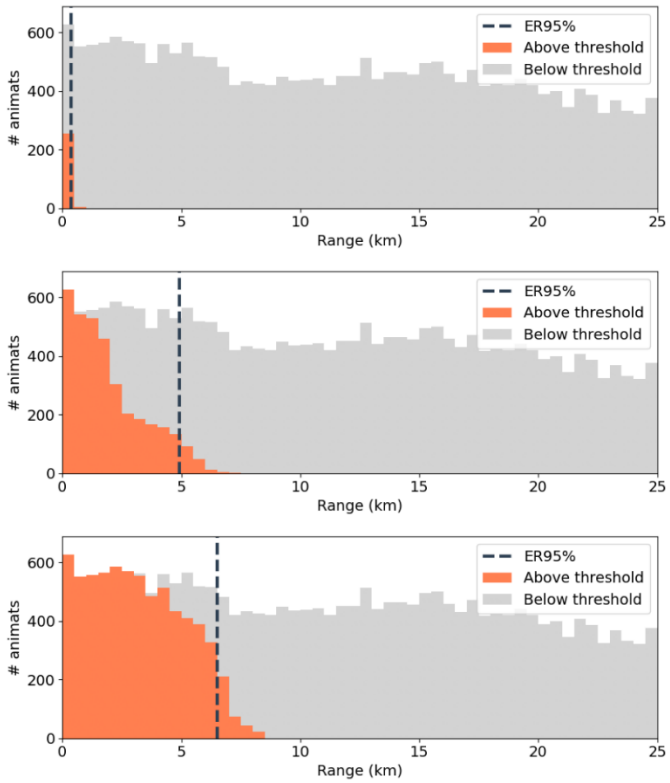

Figure F-16. *Scenario B, aggregating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

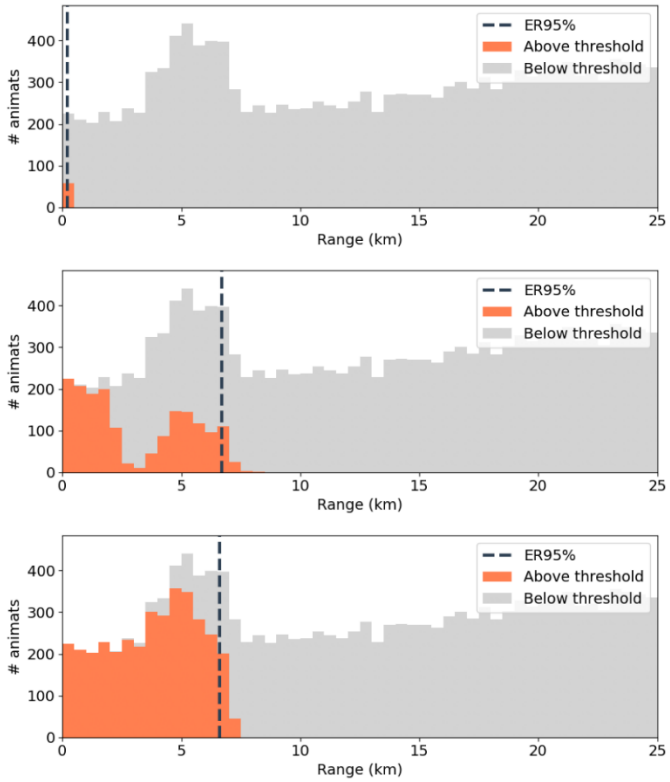

Figure F-17. *Scenario C, migrating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

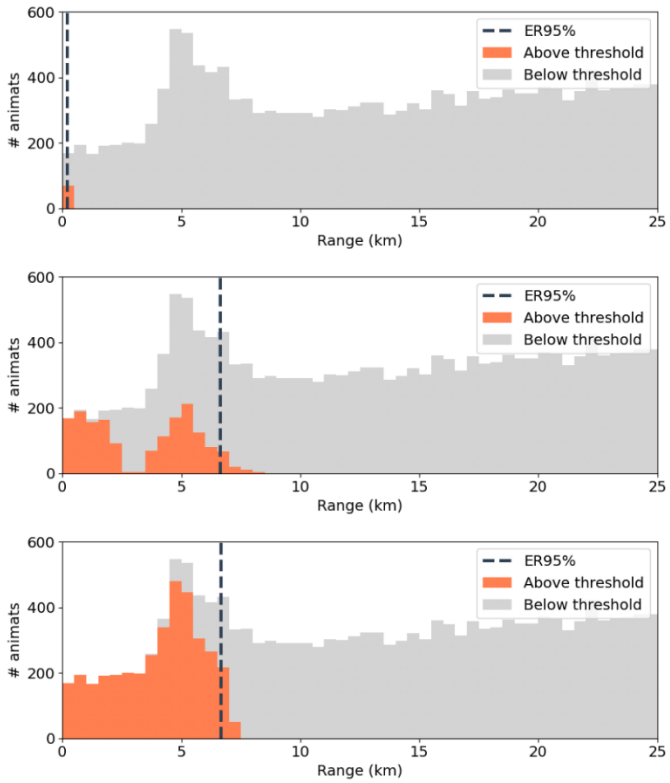

Figure F-18. *Scenario C, migrating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

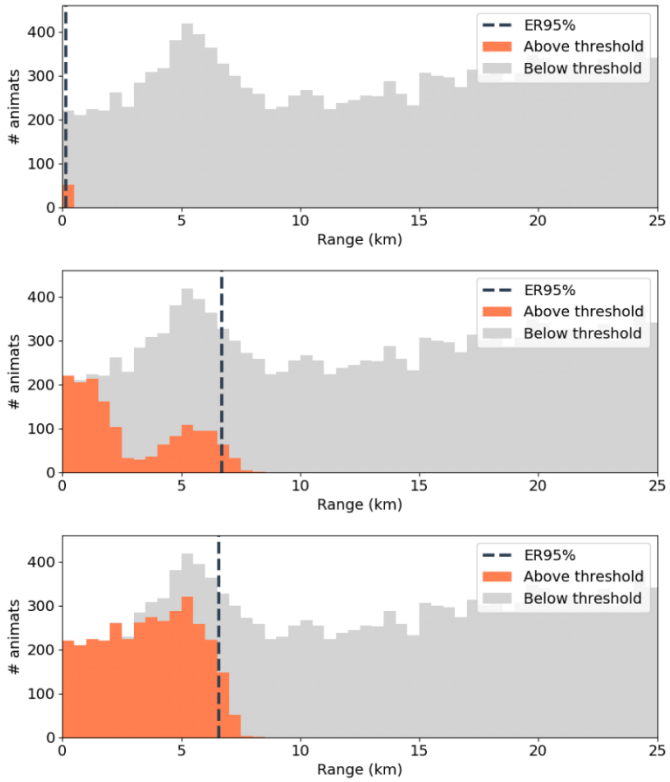

Figure F-19. *Scenario C, aggregating southern right whales, mother & calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

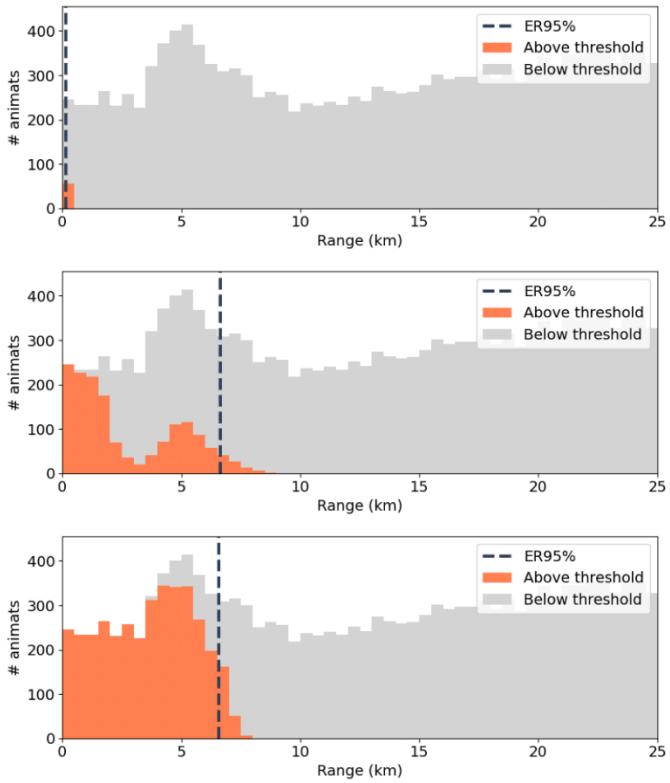

Figure F-20. *Scenario C, aggregating southern right whales, no calf, seeding A*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

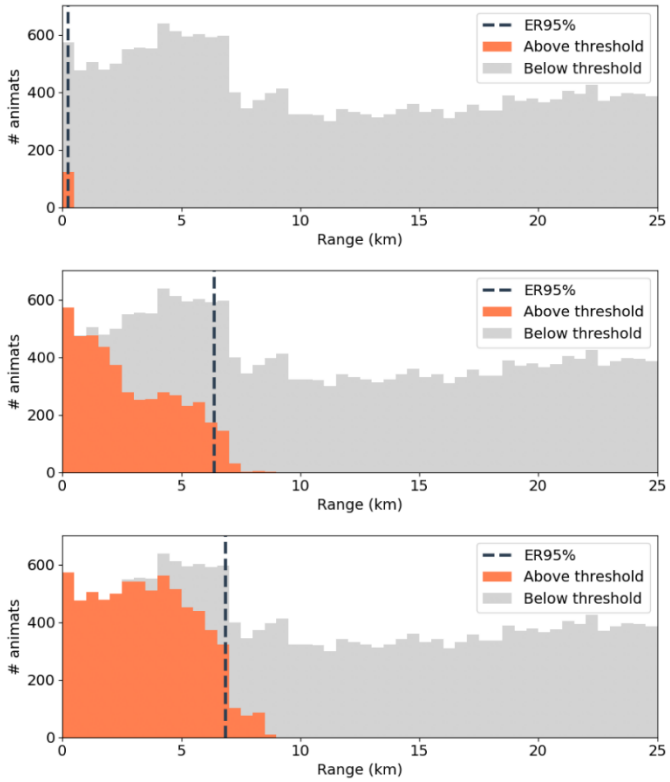

Figure F-21. *Scenario C, migrating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

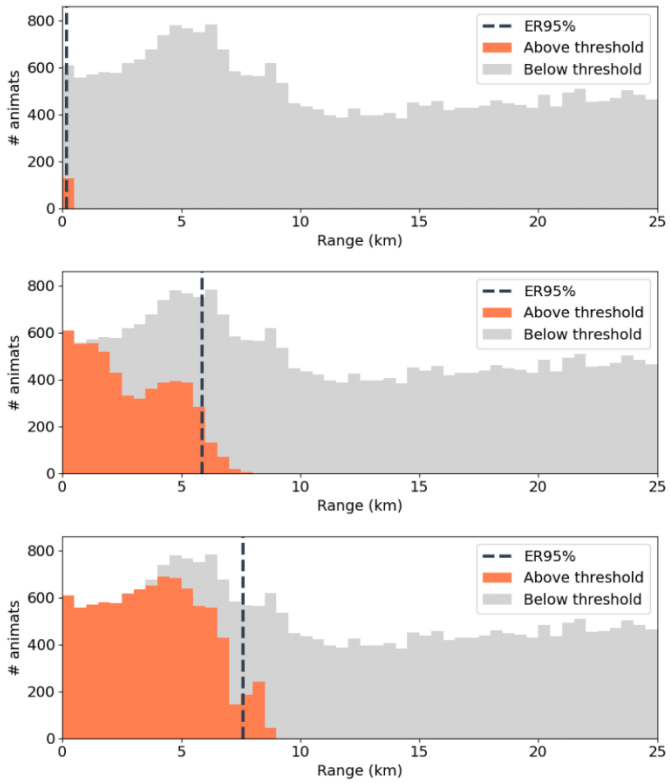

Figure F-22. *Scenario C, migrating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

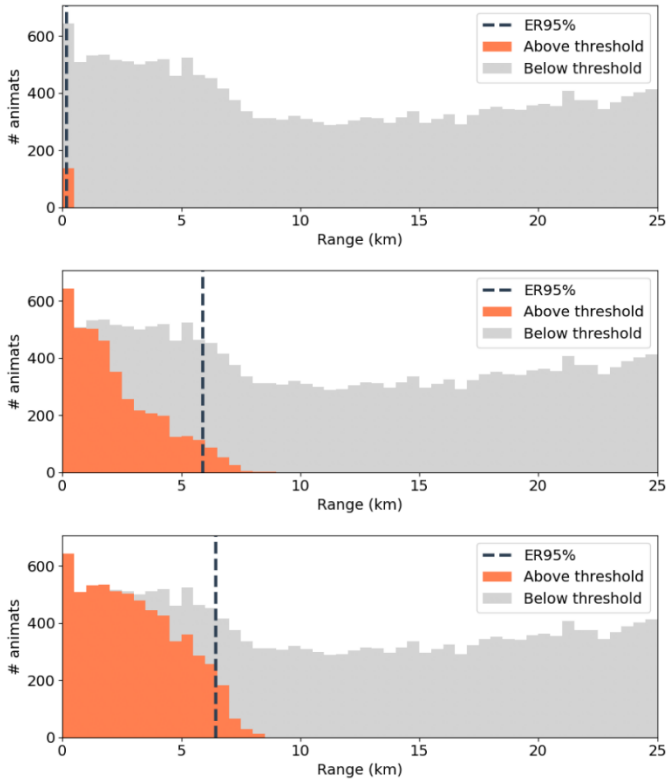

Figure F-23. *Scenario C, aggregating southern right whales, mother & calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

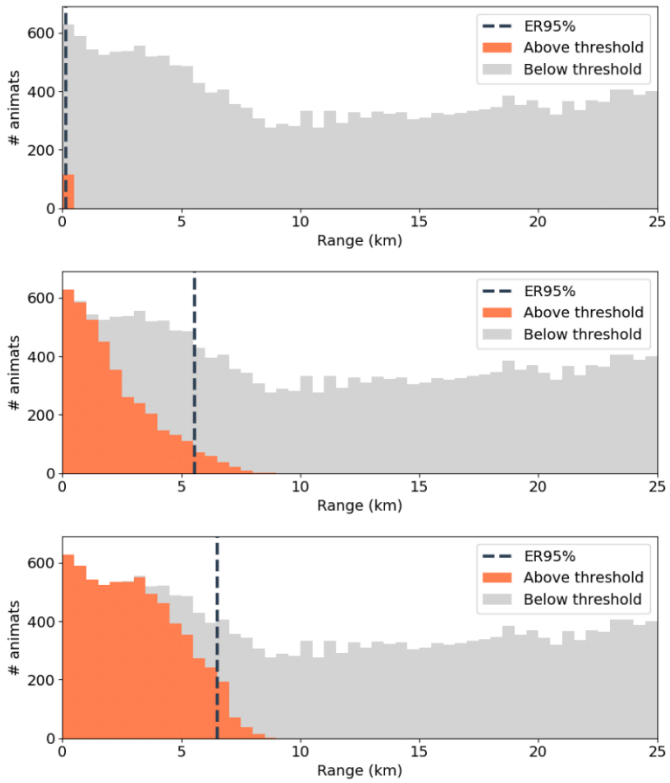

Figure F-24. *Scenario C, aggregating southern right whales, no calf, seeding B*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

Regia Marine Seismic Survey

Acoustic Modelling for Assessing Sound Exposures

JASCO Applied Sciences (Australia) Pty Ltd

5 June 2024

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The results presented herein are relevant within the specific context described in this report. They could be misinterpreted if not considered in the light of all the information contained in this report. Accordingly, if information from this report is used in documents released to the public or to regulatory bodies, such documents must clearly cite the original report, which shall be made readily available to the recipients in integral and unedited form.

Contents

Executive Summary 1
1. Introduction 6
1.1. Iterative Approach 6
1.2. Modelling Scenarios 7
1.3. Sensitive receivers 9
2. Noise Effect Criteria 12
2.1. Marine Mammals 13
2.2. Fish, Fish Eggs, and Fish Larvae 14
2.3. Sea Turtles 15
2.4. Diving Birds 16
2.5. Invertebrates 16
2.5.1. Benthic Invertebrates 16
2.5.2. Plankton 17
2.6. Human Health Assessment Threshold 18
3. Methods 19
3.1. Parameter Overview 19
3.2. Acoustic Source Model 19
3.3. Sound Propagation Models 19
3.4. Geometry and Modelled Regions 20
3.5. Accumulated SEL 20
3.6. Per-pulse Levels at Receivers 21
3.7. Animal Movement and Exposure Modelling 22
3.7.1. Methodology 22
3.7.2. Exposure–based Radial Distance Estimation 24
3.7.3. Species Specific Behaviour Profile Parameterisation 25
4. Results 27
4.1. Acoustic Source Levels and Directivity 27
4.2. Per-pulse Sound Fields 27
4.2.1. Tabulated Results 29
4.2.2. Sound Field Maps and Graphs 35
4.3. Multiple Source Fields 54
4.3.1. Tabulated Results 55
4.3.2. Sound Level Contour Maps 56
4.4. Animal Movement Exposure Ranges 58
4.4.1. Exposure Range Histograms: Pygmy Blue Whales 60
4.4.2. Exposure Range Histograms: Southern Right Whales 64
5. Discussion and Summary 67
5.1. Per-Pulse Sound Fields 67

5.2. Multiple Pulse Sound Fields 68
5.3. Acoustic Results Summary 68
5.4. Animal Movement Modelling 72
5.4.1. PTS and TTS 73
5.4.2. Behavioural Effects 74
Glossary 75
Literature Cited 83
Appendix A. Acoustic Metrics A-1
Appendix B. Acoustic Source Model B-1
Appendix C. Sound Propagation Models C-1
Appendix D. Methods and Parameters D-1
Appendix E. Model Validation Information E-1
Appendix F. Supplemental Modelling Results F-1
Appendix G. Sensitive Receiver Maps G-1
Appendix H. Supplemental Animal Movement Modelling Results H-1

Figures

Figure 1. Overview of the single-impulse modelled sites, acquisition lines in the modelled scenarios, and features relevant to the Regia Marine Seismic Survey. 8
Figure 2. Overview maps of the seeding areas and restrictions for animal movement modelling. 9
Figure 3. Sensitive receiver locations and single-impulse modelled sites 11
Figure 4. Exposure modelling process overview. 22
Figure 5. Depiction of animats in a moving sound field. 23
Figure 6. Animat track from an example simulation 24
Figure 7. Example distribution of animat closest points of approach 25
Figure 8. *Site 1, SPL, 2820 in^3 source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 35
Figure 9. *Site 2, SPL, 2820 in^3 source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 36
Figure 10. *Site 3, SPL, 2820 in^3 source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 36
Figure 11. *Site 4, SPL, 2820 in^3 source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 37
Figure 12. *Site 5, SPL, 2820 in^3 source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 37
Figure 13. *Site 6, SPL, 2820 in^3 source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 38
Figure 14. *Site 7, SPL, 2820 in^3 source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 38
Figure 15. *Site 8, SPL, 2820 in^3 source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 39
Figure 16. *Site 9, SPL, 2820 in^3 source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 39
Figure 17. *Site 10, SPL, 2820 in^3 source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 40

Figure 18. *Site 11, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 40
Figure 19. *Site 12, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 41
Figure 20. *Site 13, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 41
Figure 21. *Site 14, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 42
Figure 22. *Site 15, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. 42
Figure 23. *Site 1, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 43
Figure 24. *Site 2, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 43
Figure 25. *Site 3, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 44
Figure 26. *Site 4, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 44
Figure 27. *Site 5, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 45
Figure 28. *Site 6, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 45
Figure 29. *Site 7, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 46
Figure 30. *Site 8, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 46

Figure 31. *Site 9, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 47
Figure 32. *Site 10, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 47
Figure 33. *Site 11, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 48
Figure 34. *Site 12, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 48
Figure 35. *Site 13, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 49
Figure 36. *Site 14, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 49
Figure 37. *Site 15, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice. 50
Figure 38. *SPL, 2820 in³ source,* seismic single-impulse locations where the human health assessment threshold at any sensitive receivers is exceeded. 51
Figure 39. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Deen Maar (Lady Julia Percy Island) is exceeded. 51
Figure 40. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Middle Island is exceeded. 52
Figure 41. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Port Fairy Lighthouse is exceeded. 52
Figure 42. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Killarney Beach is exceeded. 53
Figure 43. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Merri Sanctuary is exceeded. 53
Figure 44. *Scenario A*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. 56
Figure 45. *Scenario B*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. 57
Figure 46. *Scenario C*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. 57
Figure 47. *Scenario D*, sound level contour map of unweighted maximum-over-depth SEL24h results, along with isopleths for marine mammals and fish. 58
Figure 48. *Scenario A, female pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 60

Figure 49. *Scenario A, male pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel).....61
Figure 50. *Scenario A, female pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 61
Figure 51. *Scenario A, male pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel).....62
Figure 52. *Scenario A, female pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 62
Figure 53. *Scenario A, male pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 63
Figure 54. *Scenario A, migrating southern right whale animats, no calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 64
Figure 55. *Scenario A, migrating southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 65
Figure 56. *Scenario A, reproducing southern right whale animats, no calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 65
Figure 57. *Scenario A, reproducing southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). 66
Figure 58. *Scenario A, reproducing southern right whale animats, no calf, restricted to reproduction BIA*: CPA range histogram for animats, SEL_{24h} TTS threshold. 66
Figure 59. Acoustic (R_{max}) and exposure ranges ($ER_{95\%}$) for PTS, TTS and the behavioural thresholds, shown for each species.....73

Figure A-1. Decidecade frequency bands (vertical lines) shown on a linear frequency scale and a logarithmic scale.....A-3
Figure A-2. Sound pressure spectral density levels and the corresponding decidecade band sound pressure levels of example ambient noise shown on a logarithmic frequency scale. A-4
Figure A-3. Auditory weighting functions for functional marine mammal hearing groups used in this project as recommended by Southall et al. (2019). A-7
Figure B-1. Layout of the modelled 2820 in^3 seismic source where the plotted layout is such that the array is centred on the origin and vessel travel direction is in the positive x-direction. B-2
Figure B-2. Predicted source level details for the 2820 in^3 seismic source with a 7 m tow depth. B-3
Figure B-3. Directionality of the predicted horizontal source levels for the 2820 in^3 seismic source, 5 Hz to 2 kHz. B-4
Figure C-1. The N×2-D and maximum-over-depth modelling approach used by MONM. C-1
Figure D-1. Sample areas ensonified to an arbitrary sound level with R_{max} and $R_{95\%}$ ranges shown for two scenarios. D-1
Figure D-2. *Site 2 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. D-2
Figure D-3. *Site 3 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. D-3
Figure D-4. *Site 5 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. D-3

Figure D-5. *Site 8 tow direction 113*°: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. D-4
Figure D-6. *Site 10 tow direction 113*°: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. D-4
Figure D-7. Bathymetry map of the modelling area for the Regia Marine Seismic Survey. D-5
Figure D-8. The sound speed profile (June) used for all modelling, showing the entire water column (left) and the top 100 m within the profile (right). D-6
Figure F-1. *Site 1, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-1
Figure F-2. *Site 2, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-2
Figure F-3. *Site 3, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-2
Figure F-4. *Site 4, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-3
Figure F-5. *Site 5, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-3
Figure F-6. *Site 6, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-4
Figure F-7. *Site 7, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-4
Figure F-8. *Site 8, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-5
Figure F-9. *Site 9, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-5
Figure F-10. *Site 10, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-6
Figure F-11. *Site 11, SPL, 2820 in^3 source, tow direction 293*°: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-6

Figure F-12. *Site 12, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-7
Figure F-13. *Site 13, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-7
Figure F-14. *Site 14, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-8
Figure F-15. *Site 15, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold. F-8
Figure G-1. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Deen Maar (Lady Julia Percy Island) is exceeded. G-1
Figure G-2. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Middle Island is exceeded. G-2
Figure G-3. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Apollo Marine Park is exceeded. G-2
Figure G-4. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Portland is exceeded. G-3
Figure G-5. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Port Fairy Lighthouse is exceeded. G-3
Figure G-6. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Killarney Beach is exceeded. G-4
Figure G-7. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Merri Sanctuary is exceeded. G-4
Figure G-8. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Rivernook Beach is exceeded. G-5
Figure G-9. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Clifton Beach is exceeded. G-5
Figure G-10. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Gibson Beach is exceeded. G-6
Figure G-11. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Newfield Beach is exceeded. G-6
Figure G-12. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Bay of Islands is exceeded. G-7
Figure G-13. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Massacre Bay is exceeded. G-7
Figure G-14. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Twelve Apostles MP is exceeded. G-8
Figure H-1. *Scenario B, female pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-1
Figure H-2. *Scenario B, male pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-2

Figure H-3. *Scenario B, female pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-2
Figure H-4. *Scenario B, male pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel)..... H-3
Figure H-5. *Scenario B, female pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-3
Figure H-6. *Scenario B, male pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-4
Figure H-7. *Scenario B, migrating southern right whale animats, no calf, unrestricted:* CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-4
Figure H-8. *Scenario B, migrating southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-5
Figure H-9. *Scenario B, reproducing southern right whale animats, no calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-5
Figure H-10. *Scenario B, reproducing southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-6
Figure H-11. *Scenario C, female pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel)..... H-7
Figure H-12. *Scenario C, male pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel)..... H-8
Figure H-13. *Scenario C, female pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-8
Figure H-14. *Scenario C, male pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-9
Figure H-15. *Scenario C, female pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-9
Figure H-16. *Scenario C, male pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-10
Figure H-17. *Scenario C, migrating southern right whale animats, no calf, unrestricted:* CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-10
Figure H-18. *Scenario C, migrating southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-11
Figure H-19. *Scenario C, reproducing southern right whale animats, no calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-11

Figure H-20. *Scenario C, reproducing southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-12
Figure H-21. *Scenario D, female pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-13
Figure H-22. *Scenario D, male pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-14
Figure H-23. *Scenario D, female pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-14
Figure H-24. *Scenario D, male pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-15
Figure H-25. *Scenario D, female pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-15
Figure H-26. *Scenario D, male pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-16
Figure H-27. *Scenario D, migrating southern right whale animats, no calf, unrestricted:* CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-16
Figure H-28. *Scenario D, migrating southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-17
Figure H-29. *Scenario D, reproducing southern right whale animats, no calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-17
Figure H-30. *Scenario D, reproducing southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). H-18

Tables

Table 1. Summary of maximum (R_{max}) horizontal distances (in km) from all modelled sites and scenarios to behavioural response thresholds, temporary threshold shift (TTS) and permanent threshold shift (PTS) for marine mammals showing the relevant metric. 2
Table 2. Summary of animat simulation results for PTS, TTS and SPL behavioural response criteria for pygmy blue whales and southern right whales. 3
Table 3. Summary of maximum horizontal distances (in km) from the sound source within which the turtle behavioural response criteria, temporary threshold shift (TTS), and permanent threshold shift (PTS), are exceeded. 4
Table 4. Summary of maximum fish, fish eggs, and larvae injury and temporary threshold shift (TTS) onset distances for single-impulse and 24 hour sound exposure level (SEL_{24h}) criteria. 5
Table 5. Key parameters of the four accumulated sound exposure level (SEL) scenarios. 7
Table 6. Location details for the single-impulse modelled sites. 8
Table 7. Location details for the sensitive receiver sites. 10
Table 8. Unweighted sound pressure level (SPL), 24-hour sound exposure level (SEL_{24h}), and peak pressure (PK) thresholds for acoustic effects on marine mammals. 13
Table 9. Criteria for seismic noise exposure for fish, adapted from Popper et al. (2014). 15

Table 10. Acoustic effects of impulsive noise on sea turtles: Unweighted sound pressure level (SPL), 24 hour sound exposure level (SEL_{24h}), and peak pressure (PK) thresholds.....16
Table 11. Far-field source level specifications for 2820 in^3 source.....27
Table 12. *Sites 1-15, 2820 in^3 source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to modelled maximum-over-depth unweighted per-pulse sound exposure level (SEL) isopleths from the modelled single-impulse sites. Water depth at each site is indicated. 29
Table 13. *Sites 1-15, 2820 in^3 source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to modelled maximum-over-depth per-pulse sound pressure level (SPL) isopleths from the modelled single-impulse sites. Water depth at each site is indicated. 30
Table 14. *Sites 1-15, Penguin behavioural threshold, SPL, 2820 in^3 source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to modelled maximum-over-depth per-pulse sound pressure level (SPL) isopleths from the modelled single-impulse sites. Water depth at each site is indicated. 31
Table 15. *2820 in^3 source*: Maximum (R_{max}) horizontal distances (in km) to modelled maximum-over-depth peak pressure level (PK) thresholds for eight modelled sites. Thresholds are based on Southall et al. (2019) for marine mammals, Popper et al. (2014) for fish and Finneran et al. (2017) for sea turtles. Water depth at each site is indicated. The results presented are the maxima considering either of the two tow directions modelled for each site. 32
Table 16. *2820 in^3 source*: Maximum (R_{max}) horizontal distances (in m) from the seismic source to modelled seafloor (receiver located 50 cm above seafloor) peak pressure level thresholds (PK) at ten representative water depths.....33
Table 17. 2820 *in^3 source*: Maximum (R_{max}) horizontal distances (in m) from the seismic source to modelled seafloor (receiver located 5 cm above seafloor) peak-peak pressure levels (PK-PK) at ten representative water depths. 33
Table 18. 2820 *in^3 source*: Maximum (R_{max}) horizontal distances (in m) from the 2820 in^3 to particle motion level: Peak acceleration magnitude level (m/s^2), 5 cm above the seafloor. Results included in relation to benthic invertebrates (Section 2.5.1).....34
Table 19. Exceedances of the human health assessment threshold (145 dB re 1 µPa) at each the sensitive receivers outlined in Section 1.3.....34
Table 20. Maximum-over-depth horizontal distances (R_{max}, in km) to frequency-weighted 24 h sound exposure level (SEL_{24h}) marine mammal and turtle thresholds, and the corresponding area ensonified above the respective threshold (in km^2). Thresholds provided are based on permanent threshold shift (PTS) and temporary threshold shift (TTS) for marine mammals (Southall et al. 2019) and sea turtles (Finneran et al. 2017).....55
Table 21. Maximum-over depth horizontal distances (R_{max}, in km) to 24 h sound exposure level (SEL_{24h}) fish thresholds, and the corresponding area ensonified above the respective threshold (in km^2). Thresholds provided are based on injury and temporary threshold shift (TTS) (Popper et al., 2014). 55
Table 22. Summary of animat simulation results for pygmy blue whales. 59
Table 23. Summary of animat simulation results for migrating southern right whales.....59
Table 24. Summary of animat simulation results for aggregating southern right whales. 60
Table 25. Summary of maximum (R_{max}) horizontal distances (in km) from modelled sites or scenarios to behavioural response thresholds and temporary threshold shift (TTS) and permanent threshold shift (PTS) for marine mammals. 69
Table 26. Summary of horizontal distances (in km) to turtle behavioural response criteria, temporary threshold shift (TTS), and permanent threshold shift (PTS).....69
Table 27. Summary of maximum fish, fish eggs, and larvae injury and temporary threshold shift (TTS) onset distances for single impulse and 24 hr sound exposure level (SEL_{24h}) modelled scenarios. 70
Table 28. Summary of animat simulation results for PTS, TTS and SPL behavioural response criteria for pygmy blue whales and southern right whales 72

Table A-1. Parameters for the auditory weighting functions used in this project as recommended by Southall et al. (2019). A-6
Table B-1. Layout of the modelled 2820 in^3 seismic source. B-3
Table D-1. Geoacoustic profile used in the acoustic propagation models for sites in less than 65 m water depth. D-7
Table D-2. Geoacoustic profile used in the acoustic propagation models for between 65 m and 120 m water depth. D-7
Table D-3. Geoacoustic profile used in the acoustic propagation models for all modelled sites greater than 120 m water depth. D-8

Executive Summary

JASCO Applied Sciences (JASCO) performed a numerical modelling study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic impacts on key regional receptors including marine mammals, fish, turtles, benthic invertebrates, plankton and recreational divers and swimmers. The modelling considered a seismic source in triple configuration with a 2820 in^3 total volume, towed at a 7 m depth behind a single vessel, with a 12.5 m impulse interval (inter-pulse interval) and a 37.5 m crossline array separation.

JASCO's specialised airgun array source model was used to predict the acoustic signature of the seismic source and complementary underwater acoustic propagation models were used in conjunction with the modelled array signatures to estimate sound levels over a large area around the sources. Single-impulse sound fields were predicted at 15 sites over the proposed survey line plans. Accumulated sound exposure fields for a 24-hour period were predicted for four representative survey operation scenarios. Four animal movement modelling scenarios, to address the four different survey operations, were also modelled.

The modelling methodology considered source directivity and range-dependent environmental properties likely to be encountered within the proposed survey area. Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p), zero-to-peak pressure levels (PK, L_{pk}), peak-to-peak pressure levels (PK-PK; $L_{pk\text{-}pk}$), and either single-impulse (i.e., per-pulse) or accumulated sound exposure levels (SEL, L_E) as appropriate for different noise effect criteria. A conservative sound speed profile that would be most supportive of sound propagation conditions for the period of the survey was defined and applied to all modelled sites.

SEL_{24h} is a cumulative metric that reflects the dosimetric effect of noise levels over 24 hours, based on the assumption that a receiver (e.g., an animal) is consistently exposed to such noise levels at a fixed position. More realistically, marine animals would not stay in the same location for 24 hours (especially in the absence of location-specific habitat) but rather a shorter period, depending on the animal's behaviour and the source's proximity and movements. Therefore, a reported radius for the SEL_{24h} criteria does not mean that marine fauna travelling within this radius of the source will be impaired, but rather that an animal could be exposed to the sound level associated with impairment (Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS)) if it remained at that location for 24 hours.

A more realistic representation of the potential exposures for pygmy blue whales and southern right whales within the modelling area was undertaken using animal movement modelling ('animat modelling'). While acoustic modelling inherently assumes static animals, the JASCO Animal Simulation Model Including Noise Exposure (JASMINE) combines modelled sound fields with realistic animal movements to predict how animals might be impacted through sound exposure. Calculated exposure ranges account for animats sampling the sound field vertically and horizontally based on species-specific diving and movement parameters.

The distribution of distances of animats predicted to be exposed to sound levels above relevant thresholds was used to calculate 95th percentile exposure ranges ($ER_{95\%}$). Within the $ER_{95\%}$, there is generally some proportion of animats that do not exceed the threshold criterion. This occurs for several reasons, including the spatial and temporal characteristics of the sound field and the way in which the animats are exposed to the sound field over time, both vertically and horizontally. The probability that an animat within the $ER_{95\%}$ was exposed above the threshold criterion was also computed (P_{exp}) to provide additional context.

The acoustic analysis considered the distances away from the seismic source at which several effects criteria or relevant sound levels were reached. The results are summarised below considering all the representative single-impulse modelling sites and all accumulated SEL scenarios for both acoustic

modelling results and pygmy blue whale and southern right whale animat $ER_{95\%}$ results and probabilities.

Marine Mammals – Acoustic Results

- The maximum distance where the NOAA marine mammal behavioural response criterion of 160 dB re 1 µPa^2 (SPL) for impulsive noise could be exceeded varied between 2.91 and 11.8 km from the 2820 in^3 seismic source, depending on modelled site.
- The results for marine mammal injury considered the criteria from Southall et al. (2019). These criteria contain two metrics (PK and SEL_{24h}), both required for the assessment of marine mammal PTS and TTS. The longest distance associated with either metric is required to be applied for assessment; Table 1 summarises the maximum distances, along with the relevant metric.

Table 1. Summary of maximum (R_{max}) horizontal distances (in km) from all modelled sites and scenarios to behavioural response thresholds, temporary threshold shift (TTS) and permanent threshold shift (PTS) for marine mammals showing the relevant metric.

Hearing group	Maximum modelled distance to effect threshold (R_{max})								
	Behavioural response[1]	Scenario A		Scenario B		Scenario C		Scenario D	
		TTS[2] (km)	PTS[2] (km)	TTS[2] (km)	PTS[2] (km)	TTS[2] (km)	PTS[2] (km)	TTS[2] (km)	PTS[2] (km)
Low-frequency cetaceans	11.8 (SPL)	41.9 (SEL_{24h})	5.07 (SEL_{24h})	35.4 (SEL_{24h})	4.55 (SEL_{24h})	20.5 (SEL_{24h})	2.43 (SEL_{24h})	28.6 (SEL_{24h})	1.00 (SEL_{24h})
High-frequency cetaceans		0.05 (SEL_{24h})	–	0.05 (SEL_{24h})	–	0.03 (SEL_{24h})	–	0.04 (SEL_{24h})	–
Very high-frequency cetaceans		0.82 (PK)	0.41 (PK)	0.82 (PK)	0.41 (PK)	0.79 (PK)	0.39 (PK)	0.71 (PK)	0.37 (PK)
Otariid Pinnipeds		0.06 (SEL_{24h})	–	0.06 (SEL_{24h})	–	0.06 (SEL_{24h})	–	0.05 (SEL_{24h})	–

Noise exposure criteria: [1] NOAA (2019) and [2] Southall et al. (2019).
A dash indicates the threshold was not reached within the limits of the modelling resolution (20 m).

Animal Movement Modelling

The exposure ranges predicted using animat modelling are more realistic, due to the incorporation of species-specific realistic movements, rather than a conservative approach of calculating ranges using the maximum-over-depth sound fields and receivers which are stationary for 24 hours. In particular, the exposure ranges account for animats sampling the sound field vertically and horizontally based on species-specific diving and movement parameters.

Animal movement modelling ('animat modelling') focussed on feeding pygmy blue whales, migrating southern right whales, and reproducing southern right whales. Animat simulations were run with unrestricted animat seeding, and, if applicable, with seeding restricted to relevant BIAs (southern right whales were restricted to their reproduction BIA and pygmy blue whales were restricted to their foraging BIA). Southern right whales were not additionally restricted to the southern right whale migration BIA as this BIA completely encompassed the modelling area. Pygmy blue whales were additionally restricted to be on the shelf.

- Exposure ranges ($ER_{95\%}$) for single exposure metrics, such as the SPL behavioural response criterion, are typically comparable to the predicted acoustic ranges. Apart from reproducing

southern right whales restricted to their reproduction BIA, all scenarios resulted in exposures above the behavioural response threshold (NOAA (2019)). Of these, the maximum $ER_{95\%}$ to the marine mammal behavioural response threshold was 9.83 km, with an associated probability of exposure of 76%. These results are summarised in Table 2.

- Exposure ranges from animal movement modelling for PTS and TTS criteria are typically shorter than those predicted using acoustic propagation modelling because the moving animats have a shorter time ('dwell time') to accumulate sound energy. There were exposures above PTS and TTS threshold for all considered scenarios and species, except for southern right whales when they were restricted to their respective reproductive BIA. The maximum $ER_{95\%}$ to PTS and TTS thresholds (Southall et al. 2019) were 1.98 and 22.5 km, respectively, with probabilities of exposure of 58% and 56%.

Table 2. Summary of animat simulation results for PTS, TTS and SPL behavioural response criteria for pygmy blue whales and southern right whales. Maximum exposure ranges show $ER_{95\%}$ (km) first and associated probability of exposure of animats travelling within the maximum $ER_{95\%}$ (P_{exp} (%)) in parentheses.

Species	Scenario	Behavioural response (SPL)[4]	TTS (SEL_{24h})[3]	PTS (SEL_{24h})[3]
		160[2]	168[1]	183[1]
Pygmy blue whale	A	9.83 (76%)	22.5 (56%)	1.98 (58%)
	B	9.54 (77%)	18.9 (57%)	1.73 (50%)
	C	8.38 (45%)	10.8 (35%)	0.83 (36%)
	D	6.69 (63%)	8.85 (59%)	0.37 (59%)
Southern right whale	A	9.51 (83%)	14.2 (1%)	1.40 (52%)
	B	8.97 (73%)	11.3 (64%)	1.22 (44%)
	C	7.39 (47%)	7.10 (35%)	0.69 (26%)
	D	6.84 (63%)	6.23 (58%)	0.24 (51%)

[1] LF-weighted SEL_{24h} ($L_{E,24h}$; dB re 1 $\mu Pa^2 \cdot s$)
[2] SPL (L_p; dB re 1 μPa^2)
[3] Southall et al. (2019) criteria for marine fauna.
[4] NOAA (2019) recommended unweighted behavioural threshold for marine mammals.

Sea Turtles

- The PK sea turtle injury criteria of 232 dB re 1 µPa for PTS and 226 dB re 1 µPa for TTS from Finneran et al. (2017) were exceeded at a distance up to 40 m and 80 m from the acoustic centre of the source, respectively.
- The maximum distance to the SEL_{24h} metrics of 204 dB re 1 $\mu Pa^2 s$ for PTS and 189 dB re 1 $\mu Pa^2 s$ for TTS (summarised in Table 3) for all scenarios was 0.07 km for PTS onset and 3.35 km for TTS onset for the 2820 in^3 seismic source (Finneran et al. 2017). As is the case with marine mammals, a reported radius for SEL_{24h} criteria does not mean that sea turtles travelling within this radius of the source will be injured, but rather that an animal could be exposed to the sound level associated with either PTS or TTS if it remained in that location for 24 hours.
- Table 3 summarises the distances to where the criterion for behavioural response of turtles to 166 dB re 1 μPa^2 (SPL) and the 175 dB re 1 μPa^2 (SPL) threshold for behavioural disturbance (McCauley et al. 2000) could be exceeded.

Table 3. Summary of maximum horizontal distances (in km) from the sound source within which the turtle behavioural response criteria, temporary threshold shift (TTS), and permanent threshold shift (PTS), are exceeded.

Hearing group	Maximum modelled distance to effect threshold (R_{max})									
	Behavioural response[1]	Behavioural disturbance[1]	Scenario A		Scenario B		Scenario C		Scenario D	
			TTS[2]	PTS[2]	TTS[2]	PTS[2]	TTS[2]	PTS[2]	TTS[2]	PTS[2]
Sea Turtles	6.30 (SPL)	2.62 (SPL)	3.35 (SEL_{24h})	0.07 (SEL_{24h})	3.20 (SEL_{24h})	0.07 (SEL_{24h})	1.67 (SEL_{24h})	0.07 (SEL_{24h})	0.60 (SEL_{24h})	0.07 (SEL_{24h})

Noise exposure criteria: [1] McCauley et al. (2000), and [2] Finneran et al. (2017)

Penguins

- The maximum distance within which the OCW-weighted penguin TTS SEL_{24h} threshold of 188 dB re 1 µPa^{2}s was reached was 0.06 km for all scenarios. PTS and PK thresholds were not resolved within the modelled resolution of 20 m. As is the case with marine mammals, a reported radius for SEL_{24h} criteria does not mean that a penguin underwater travelling within this radius of the source will be injured, but rather that an animal could be exposed to the sound level associated with either PTS or TTS if it remained in that location for 24 hours.
- The maximum distance within which the OCW-weighted penguin behavioural response threshold of 120 dB re 1 µPa^2 (SPL) for impulsive noise could be exceeded varied between 10.4 and 77.0 km for the 2820 in^3 seismic source, depending on modelled site.

Fish, fish eggs, and fish larvae

- This modelling study assessed the ranges for quantitative criteria based on Popper et al. (2014) and considered both PK (seafloor and water column) and SEL_{24h} metrics associated with mortality and potential mortal injury as well as impairment in the following groups:
  - Fish without a swim bladder (also appropriate for sharks in the absence of other information),
  - Fish with a swim bladder that do not use it for hearing,
  - Fish that use their swim bladders for hearing,
  - Fish eggs and fish larvae.
- Table 4 summarises maximum distances within which effect criteria for fish, fish eggs, and fish larvae were exceeded along with the relevant metric. Received sound levels at the seafloor were assessed at a set of representative depths related to the planned acquisition lines ranging from 40 to 170 m.

Table 4. Summary of maximum fish, fish eggs, and larvae injury and temporary threshold shift (TTS) onset distances for single-impulse and 24 hour sound exposure level (SEL_{24h}) criteria.

Relevant hearing group	Effect criteria	Water column	
		Metric associated with longest distance to criteria	R_{max} (km)
Fish: No swim bladder	Mortality and Potential Mortal Injury	PK	0.11
	Recoverable injury	PK	0.11
	TTS	SEL_{24h}	8.35
Fish: Swim bladder not involved in hearing and Swim bladder involved in hearing	Mortality and Potential Mortal Injury	PK	0.21
	Recoverable injury	PK	0.23
	TTS	SEL_{24h}	8.35
Fish eggs, and larvae (relevant to plankton)	Mortality and Potential Mortal Injury	PK	0.23

Benthic invertebrates

To assist with assessing the potential effects on these receptors, the following results were determined:

- Crustaceans: The sound level of 202 dB re 1 µPa PK-PK from Payne et al. (2008), which is representative of no effects, was considered for seafloor sound levels; the sound level was reached at ranges between 322 and 715 m for the 2820 in^3 source.
- Bivalves: For comparison to relevant criteria in Day et al. (2016a), the distance where a particle acceleration of 37.57 ms^{-2} at the seafloor could occur was calculated. This particle acceleration was reached at a range of 4 m for a water depth of 50 m, and was not reached at any greater water depth.
- Sponges and coral: The PK sound level at the seafloor directly underneath the seismic source was estimated at all modelled sites and compared to the sound level of 226 dB re 1 µPa PK for sponges and corals (Heyward et al. 2018); the threshold was not reached in water depths greater than 50 m.

Divers and Swimmers

An SPL human health assessment of 145 dB re 1 μPa^2 (SPL; L_P) derived from (Parvin 2005) was considered for recreational swimmers and divers. This criterion was considered for all single-impulse modelled sites and cumulative scenarios, and specifically at 14 coastal sensitive receiver locations. The human health assessment threshold was predicted to be exceeded at Deen Maar (Lady Julia Percy Island), Middle Island, Port Fairy Lighthouse, Killarney Beach and Merri Sanctuary. Maximum received sound levels varied between154.8–150.6 dB re 1 μPa^2 (SPL; L_P) at predicted at Deen Maar and Killarney Beach respectively.

1. Introduction

JASCO Applied Sciences (JASCO) performed a numerical estimation study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic effect on receptors including marine mammals, fish, sea turtles, benthic invertebrates, plankton, and divers.

This study considered a 2820 in^3 seismic source array. JASCO's specialised Airgun Array Source Model (AASM) was used to predict acoustic signatures and spectra (see Section 3.2). AASM accounts for individual airgun volumes, airgun bubble interactions, and array geometry to yield accurate source predictions.

Complementary underwater acoustic propagation models were used in conjunction with the array signature and spectra to estimate sound levels considering site-specific environmental influences. Single-impulse sound fields were predicted at 15 unique geographic locations linked to the considered survey line plans and four representative scenarios for accumulated SEL modelling were considered. Accumulated sound exposure fields were predicted for each representative scenario for likely survey operations over 24 hours (see Section 0).

The modelling methodology considered source directivity and range-dependent environmental properties. Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p), zero-to-peak pressure levels (PK, L_{pk}), peak-to-peak pressure levels (PK-PK; $L_{pk\text{-}pk}$), and either single-impulse (i.e., per-pulse) or accumulated sound exposure levels (SEL, L_E) as appropriate for different noise effect criteria.

The planned seismic acquisition area overlaps the pygmy blue whale (*Balaenoptera musculus brevicauda*) foraging BIA and the migration BIA for southern right whales (*Eubalaena australis*). The southern right whale reproduction BIA lies inshore of the proposed survey lines. The acoustic modelling results were used in conjunction with animal movement modelling ('animat modelling') simulations to predict the distance at which feeding pygmy blue whales, migrating and reproducing southern right whales are expected to be exposed above threshold criteria for PTS, TTS, and behavioural response. Estimates of sound exposure distribution were determined by moving large numbers of simulated animals (animats) through a modelled time-evolving sound field, computed using acoustic models. This approach provides the most realistic prediction of the maximum expected SPL and SEL_{24h} for comparison against the relevant thresholds.

Section 2 explains the metrics used to represent underwater acoustic fields and the effect criteria considered. Section 3 details the methodology for predicting the source levels and modelling the sound propagation, including the specifications of the seismic source and all environmental parameters the propagation models require. Section 3 also describes the methodology used in the animal movement and exposure modelling simulations. Section 4 presents the results, which are then discussed and summarised in Section 5.

1.1. Iterative Approach

This report, labelled version 2.0, presents a second iteration of modelling undertaken to assess the risks and impacts of underwater noise for the proposed Regia MSS. This second iteration incorporates additional modelled sites and updated survey line plans. The updated survey line plans focused on moving the survey to deeper water depths and increasing the separation from Deen Maar. The acoustic modelling considers an increased number of single-impulse modelling sites to enhance the resolution of predictions at sensitive receiver locations. The labelling of sites and scenarios are similar to the original version 1.0 report. However, identically labelled sites and scenarios are not necessarily equivalent, any comparisons should be done with the careful consideration and attention to detail.

1.2. Modelling Scenarios

Four nominal 24-hour acquisition scenarios were considered for both acoustic modelling and animal movement modelling. Acoustic modelling consisted of both source and propagation modelling and was conducted at 15 individual single-impulse sites for SEL and SPL while water column PK was assessed at eight sites. The locations of the modelled sites are provided in Table 6 and the acquisition lines for the scenarios are shown in Figure 1. The current iteration of the proposed line plan for the survey has included a provision to not survey over bathymetry less than 50 m. The modelling conducted herein was based on a line plan which had some lines extending over bathymetry that was marginally less than 50 m. For the purposes of acoustic and animal movement modelling very little difference is expected if the modelled lines were terminated at the 50 m bathymetric contour. The sites in Table 6 are representative of the geographic and bathymetric extents of the survey.

This study considered a 2820 in^3 seismic source towed in a triple array configuration at a speed of 4.5 knots with an impulse interval (inter-pulse interval) of 12.5 m and a crossline array separation of 37.5 m. The acoustic propagation modelling utilised the sound speed profile for June, as this month is likely to be the most supportive of sound propagation conditions across all months.

The single-impulse sites and the accumulated SEL scenarios were determined based on proposed survey line plans with lines orientated at 113/293°. The single-impulse sites and accumulated SEL scenarios were chosen to be representative of the range of water depths and the potential sound propagation characteristics of the considered line plans. Near-field sea-floor PK and PK-PK sound levels were assessed considering 10 water depths chosen to represent the depth range encompassed by the considered line plans (50 – 170 m). Particle motion modelling was also performed for these representative water depths.

Table 5 summarises the total number of impulses and the period of acquisition within each of the four 24-hour scenarios. The total assessment period for accumulated sound exposure level was 24 h and during line turns, the seismic source was not operating for modelling purposes. The time surveying and time on turns combine to a total 24 h period.

Table 5. Key parameters of the four accumulated sound exposure level (SEL) scenarios.

Scenario	Array	Impulse interval (m)	Tow direction (°)	Total impulses	Acquisition period (h)
A	Triple 2820 in^3 seismic source	12.5	113/293	8000	11.9
B				8116	12.46
C				13508	20.26
D				13248	20.16

Table 6. Location details for the single-impulse modelled sites. Each site was modelled for both tow directions applicable to the modelling of the scenarios of 24 hour operation.

Site	Scenario(s)	Tow directions (°)	Latitude (°S)	Longitude (°E)	MGA[1] Zone 54		Water depth (m)
					X (m)	Y (m)	
1	A, B	113/293	38° 32' 14.47"	142° 13' 18.17"	606478	5733855	49.1
2			38° 34' 46.30"	142° 18' 36.24"	614112	5729068	54.8
3			38° 37' 42.81"	142° 25' 11.06"	623581	5723485	63.9
4	C, D		38° 47' 44.74"	142° 29' 15.08"	629180	5704837	81.0
5	B, C, D		38° 39' 09.22"	142° 03' 04.80"	591481	5721254	61.9
6			38° 42' 40.30"	142° 13' 44.82"	606865	5714555	71.1
7	C, D		38° 54' 13.43"	142° 24' 11.18"	621664	5692971	124.9
8	D		38° 50' 31.49"	142° 12' 53.35"	605428	5700047	173.6
9			38° 46' 28.15"	142° 00' 39.98"	587832	5707763	166.5
10	C		38° 50' 59.78"	142° 52' 42.94"	663020	5698199	67.4
11			38° 46' 49.37"	142° 39' 47.20"	644460	5706281	72.0
12	C, D		38° 53' 08.30"	142° 39' 59.06"	644533	5694594	84.0
13			38° 58' 41.40"	142° 37' 18.31"	640477	5684395	99.0
14	A, B, C		38° 41' 11.94"	142° 26' 08.44"	624867	5717017	69.2
15			38° 34' 10.45"	142° 01' 12.89"	588879	5730494	51.6

[1] Map grid of Australia (MGA)

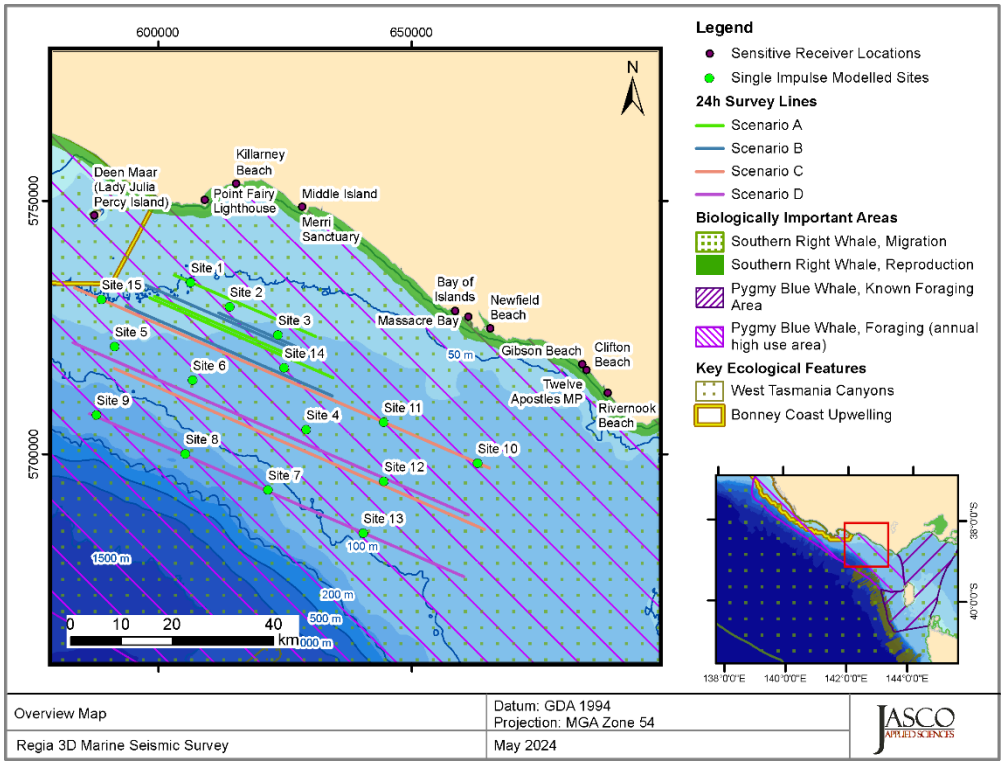

Figure 1. Overview of the single-impulse modelled sites, acquisition lines in the modelled scenarios, and features relevant to the Regia Marine Seismic Survey.

Animal movement modelling ('animat modelling') was undertaken considering the four nominal 24-hour nominal acquisition scenarios and focussed on feeding pygmy blue whales, migrating southern right whales, and reproducing southern right whales.

In unrestricted scenarios, animats were randomly placed, or seeded, within the simulation boundary at a specified density (animats/km^2) within the species preferred depth range. During the simulation, if an animat's movement takes it outside of its preferred depth range, it will begin to make movements (while still following the parameters within its species behaviour file) back towards its preferred depth range.

Animat simulations were also run with seeding restricted to relevant BIAs (southern right whales were restricted to their reproduction BIA and pygmy blue whales were restricted to their foraging BIA). Southern right whales were not additionally restricted to the southern right whale migration BIA as this BIA completely encompassed the modelling area. Pygmy blue whales were additionally restricted to be on the shelf.

Animats were seeded at a nominal horizontal sampling density of 4 animats/km^2 for all simulations, except those in which southern right whale animats were restricted to their reproduction BIA, in which case the density was increased to 6 animats/km^2 to account for the relatively small area. Each of the animat simulations were run for a representative 24 h duration.

Figure 2 shows the spatial extent of animat seeding for the four modelled scenarios.

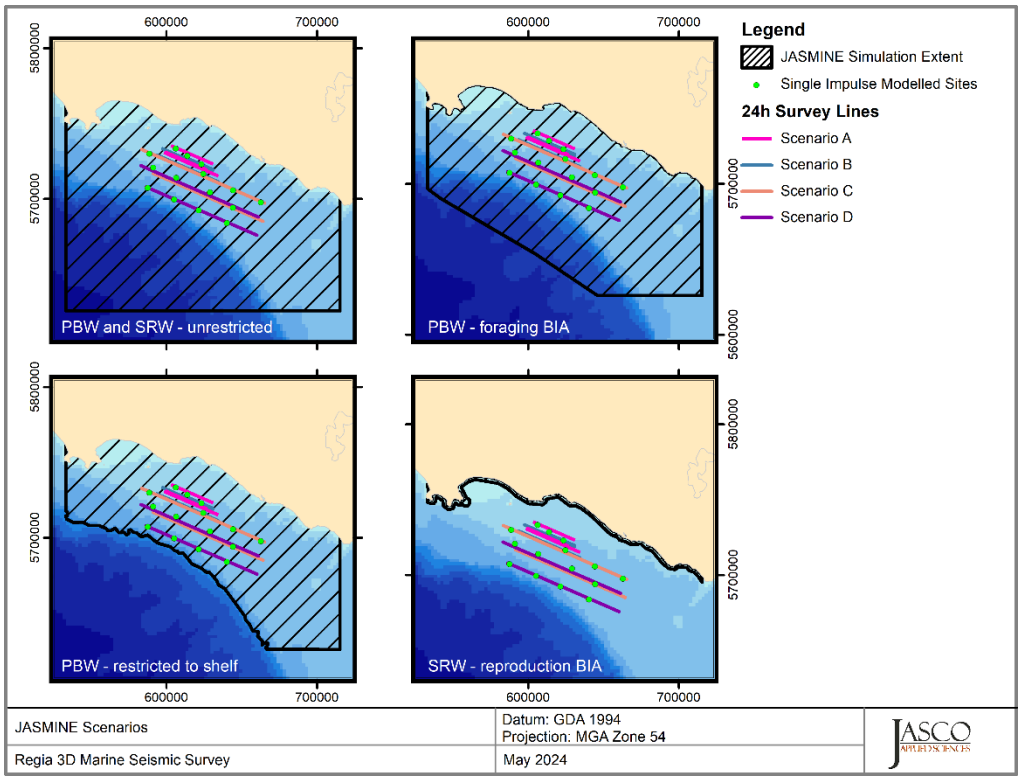

Figure 2. Overview maps of the seeding areas and restrictions for animal movement modelling.

1.3. Sensitive receivers

The Regia MSS lies within a foraging BIA for pygmy blue whales and the migration BIA for southern right whales. In addition, there are several swimming, diving and surfing beaches that are within proximity of the survey area. Deen Maar (Lady Julia Percy Island) is also an important sensitive location. The modelled received sound levels at 14 specific receiver locations have been calculated and are presented in Section 4.2.1.4. The sensitive receiver locations have been labelled 1–14 and are summarised in Table 7 along with the nature of the receptor(s) present at each location.

Table 7. Location details for the sensitive receiver sites.

Receiver ID	Sensitive receiver location	Receptors	Latitude (S)	Longitude (E)	MGA[1] Zone 54	
					X (m)	Y (m)
1	Deen Maar (Lady Julia Percy Island)	No Specific Receptors	38° 25' 37.22"	142° 00' 20.52"	587784	5746327
2	Middle Island	Divers Recreational Swimmers Little Penguins	38° 24' 20.63"	142° 28' 02.65"	628124	5748147
3	Apollo Marine Park	No Specific Receptors	38° 58' 48.00"	143° 30' 36.00"	717421	5682446
4	Portland	Divers Recreational Swimmers	38° 20' 30.71"	141° 41' 33.53"	560529	5756027
5	Port Fairy Lighthouse	Divers Recreational Swimmers	38° 23' 26.44"	142° 15' 26.76"	609813	5750089
6	Killarney Beach	Divers Recreational Swimmers	38° 22' 03.69"	142° 19' 11.50"	615302	5752563
7	Merri Sanctuary	Divers Recreational Swimmers	38° 24' 20.56"	142° 27' 58.42"	628022	5748151
8	Rivernook Beach	Divers Recreational Swimmers	38° 43' 16.44"	143° 10' 08.65"	688568	5711924
9	Clifton Beach	Divers Recreational Swimmers	38° 40' 48.00"	143° 07' 12.00"	684408	5716600
10	Gibson Beach	Divers Recreational Swimmers	38° 40' 22.24"	143° 06' 25.43"	683301	5717420
11	Newfield Beach	Divers Recreational Swimmers	38° 37' 06.28"	142° 53' 49.25"	665151	5723861
12	Bay of Islands	Divers Recreational Swimmers	38° 35' 03.15"	142° 48' 53.68"	658078	5727801
13	Massacre Bay	Divers Recreational Swimmers	38° 35' 55.07"	142° 50' 36.59"	660536	5726151
14	Twelve Apostles MP	Divers Recreational Swimmers	38° 40' 48.00"	143° 07' 12.00"	684408	5716600

[1] Map Grid of Australia (MGA)

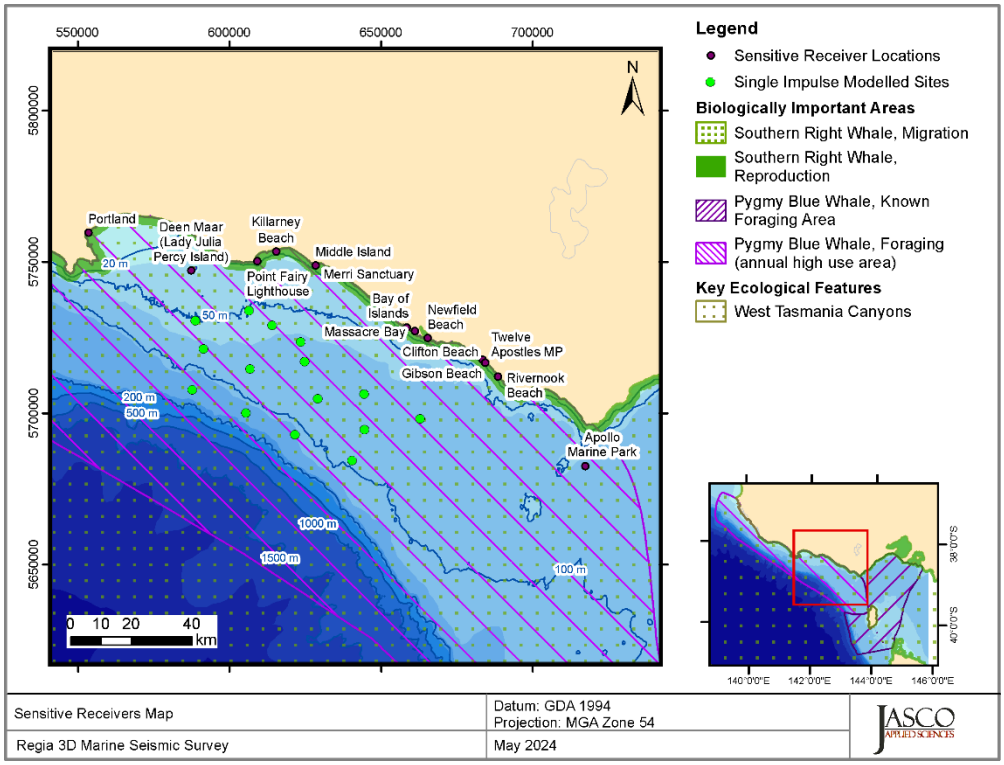

Figure 3. Sensitive receiver locations and single-impulse modelled sites

2. Noise Effect Criteria

The perceived loudness of sound, especially impulsive sound such as that from seismic airguns, is not generally proportional to the instantaneous acoustic pressure. Rather, perceived loudness depends on the pulse rise-time and duration, and the frequency content. Several sound level metrics, such as PK, SPL, and SEL, are commonly used to evaluate sound and its effects on marine life (Appendix A). The period of accumulation associated with SEL is defined, with this report referencing either a "per pulse" assessment or over 24 h. The acoustic metrics in this report reflect the updated ISO standard for acoustic terminology, ISO/DIS 18405:2017 (2017).

Whether acoustic exposure levels might injure or disturb marine mammals is an active research topic. Since 2007, several expert groups have developed SEL-based assessment approaches for evaluating auditory injury, with key works including Southall et al. (2007), Finneran and Jenkins (2012), Popper et al. (2014), United States National Marine Fisheries Service (NMFS 2018) and Southall et al. (2019). The number of studies that have investigated the level of behavioural disturbance to marine fauna by anthropogenic sound has also increased substantially.

The following noise criteria and sound levels for this study were chosen because they include standard thresholds, thresholds suggested by the best available science, and sound levels presented in literature for species with no suggested thresholds (Sections 2.1–2.5 and Appendix A):

1. Peak pressure levels (PK; L_{pk}) and frequency-weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from (Southall et al. 2019) for the onset of Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) in marine mammals.
2. Marine mammal behavioural threshold based on the current US National Oceanic and Atmospheric Administration (NOAA 2019) criterion for marine mammals of 160 dB re 1 µPa^2 (SPL; L_p) for impulsive sound sources.
3. Sound exposure guidelines for fish, fish eggs and larvae (including plankton) (Popper et al. 2014).
4. Peak pressure levels (PK; L_{pk}) and frequency-weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from Finneran et al. (2017) for the onset of permanent threshold shift (PTS) and temporary threshold shift (TTS) in turtles.
5. Sea turtle behavioural response threshold of 166 dB re 1 µPa^2 (SPL; L_p), (McCauley et al. 2000) as cited in the Recovery Plan for Marine Turtles in Australia (Department of the Environment and Energy et al. 2017), along with a sound level associated with behavioural disturbance 175 dB re 1 µPa^2 (SPL; L_p) (McCauley et al. 2000)
6. Diving birds (penguins):
    - Thresholds for otariid pinnipeds are used as a proxy (Section 2.4): Peak pressure levels (PK; L_{pk}) and frequency–weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from Southall et al. (2019) for the onset of PTS and TTS in otariids.
    - Behavioural response to impulsive sound of 120 dB re 1 µPa^2 (SPL; L_p) for diving birds based on information from Sørensen et al. (2020).
7. Peak-peak pressure levels (PK-PK; $L_{pk\text{-}pk}$) and particle acceleration (ms^{-2}) at the seafloor to help assess effects of noise on crustaceans through comparing to results in Day et al. (2016a), Day et al. (2019), Day et al. (2016b), Day et al. (2017) and Payne et al. (2008).
8. A sound level of 226 dB re 1 µPa (PK; L_{pk}) for comparison to Heyward et al. (2018) for sponges and corals.
9. An SPL human health assessment threshold of 145 dB re 1 µPa^2 (SPL; L_p) for sound exposure to people swimming and diving derived from Parvin (2005), and considering Ainslie (2008).

Additionally, to assess the size of the low-power zone required under the Australian Environment Protection and Biodiversity Conservation (EPBC) Act Policy Statement 2.1, Department of the

Environment, Water, Heritage and the Arts (DEWHA 2008), the distance to an unweighted per-pulse SEL of 160 dB re 1 µPa^2·s (L_E) is reported.

The following subsections (Sections 2.1–2.5, along with Appendix A.4 and A.5), expand on the thresholds, guidelines and sound levels for marine mammals, fish, fish eggs, fish larvae, sea turtles, and benthic invertebrates.

2.1. Marine Mammals

There are two categories of auditory threshold shifts or hearing loss: permanent threshold shift (PTS), a physical injury to an animal's hearing organs; and Temporary Threshold Shift (TTS), a temporary reduction in an animal's hearing sensitivity as the result of receptor hair cells in the cochlea becoming fatigued.

To help assess the potential for the possible injury and hearing sensitivity changes in marine mammals, this report applies the criteria recommended by Southall et al. (2019), considering both PTS and TTS. These criteria, along with the applied behavioural criterion (NOAA 2019), are summarised in Table 8, with descriptions included in Appendix A.4.1 (auditory impairment) and Appendix A.4.2 (behavioural response), with frequency weighting explained in Appendix A.5. Of particular note, whilst the newly published Southall et al. (2021) provides recommendations and discusses the nuances of assessing behavioural response, the authors do not recommend new numerical thresholds for onset of behavioural responses for marine mammals.

Table 8. Unweighted sound pressure level (SPL), 24-hour sound exposure level (SEL_{24h}), and peak pressure (PK) thresholds for acoustic effects on marine mammals.

Hearing group	NOAA (2019)	Southall et al. (2019)			
	Behaviour	PTS onset thresholds[1] (received level)		TTS onset thresholds[1] (received level)	
	SPL (L_p; dB re 1 µPa^2)	Weighted SEL (L_E; dB re 1 µPa^2 s)	PK (L_{pk}; dB re 1 µPa)	Weighted SEL (L_E; dB re 1 µPa^2 s)	PK (L_{pk}; dB re 1 µPa)
Low-frequency cetaceans (baleen whales)	160	183	219	168	213
High-frequency cetaceans (dolphins, plus toothed, beaked, and bottlenose whales)		185	230	170	224
Very-high-frequency cetaceans (*Kogia*, cephalorhynchid, and *L. australis*)		155	202	140	196
Pinnipeds[2] (Australian sea lion, Australian fur seal, New Zealand fur seal)		203	232	188	226

[1] Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS and TTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

[2] Listed as pinnipeds but equivalent to other marine carnivores in water in the Southall et al. (2019) criteria. Also equivalent to Otariid pindipeds listed in NMFS (2018).

L_p denotes sound pressure level and has a reference value of 1 µPa^2.

$L_{pk,\,flat}$ peak sound pressure is flat weighted or unweighted and has a reference value of 1 µPa.

L_E denotes cumulative sound exposure over a 24-hour period and has a reference value of 1 µPa^{2}s.

2.2. Fish, Fish Eggs, and Fish Larvae

In 2006, the Working Group on the Effects of Sound on Fish and Turtles was formed to continue developing noise exposure criteria for fish and turtles, work begun by a panel convened by NOAA two years earlier. The resulting guidelines included specific thresholds for different levels of effects and for different groups of species (Popper et al. 2014). These guidelines defined quantitative thresholds for three types of immediate effects:

- Mortality, including injury leading to death.
- Recoverable injury, including injuries unlikely to result in mortality, such as hair cell damage and minor haematoma.
- TTS.

Masking and behavioural effects can be assessed qualitatively, by assessing relative risk rather than by specific sound level thresholds. However, as these depend upon activity-based subjective ranges, these effects are not addressed in this report and are included in Table 9 for completeness only. Because the presence or absence of a swim bladder has a role in hearing, fish's susceptibility to injury from noise exposure varies depending on the species and the presence and possible role of a swim bladder in hearing. Thus, different thresholds were proposed for fish without a swim bladder (also appropriate for sharks and applied to whale sharks in the absence of other information), fish with a swim bladder not used for hearing, and fish that use their swim bladders for hearing. Turtles, fish eggs, and fish larvae are considered separately. Table 9 lists relevant effects thresholds from Popper et al. (2014).

The SEL metric integrates noise intensity over some period of exposure. Because the period of integration for regulatory assessments is not well defined for sounds that do not have a clear start or end time, or for very long-lasting exposures, it is required to define a time. Popper et al. (2014) recommend applying a standard period, where this is either defined as a justified fixed period or the duration of the activity; however, Popper et al. (2014) also included caveats about how long the fish will be exposed because they can move (or remain in location) and so can the source. Popper et al. (2014) summarises that in all TTS studies considered, fish that showed TTS recovered to normal hearing levels within 18–24 hours. Due to this, a period of accumulation of 24 hours has been applied in this study for SEL, which is similar to that applied for marine mammals in NMFS (2016, 2018).

In the discussion of the criteria, Popper et al. (2014) discuss the complications in determining a relevant period of mobile seismic surveys, as the received levels at the fish change between impulses because the source is moving, and that in reality a revised guideline based on the closest PK or the per-pulse SEL might be more useful than one based on accumulated SEL. This is because exposures at the closest point of approach (CPA) are the primary exposures contributing to a receiver's accumulated level (Gedamke et al. 2011). Additionally, several important factors determine the likelihood and duration a receiver is expected to be in close proximity to a sound source (i.e., overlap in space and time between the source and receiver). For example, accumulation time for fast moving (relative to the receiver) mobile sources is driven primarily by the characteristics of the source (i.e., speed, duty cycle; NMFS 2016, 2018).

As discussed in Popper (2018), many fish species move around, some over large distances. The author suggests that it is reasonable to think that if the sound of a seismic source becomes too loud, the fish will move away from the source because they are able to determine the direction of a sound source. If the fish moves away, the amount of energy to which it is exposed is likely to be one or a few seismic pulses, and these would not likely be loud enough to result in any effect because the fish would move away at a much lower level signal than could cause harm. Data on TTS for fish are very limited, with the only study that examined recovery from seismic impulses being Popper et al. (2005). Popper (2018) states that if this study had been conducted on wild, free-swimming fish instead of caged ones, there would have been no effect whatsoever because they were likely to have moved

away from the source as it approached them, as would happen with normally free-moving demersal and pelagic fish species associated with a 3-D seismic survey in northern Australian waters, extrapolating from the Bethany 3-D assessed in Popper (2018).

Therefore, the time over which energy should be accumulated in each individual fish in the survey area should be limited to the time over which fish receives the maximum exposure, and 24 h is likely too long a period for calculating the accumulation of energy in determining potential harm (e.g., damage or TTS) (Popper 2018). Even if fish do show some TTS, recovery will start as soon as the most intense sounds end, and recovery is likely to even occur, to a limited degree, between seismic pulses. Based on very limited data, recovery within 24 h (or less) is very likely. If TTS does occur, the duration of exposure to the most intense sounds that could result in TTS will be over just a few hours. Thus, energy accumulating over longer periods than a few hours is probably inappropriate (Popper 2018).

Table 9. Criteria for seismic noise exposure for fish, adapted from Popper et al. (2014).

Type of animal	Mortality and Potential mortal injury	Impairment			Behaviour
		Recoverable injury	TTS	Masking	
Fish: No swim bladder (particle motion detection)	>219 dB SEL_{24h} or >213 dB PK	>216 dB SEL_{24h} or >213 dB PK	>>186 dB SEL_{24h}	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low
Fish: Swim bladder not involved in hearing (particle motion detection)	210 dB SEL_{24h} or >207 dB PK	203 dB SEL_{24h} or >207 dB PK	>>186 dB SEL_{24h}	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low
Fish: Swim bladder involved in hearing (primarily pressure detection)	207 dB SEL_{24h} or >207 dB PK	203 dB SEL_{24h} or >207 dB PK	186 dB SEL_{24h}	(N) Low (I) Low (F) Moderate	(N) High (I) High (F) Moderate
Fish eggs and fish larvae (relevant to plankton)	>210 dB SEL_{24h} or >207 dB PK	(N) Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low

Peak sound level (PK) dB re 1 µPa; SEL_{24h} dB re 1µPa^2·s. All criteria are presented as sound pressure, even for fish Without swim bladders, since no data for particle motion exist. Relative risk (high, moderate, or low) is given for animals at three distances from the source defined in relative terms as near (N), intermediate (I), and far (F).

2.3. Sea Turtles

There is a paucity of data regarding responses of turtles to acoustic exposure, and no studies of hearing loss due to exposure to loud sounds. Popper et al. (2014) suggested thresholds for onset of mortal injury (including PTS) and mortality for sea turtles and, in absence of taxon-specific information, adopted the levels for fish that do not hear well (suggesting that this likely would be conservative for sea turtles).

Finneran et al. (2017) presented revised thresholds for sea turtle injury and hearing impairment (TTS and PTS). Their rationale is that sea turtles have best sensitivity at low frequencies and are known to have poor auditory sensitivity (Bartol and Ketten 2006, Dow Piniak et al. 2012). Accordingly, TTS and PTS thresholds for turtles are likely more similar to those of fishes than to marine mammals (Popper et al. 2014).

McCauley et al. (2000) observed the behavioural response of caged sea turtles—green (*Chelonia mydas*) and loggerhead (*Caretta caretta*)—to an approaching seismic airgun. For received levels above 166 dB re 1 μPa^2 (SPL), the sea turtles increased their swimming activity, and above 175 dB re 1 μPa^2 they began to behave erratically, which was interpreted as an agitated state. The

Recovery Plan for Marine Turtles in Australia (Department of the Environment and Energy et al. 2017) acknowledges the 166 dB re 1 µPa^2 SPL reported (McCauley et al. 2000) as the level that may result in a behavioural response to marine turtles. The 175 dB re 1 µPa^2 level from McCauley et al. (2000) is recommended as a criterion for behavioural disturbance. These thresholds are shown in Table 10.

Table 10. Acoustic effects of impulsive noise on sea turtles: Unweighted sound pressure level (SPL), 24 hour sound exposure level (SEL_{24h}), and peak pressure (PK) thresholds

Effect type	Criterion	SPL (L_p; dB re 1 µPa^2)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1 µPa^2·s)	PK (L_{pk}; dB re 1 µPa)
Behavioural response	McCauley et al. (2000)	166	NA	
Behavioural disturbance		175		
PTS onset thresholds[1] (received level)	Finneran et al. (2017)	NA	204	232
TTS onset thresholds[1] (received level)			189	226

[1] Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS and TTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

L_p denotes sound pressure level and has a reference value of 1 µPa^2.

$L_{pk,flat}$ denotes peak sound pressure is flat weighted or unweighted and has a reference value of 1 µPa.

L_E denotes cumulative sound exposure over a 24 h period and has a reference value of 1 µPa^{2}s.

2.4. Diving Birds

There are no regulatory thresholds with regard to onset of hearing impairment for penguins, any other bird species, or phylogenetically or anatomically related species. The only scientifically robust thresholds in this context exist for marine mammals. To allow for assessing the noise–induced impact risk of impulsive airgun signals on penguins, the least sensitive marine mammal hearing group, other carnivores in water (OCW), from Southall et al. (2019), is recommended as a proxy. This hearing group has been selected due to similar hearing sensitivity in the frequency band of underwater hearing for diving birds and otariid pinnipeds, which are included in the group. This provides a conservative approach, as otariids are considered more sensitive to underwater sound at higher frequencies than penguins.

There are also no regulatory thresholds or criteria established to assess potential behavioural responses by penguins or flying seabirds to underwater noise. To allow for assessing the potential for such impacts, an onset criterion for behavioural responses of penguins and flying seabirds of 120 dB re 1 µPa^2 (SPL) for impulsive sources was chosen based on information from Sørensen et al. (2020). They exposed gentoo penguins (*Pygoscelis papua*) in a controlled exposure experiment to underwater noise bursts (impulsive signals) and demonstrated that the animals show a graded reaction depending on received sound levels. For consistency with the approach to assess PTS and TTS, the behavioural response threshold is applied as OCW weighted.

2.5. Invertebrates

2.5.1. Benthic Invertebrates

Research is ongoing into the relationship between sound and its effects on crustaceans, including the relevant metrics for both effect and impact. Available literature suggests particle motion, rather than sound pressure, is a more important factor for crustacean and bivalve hearing. Water depth and

seismic source size are related to the particle motion levels at the seafloor, with larger arrays and shallower water being related to higher particle motion levels, more likely relevant to effects on crustaceans and bivalves.

At the seafloor interface, crustaceans and bivalves are subject to particle motion stimuli from several acoustic or acoustically induced waves. These include the particle motion associated with an impinging sound pressure wave in the water column (the incident, reflected, and transmitted portions), substrate acoustic waves, and interface waves of the Scholte type. However, it is unclear which aspect(s) of these waves is/are most relevant to the animals, either when they normally sense the environment or their physiological responses to loud sounds so there is not enough information to establish similar criteria and thresholds as done for marine mammals and fish. Including recent research, such as Day et al. (2016b), current literature does not clearly define an appropriate metric or identify relevant levels (pressure or particle motion) for an assessment. This includes the consideration of what particle motion levels lead to a behavioural response, or mortality. Therefore, at this stage, we cannot propose authoritative thresholds to inform the impact assessment. However, levels can be determined for pressure metrics presented in literature to assist the assessment.

The pressure and acceleration examples provided in Day et al. (2016a) (Figures 11 and 12) indicate that the acceleration and pressure signals occurred simultaneously, which was interpreted as an indication that the waterborne sounds were responsible for the accelerations measured by the geophones. For clarity, it is important to distinguish that the acceleration from waterborne sound energy is *not* ground roll, which Day et al. (2016a) correctly define as the sound that propagates along the interface at a speed lower than the shear wave speed of the sediment. However, the report subsequently uses ground roll for all further discussions of particle acceleration. While Day et al. (2016a) discuss that they chose the simplest measure of ground roll, it should have been referring to as ‘the acceleration from waterborne sound energy’, or ‘waterborne acceleration’ for short.

For crustaceans, a PK-PK sound level of 202 dB re 1 µPa (Payne et al. 2008) is considered to be associated with no effect, and therefore applied in the assessment. Additionally for context related to different levels of potential impairment, the PK-PK sound levels determined for crustaceans in Day et al. (2016b), 209–212 dB re 1 µPa and 213 dB re 1 µPa from Day et al. (2019), are also included.

For bivalves, PK-PK sound levels of 212 and 213 dB re 1 µPa are presented to allow comparison to the maximum sound levels measured in Day et al. (2016a) and Day et al. (2017) for scallops and pearl shell oyster.

A sound level of 226 dB re 1 µPa (PK; L_{pk}) has been considered for comparison to Heyward et al. (2018) for sponges and corals.

Particle acceleration from the seismic source has been presented to allow for comparison with the results in Table 7 of Day et al. (2016a). The maximum particle acceleration assessed by Day et al. (2016a) for scallops was 37.57 ms^{-2}.

2.5.2. Plankton

To assess effects on plankton, there are only a few studies to base threshold criteria on. Popper et al. (2014) cites many of the references and studies on potential impacts of noise emissions on fish eggs and larvae prior to 2014. Results presented in Day et al. (2016b) for embryonic lobsters and Fields et al. (2019) for copepods align with those presented in Popper et al. (2014), which is that mortality and sub-lethal injury are limited to within tens of metres of seismic sources. Additionally, the Popper et al. (2014) criteria (Table 9), are extrapolated from simulated pile driving signals which have a more rapid rise time and greater potential for trauma than pulses from a seismic source.

Other research, such as McCauley et al. (2017), has indicated the potential for effects at longer range and at levels of 178 dB PK-PK, however, Fields et al. (2019) noted that it was difficult to reconcile the

high mortality reported by McCauley et al. (2017) with the low mortalities reported in the greater previous body of earlier research and their experiment. They recommended further research into whether it is the sound pulse itself (i.e., the energy, peak pressures, or particle acceleration), the (turbulent) fluid flow occurring more slowly (i.e., not related to the sound pulse), or other effects such as the bubble cloud that which might cause higher mortality near the seismic source.

2.6. Human Health Assessment Threshold

Underwater, the human ear is about 20 dB less sensitive than it is in air at low frequencies (20 Hz), increasing to 40 dB at mid–frequencies (less than 1 kHz), and increasing to 70–80 dB less sensitive at higher frequencies (Parvin 1998). Divers who wear neoprene hoods have even higher hearing thresholds (lower sensitivity) above 500 Hz because the hood material absorbs high–frequency sounds (Sims et al. 1999). Exposure studies related to divers have typically focused on military sonar exposure, with little information on seismic surveys, and as such care is required when considering thresholds for recreational divers and swimmers, particularly for impulsive sounds such as seismic surveys (Ainslie 2008).

The auditory threshold of hearing under water was lowest at 1 kHz (70 dB re 1 µPa SPL) and increased for lower and higher frequencies to around 120 dB re 1 µPa at 20 Hz and at 20 kHz (Parvin 1998). Fothergill et al. (2000) and Fothergill et al. (2001) conducted controlled acoustic exposure experiments on military divers under fully controlled conditions at a US Ocean Simulation Facility and an US Open water test facility; in all tests, the diver were covered with soft or hard shell dive suits and their position and distance relative to sound source, signal characteristics and received levels were controlled and documented (Pestorius et al. 2009). A total of 89 male Navy divers were exposed to pure tone signals and sweeps between 160–320 Hz at SPLs up to 160 dB re 1 µPa. The divers were exposed to these sounds over 100 seconds at depths from 10 to 40 metres. The divers rated the sounds on a severity scale. For frequencies between 100 and 500 Hz, at a received SPL of 130 dB re 1 µPa, divers and swimmers detected body vibration. None of the divers tested rated levels of 140 dB re 1 µPa as “very severe”; however, at 157 dB re 1 µPa, sound was rated as “very severe” 19 per cent of the time. No physiological damage was observed at the highest levels tested: 160 dB re 1 µPa (Fothergill et al. 2001). In a subsequent study, recreational divers were exposed to tonal signals or 30 Hz–sweeps at frequencies between 100 and 500 Hz at received levels of 130–157 dB re 1 µPa (Pestorius et al. 2009). Each exposure lasted for seven seconds. Nine female and 17 male scuba divers were tested, all wearing full body neoprene wetsuits. Diver aversion and perception of body vibration were used as test parameters. The results showed no sex–specific differences. The results differed as a function of frequency – while test results showed a strong overall variation between subjects, signals at 100 Hz elicited the strongest aversion in all tests and even at 148 dB a few diver ratings indicated extreme aversion. Due to this and the strong variation between test subjects, the following exposure limit for both military and recreational divers was suggested as a conservative measure: For frequencies between 100 and 500 Hz, the maximum SPL should be 145 dB re 1 µPa over a maximum continuous exposure of 100 seconds or with a maximum duty cycle of 20 per cent and a maximum daily cumulative total of three hours. The trading relation between the maximum SPL and duration was 4 dB per doubling of duration (e.g. 141 dB SPL for a 200 second exposure) (Pestorius et al. 2009).

Considering only frequencies between 100 and 500 Hz, Parvin (2005) suggested 145 dB re 1 µPa as a safety criterion for recreational divers and swimmers. Piling impulses are broadband sources, and therefore, to be precautionary, the 145 dB re 1 µPa SPL suggested by Fothergill et al. (2001) and Parvin (2005) has been applied in this study as a broadband SPL and as a human health assessment threshold for recreational divers and swimmers. This does not imply that this level is associated with the onset of injury.

3. Methods

3.1. Parameter Overview

The specifications of the seismic sources and the environmental parameters used in the propagation models are described in additional detail in Appendix D. A single sound speed profile for June was considered in this modelling study (Appendix D.3.2). This was identified as the month that would likely provide the farthest propagation by comparing the sound speed profile across all months.

The modelled single-impulse sites spanned water depths of 49–174 m. Three geological profiles were defined to represent the different geo-acoustic properties across the area encompassed by the considered line plans, and are representative of the different zones within the entire Survey Area (Appendix D.3.3). In water depths less than 120 m, the seabed geological profile was characterised as layered limestone, variably cemented. In the shallowest modelled water depths, less than 65 m and within 20 km of the coast, the geological profile also included a thin layer of overlying sand. For sites in deeper water, greater than 120 m, the seabed geologic profile was characterised as a thick package of unconsolidated sediments.

3.2. Acoustic Source Model

The pressure signature of the individual airguns and the composite decidecade-band point-source equivalent directional levels (i.e., source levels) of the 2820 in^3 seismic source were modelled with JASCO's Airgun Array Source Model (AASM). Although AASM accounts for notional pressure signatures of each seismic source with respect to the effects of surface-reflected signals on bubble oscillations and inter-bubble interactions, the surface-reflected signal (known as surface ghost) is not included in the far-field source signatures. The acoustic propagation models account for those surface reflections, which are a property of the propagating medium rather than the source.

AASM considers:

- Array layout.
- Volume, tow depth, and firing pressure of each airgun.
- Interactions between different airguns in the array.

All seismic sources considered were modelled over AASMs full frequency range, up to 25 kHz. Appendix B.1 details this model.

3.3. Sound Propagation Models

Three sound propagation models were used to predict the acoustic field around the seismic source:

- Combined range-dependent parabolic equation and Gaussian beam acoustic ray-trace model (MONM-BELLHOP, 10 Hz to 25 kHz).
- Full Waveform Range-dependent Acoustic Model (FWRAM, 10 to 1024 Hz).
- Wavenumber integration model (VSTACK, 10 to 1024 Hz).

The models were used in combination to characterise the acoustic fields at short and long ranges in terms of SEL, SPL, PK, and PK-PK. Appendix C details each model. MONM-BELLHOP was used to calculate SEL of a 360° area around each source location. FWRAM was used to model synthetic seismic pulses and to generate a generalised range-dependent SEL to SPL conversion function for a

sub-set of the considered modelled sites. The range-dependent conversion function was applied to predicted per-pulse SEL results from MONM-BELLHOP to estimate SPL values. FWRAM was also used to calculate water column PK and PK-PK levels.

VSTACK was used to calculate near field PK and PK-PK levels along 4 transects at the seafloor along the endfire and broadside directions considering a set of 11 unique water depths at 40, 50, 60, 70, 80, 90, 100, 120, 140, 160 and 170 m. This model was also used to model the peak particle acceleration magnitude considering the same 11 unique water depths. For modelled sites where the seabed is likely to be composed of outcropping limestone (Appendix D.3.3), an additional correction factor was applied to predictions to better estimate loss characteristics of the seabed (see Appendix C.3.2).

3.4. Geometry and Modelled Regions

To predict sound levels with MONM-BELLHOP was used to calculate propagation losses up to distances of 100 km from the source, with a horizontal separation of 20 m between receiver points along all modelled radials. The sound fields were modelled with a horizontal angular resolution of $\Delta\theta = 2.5°$ for a total of $N = 144$ radial planes. Receiver depths were chosen to span the entire water column over the modelled area, from 2 m to a maximum of 2700 m, with step sizes that increased with depth. To supplement the MONM results, high-frequency results for propagation loss were modelled using BELLHOP for frequencies from 1.25 to 25 kHz. The MONM and Bellhop results were combined to produce results for the full frequency range of interest.

FWRAM was run to 100 km along four radials (fore and aft endfire, and port and starboard broadside) for computational efficiency. This was done to compute SEL-to-SPL conversions (Appendix D.2) and also to quantify water column PK and PK-PK. The horizontal range step begins at 20 m and increases with range from the source.

The maximum modelled range for VSTACK was 1000 m, and a variable receiver range increment that increased away from the source was used, which increased from 10 to 25 m. The final tabulated distances were obtained through interpolating predicted received levels. Received levels were computed for receivers at 5 and 50 cm above the seafloor to assist in the assessment on invertebrates and fish respectively.

3.5. Accumulated SEL

New sound energy is introduced into an environment with each pulse from the seismic source. While some impact criteria are based on the per-pulse energy released, others, such as the marine mammal and fish SEL criteria (Section 2), account for the total acoustic energy marine fauna is subjected to over a specified duration, defined in this report as 24 h. An accurate assessment of the accumulated sound energy depends not only on the parameters of each seismic impulse but also on the number of impulses delivered in a duration and the relative positions of the impulses.

When there are many seismic impulses, it becomes computationally prohibitive to perform sound propagation modelling for every single event. The distance between the consecutive seismic impulses is small enough, such that the environmental parameters that influence sound propagation are virtually the same for many impulse points. The acoustic fields can, therefore, be modelled for a subset of seismic pulses and estimated at several adjacent ones. After sound fields from representative impulse locations are calculated, they are adjusted to account for the source position for nearby impulses.

Although estimating the cumulative sound field with the described approach is not as precise as modelling sound propagation at every impulse location, small-scale, site-specific sound propagation features tend to blur and become less relevant when sound fields from adjacent impulses are

summed. Larger scale sound propagation features, primarily dependent on water depth, dominate the cumulative field. The accuracy of the present method acceptably reflects those large-scale features, thus providing a meaningful estimate of a wide area SEL field in a computationally feasible framework.

To produce the map of accumulated received sound level distributions and calculate distances to specified sound level thresholds, the maximum-over-depth were calculated at each sampling point within the modelled region. The radial grids of maximum-over-depth sound levels for each impulse were then resampled (by linear triangulation) to produce a regular Cartesian grid. The sound field grids from all impulses were summed (see Equation A-5) to produce the cumulative sound field grid with cell sizes of 20 m. The contours and threshold ranges were calculated from these flat Cartesian projections of the modelled acoustic fields.

The unweighted (fish) and frequency-weighted SEL_{24h} results were rendered as contour maps, including contours that focus on the relevant criteria-based thresholds. Only contours at ranges larger than the nearfield of the seismic source were rendered.

3.6. Per-pulse Levels at Receivers

The received acoustic levels at 14 sensitive receiver locations have been calculated; sensitive receiver locations are summarised in Table 7. To determine whether per-pulse levels at these receivers exceed relevant thresholds, modelling was undertaken to estimate the sound level at a given receiver from any shot within the survey.

The method utilised to calculate per-pulse levels at receivers is similar to the method described in Section 3.5 to calculate accumulated received levels. The per-pulse sound fields modelled for the fifteen single-impulse modelled sites were translated to each impulse location on the survey lines based on the closest, most appropriate single-impulse modelled site. For computational efficiency purposes, every 50^{th} impulse was considered in this method. Modelling every shot on the survey lines would be computationally prohibitive.

After translation the maximum-over-depth received level at a given location was extracted. In such a fashion, a sequence of received levels at a given location can be tabulated for impulses in the survey. In order to obtain per-pulse received levels, the received levels were not summed for this analysis, unlike the calculation for accumulated received levels (Section 3.5).

3.7. Animal Movement and Exposure Modelling

3.7.1. Methodology

The JASCO Animal Simulation Model Including Noise Exposure (JASMINE) was used to predict the exposure of animats to sound arising from the seismic activity. JASMINE integrates the predicted sound field with biologically meaningful movement rules for each marine mammal species (pygmy blue whales and southern right whales for the current analysis) that results in an exposure history for each animat in the model. An overview of the exposure modelling process using JASMINE is shown in Figure 4.

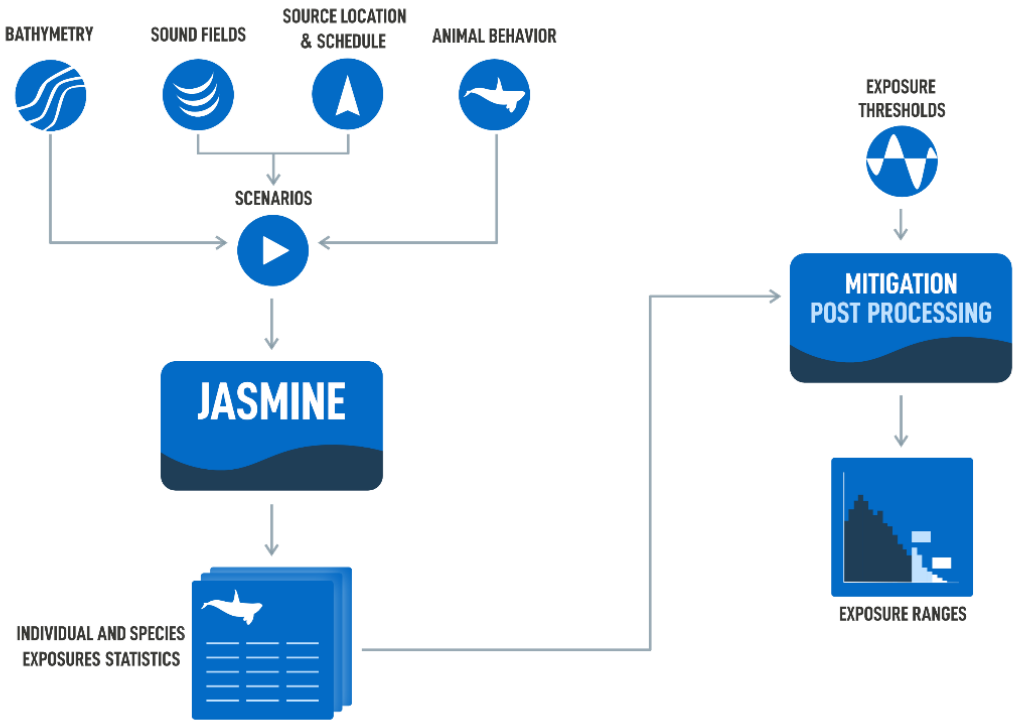

Figure 4. Exposure modelling process overview.

In JASMINE, the sound received by the animats is determined by the proposed seismic operations. As illustrated in Figure 5, animats are programmed to behave like the marine animals that may be present in the modelling area. The parameters used for forecasting realistic behaviours (e.g., diving and foraging depth, swim speed, surface times) are determined and interpreted from marine mammal studies (e.g., tagging studies) where available, or reasonably extrapolated from related or comparable species. For the assessment of cumulative criteria, an individual animats sound exposure levels are summed over a 24 h duration to determine its total received energy, and then compared to the relevant threshold criteria. For single-exposure metrics, the maximum exposure is evaluated against threshold criteria for each 24 h period. For additional information on JASMINE, see Appendix D.4.

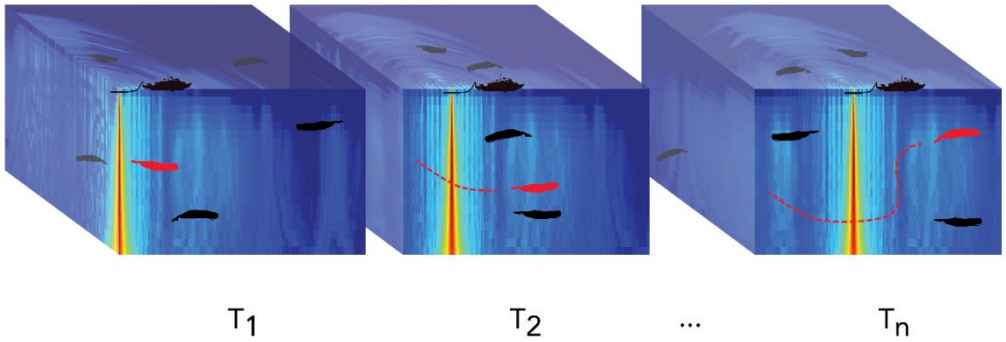

Figure 5. Depiction of animats in a moving sound field. Example animat (red) shown moving with each time step (T_n). The acoustic exposure of each animat is determined by where it is in the sound field, and its exposure history is accumulated as the simulation steps through time.

The exposure criteria for impulsive sounds (described in Section 2) were used to determine the number of animats that exceeded thresholds. To generate statistically reliable probability density functions, model simulations were run with animat sampling densities of 4 animats/km^2, except those in which southern right whale animats were restricted to their reproduction BIA, in which case the density was increased to 6 animats/km^2 to account for the relatively small area. The modelling results are not related to real-world density estimates for pygmy blue whales and southern right whales within BIAs or the wider area, as animal density in the area is unknown. To evaluate PTS, TTS and behavioural response, exposure results were obtained using detailed behavioural information for pygmy blue whales and southern right whales (described in Sections 3.7.3.1 and 3.7.3.2).

The seismic source was modelled as a vessel towing an airgun array at a speed of 4.5 knots, with an impulse interval of 12.5 m. The simulated source tracks followed a racetrack configuration with acquisition not occurring on turns. At the time and location of each seismic pulse, the modelled source location with the closest distance was selected for exposure modelling. The track lines along with the acoustic modelling locations are shown in Figure 1.

Figure 6 shows an example animat track (generated for information purposes only and not related to the results presented in this report) with associated received levels from a stationary point source. The top panel displays the animat track relative to the point source, and the bottom panel displays the accumulation of SEL_{24h} for TTS and PTS criteria. At approximately 50 seconds, the animat is exposed so that the TTS threshold is exceeded, and at approximately 700 seconds the animat is exposed so that the PTS threshold is exceeded.

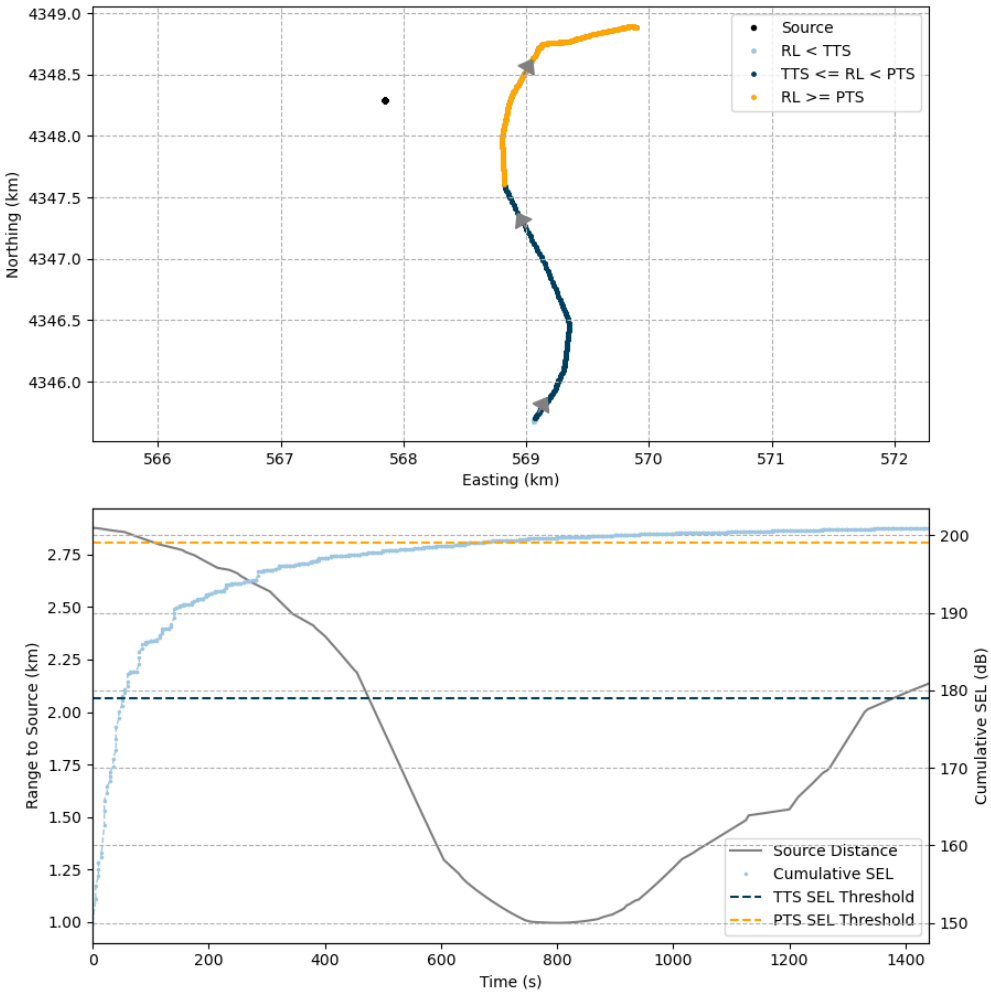

Figure 6. Animat track from an example simulation showing northward movement over a 1400 s duration. The upper panel shows a plan view of both a stationary point source and a foraging animat. Animat steps are coloured to indicate whether the accumulated sound energy at that point has exceeded either TTS or PTS threshold criteria. The lower panel shows horizontal distance in kilometres to the source (grey line; left y-axis) and cumulative 24-h SEL ($L_{E,24h}$, dB re 1 µPa²·s; right y-axis) as a function of time. Note that this example does not use data from the current study.

3.7.2. Exposure–based Radial Distance Estimation

The results from the animal movement and exposure modelling provided a way to estimate radial distances to effect thresholds. The distance to the closest point of approach (CPA) for each of the animats was recorded. The $ER_{95\%}$ (95% Exposure Range) is the horizontal distance that includes 95% of the animat CPAs that exceeded a given effect threshold (see Section 2). Within the $ER_{95\%}$, there is generally some proportion of animats that do not exceed threshold criteria. This occurs for several reasons, including the spatial and temporal characteristics of the sound field and the way in which animats sample the sound field over time, both vertically and horizontally. The sound field varies as a function of range, depth, and azimuth based on a variety of factors such as bathymetry, sound speed profile, and geoacoustic parameters. The way the animats sample the sound field depends upon species-typical swimming and diving characteristics (e.g., swim speed, dive depth, surface intervals, and reversals). Furthermore, even within a particular species definition, these characteristics vary with behavioral state (e.g., feeding, migrating). As this results in some animats not exceeding threshold criteria even within the $ER_{95\%}$, the probability that an animat within that distance was exposed above threshold within the $ER_{95\%}$ was also computed (P_{exp}) to provide additional context.

Acoustic ranges are reported for both $R_{95\%}$ and R_{max}, however, exposure ranges are reported for $ER_{95\%}$ only since, statistically, ER_{max} is not defined. JASMINE is a Monte Carlo simulation, and the results are probabilistic in nature. This is in contrast with acoustic modelling, where there is a specific maximum isopleth range for a given source/environment setup.

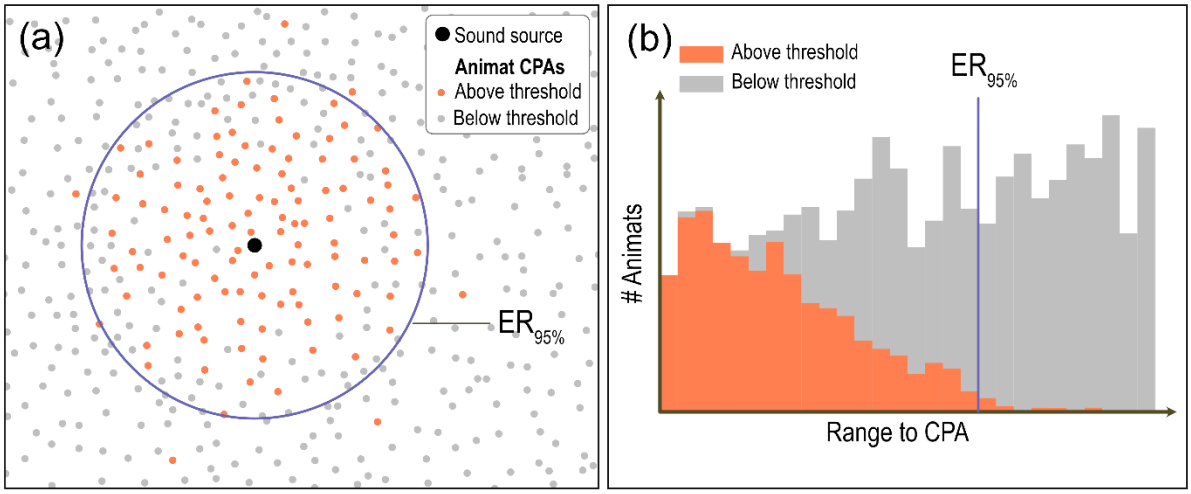

Figure 7. Example distribution of animat closest points of approach (CPAs). Panel (a) shows the horizontal distribution of animats near a sound source. Panel (b) shows the distribution of distances to animat CPAs. The 95% exposure range ($ER_{95\%}$) is indicated in both panels.

3.7.3. Species Specific Behaviour Profile Parameterisation

3.7.3.1. Pygmy Blue Whale Behaviour Profile

The project area overlaps with a known foraging BIA for pygmy blue whales (DoE (AU) 2015-2025). Therefore, only foraging behaviours were considered in the species profile.

Data on fine-scale foraging behaviour are not currently available for pygmy blue whales. Therefore, data from multi-sensor tags deployed on blue whales from the North Pacific were used to inform the feeding behaviours. Irvine et al. (2019) used intermediate-duration archival tags (SPLASH MK10) attached to eight blue whales off the coast of California and was able to determine two feeding modes based on depth: shallow and deep. These two feeding behaviours differed further between males and females, with females generally diving deeper than males during both shallow and deep feeding. In order to account for these differences, female and male pygmy blue whales were modelled separately, with values derived from Irvine et al. (2019). Most remaining parameters for feeding behaviour were sourced from Goldbogen et al. (2011), who deployed 25 multi-sensor suction cup tags (DTAGs) on blue whales off the coast of California. Finally, travel speed was derived from satellite tags deployed on pygmy blue whales off southern Australia (Möller et al. 2020), and surface interval was derived from a satellite tag deployed on a pygmy blue whale off western Australia (Davenport et al. 2022).

3.7.3.2. Southern Right Whale Behaviour Profile

The project area is located in the migration BIA for southern right whales, and the reproduction BIA for this species lies inshore of the proposed survey lines. Animals of all demographics use these areas, including mothers with new calves. The behaviour of southern right whale mother/calf pairs can be dramatically different from other demographics, particularly in regards to the amount of time spent resting at the surface (Cusano et al. 2019, Nielsen et al. 2019). Therefore, separate behavioural

profiles were modelled for mother/calf pairs and for all other demographics. Accordingly, a total of four behavioural profiles were considered for southern right whales: migrating mother with calf, migrating adult with no calf, reproducing adult with calf, reproducing adult with no calf. Migration profiles are applicable to the migration BIA, and reproducing profiles are applicable to the reproduction BIA.

The behaviour of migrating southern right whales was modelled to reflect animats transiting through the migration BIA on a 293º track to correspond with the tow direction. This reflects the animals migrating along the southern coast of Australia in a westerly or counter-clockwise direction (Burnell et al. 2001). Fine-scale behavioural data on southern right whales are limited, however migrating travel speed was derived from satellite-tagged southern right whales (Mackay et al. 2020). The remaining parameters used for the migrating species profiles were primarily sourced from multi-sensor tags (DTAGs and/or TDRs) deployed on North Atlantic right whales (Baumgartner and Mate 2003) (Dombroski et al. 2021).

Reproductive BIAs for southern right whales act as aggregation areas for mothers with new calves and for other demographics. For the reproducing behavioural profiles, behaviours reflect those observed in North Atlantic right whales on calving grounds due to limited data availability for southern right whales. Behavioural states comprise resting, travelling, and surface active. Additionally, the mother/calf profile includes nursing behaviour. The parameters used for the reproducing species profiles were again primarily sourced from North Atlantic right whales with the exception of behavioural probabilities, which were available from studies of southern right whales in South America (Thomas et al. 1984 and Lundquist et al. 2008).

4. Results

4.1. Acoustic Source Levels and Directivity

AASM (Section 3.2) was used to predict the horizontal and vertical overpressure signatures and corresponding power spectrum levels for the seismic sources, with results provided in Appendix B.3 along with the horizontal directivity plots for the selected source.

Table 11 shows the PK and per-pulse SEL source levels in the horizontal-plane broadside (perpendicular to the tow direction), endfire (along the tow direction), and vertical directions for the modelled array signature (2820 in^3 source). The vertical source level that accounts for the "surface ghost" (the out of phase reflected pulse from the water surface) is also presented to make it easier to compare the output of other seismic source models.

Figure B-2 in Appendix B.3 shows the broadside, endfire, and vertical overpressure signature and corresponding power spectrum levels for the source. The signature consists of a strong primary peak, related to the initial release of high-pressure air, followed by a series of pulses associated with bubble oscillations. Most energy was produced at frequencies below 500 Hz. Frequency-dependent peaks and nulls in the spectrum result from interference among airguns in the source and correspond with the volumes and relative locations of the airguns to each other.

Table 11. Far-field source level specifications for 2820 in^3 source, for 7 m tow depth. Source levels are for a point-like acoustic source with equivalent far-field acoustic output in the specified direction. Sound level metrics are per-pulse and unweighted.

Direction	Peak source pressure level ($L_{S,pk}$; dB re 1 µPa m)	Per-pulse source SEL ($L_{S,E}$; dB 1 μPa^2m^2s)	
		10–2000 Hz	2000–25000 Hz
Broadside	249.0	224.3	185.8
Endfire	244.9	222.6	186.4
Vertical	255.1	228.0	194.0
Vertical (surface affected source level)	255.1	230.8	197.0

4.2. Per-pulse Sound Fields

This section presents the per-pulse sound fields in terms of maximum-over-depth SPL, SEL, PK, and seafloor PK and PK-PK. The different metrics are presented for the following reasons:

- SPL sound fields were used to determine the distances to marine mammal and turtle behavioural thresholds (see Sections 2.1 and 2.3).
- Received per-pulse SPL at the considered receiver locations are presented in Table 19, as well as maps showing which impulses result in levels above the human health assessment threshold (Figure 38).
- Per-pulse SEL sound fields are used as inputs into the 24 h SEL scenario and to provide context for the range to 160 dB re 1 $\mu Pa^2 \cdot s$, relevant for the EPBC Act Policy Statement 2.1 (DEWHA 2008).
- PK metrics within the water column are relevant to thresholds and guidelines for marine mammals, sea turtles, fish, fish eggs and larvae (as well as plankton; Sections 2.1–2.3).

- PK metrics at the seafloor are relevant to guidelines for fish, fish eggs and larvae (Section 2.3) and the sound level for no effect on corals and sponges.
- PK-PK metrics at the seafloor are relevant to sound levels used in the assessment of effect on benthic invertebrates (Section 2.5.1).

The maximum and 95% distances to per-pulse SEL and SPL metrics are presented in Tables 12–13. The SPL sound fields, and distances to relevant isopleths can be visualised on the contour maps presented in Figures 8–22. Where indicated in the table captions, distances to maximum and 95% distance were calculated considering both survey directions (tow directions); the largest resultant distances were reported. The SPL sound fields are also presented as vertical slices for selected azimuths along the endfire and broadside directions out to 50 km, with the airgun array in the centre (Figures 23–27).

Maximum horizontal distances to maximum-over-depth water column PK thresholds were calculated for eight modelled single-impulse sites, Sites 1, 2, 5, 8, 10, 12, 14 and 15. This metric was calculated for the sites where FWRAM was applied to enable the SEL to SPL conversion (Appendix C.2 and D.2). PK results are presented in Table 15.

Seafloor sound levels were assessed considering ten different representative water depths (50, 60, 70, 80, 90, 100, 120, 140, 160 and 170 m). Tables 16 and 17 present the PK and PK-PK results. Particle motion was also calculated considering these water depths, results are presented in Table 18.

Table 19 provides a summary of whether or not the 145 dB re 1 µPa SPL human health assessment threshold was exceeded at each of the 14 sensitive receiver sites identified in Section 1.3 from any impulse location on the survey lines. Figures 38 to 43 indicate which modelled impulses on the seismic survey lines result in these exceedances.

4.2.1. Tabulated Results

4.2.1.1. Entire Water Column

Table 12. *Sites 1-15, 2820 in³ source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to modelled maximum-over-depth unweighted per-pulse sound exposure level (SEL) isopleths from the modelled single-impulse sites. Water depth at each site is indicated. The results presented are the maxima considering either of the two tow directions modelled for each site.

Per-pulse SEL (L_E; dB re 1 µPa²·s)	Site 1 (49.1 m)		Site 2 (54.8 m)		Site 3 (63.9 m)		Site 4 (81.0 m)		Site 5 (61.9 m)		Site 6 (71.1 m)		Site 7 (124.9 m)		Site 8 (173.6 m)		Site 9 (166.5 m)		Site 10 (67.4 m)		Site 11 (72.0 m)		Site 12 (84.0 m)		Site 13 (99.0 m)		Site 14 (69.2 m)		Site 15 (51.6 m)	
	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$
190	0.06	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.06	0.05
180	0.38	0.34	0.40	0.34	0.38	0.34	0.27	0.23	0.29	0.25	0.27	0.23	0.17	0.16	0.15	0.13	0.15	0.13	0.29	0.24	0.26	0.22	0.29	0.25	0.27	0.23	0.28	0.23	0.39	0.34
170	1.91	1.66	1.97	1.68	1.96	1.67	0.68	0.57	0.72	0.63	0.68	0.60	0.97	0.73	0.79	0.65	0.80	0.66	0.74	0.58	0.68	0.59	0.69	0.60	0.70	0.61	0.71	0.58	1.95	1.59
162[1]	4.81	3.90	4.81	4.03	4.88	4.06	1.50	1.17	1.50	1.32	1.41	1.14	3.38	2.60	2.99	2.43	2.93	2.46	1.53	1.23	1.39	1.12	1.51	1.21	1.41	1.26	1.36	1.16	4.70	3.91
160	5.69	4.71	5.65	4.8	5.85	4.91	1.61	1.43	1.77	1.44	1.76	1.37	3.92	3.26	3.95	3.10	3.77	3.22	1.76	1.50	1.53	1.35	1.66	1.48	1.75	1.58	1.74	1.42	5.65	4.67
150	13.5	10.8	13.5	10.9	14.0	11.1	4.09	3.32	4.18	3.33	3.45	2.81	11.0	8.43	9.02	7.16	9.84	7.82	3.88	3.11	3.61	2.84	4.24	3.30	4.57	3.56	3.67	2.91	14.2	10.8
140	32.7	24.7	30.7	24.4	33.3	25.7	9.01	6.84	7.87	6.34	8.03	6.28	35.3	25.1	40.3	26.1	42.7	29.3	7.84	6.26	8.27	6.5	9.09	6.58	9.02	7.42	8.3	6.27	30.7	25.1
130	61.6	45.4	63.4	48.3	75.7	46.5	19.0	14.3	13.7	10.7	14.5	12.2	>100	/	>100	/	>100	/	14.1	11.4	16.9	13.3	18.0	14.2	18.4	14.5	15.9	12.8	72.9	46.8

[1] Startle response level for squid (Fewtrell and McCauley 2012).
A slash indicates that $R_{95\%}$ radius to threshold is not reported when the R_{max} is greater than the maximum modelling extent.

Table 13. *Sites 1-15, 2820 in³ source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to modelled maximum-over-depth per-pulse sound pressure level (SPL) isopleths from the modelled single-impulse sites. Water depth at each site is indicated. The results presented are the maxima considering either of the two tow directions modelled for each site.

SPL (L_p; dB re 1 µPa²)	Site 1 (49.1 m)		Site 2 (54.8 m)		Site 3 (63.9 m)		Site 4 (81.0 m)		Site 5 (61.9 m)		Site 6 (71.1 m)		Site 7 (124.9 m)		Site 8 (173.6 m)		Site 9 (166.5 m)		Site 10 (67.4 m)		Site 11 (72.0 m)		Site 12 (84.0 m)		Site 13 (99.0 m)		Site 14 (69.2 m)		Site 15 (51.6 m)	
	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$
200	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05
190	0.32	0.29	0.36	0.31	0.35	0.28	0.23	0.21	0.27	0.23	0.23	0.20	0.15	0.13	0.13	0.12	0.13	0.12	0.25	0.21	0.23	0.20	0.27	0.23	0.25	0.22	0.24	0.21	0.32	0.29
180	1.50	1.21	1.50	1.24	1.52	1.25	0.61	0.52	0.68	0.56	0.65	0.54	0.70	0.59	0.73	0.61	0.72	0.60	0.62	0.52	0.65	0.54	0.64	0.54	0.66	0.52	0.65	0.53	1.56	1.24
175[1]	2.38	1.99	2.62	2.12	2.50	2.10	0.91	0.82	0.93	0.83	0.93	0.81	1.78	1.49	1.56	1.25	1.58	1.27	0.99	0.82	0.91	0.80	0.98	0.85	1.00	0.88	0.98	0.80	2.45	2.06
170	4.14	3.46	4.13	3.51	4.11	3.51	1.47	1.16	1.49	1.31	1.40	1.15	3.43	2.77	3.09	2.54	3.29	2.58	1.51	1.22	1.33	1.13	1.34	1.20	1.39	1.24	1.35	1.16	4.00	3.39
166[2]	6.30	5.02	6.02	5.05	6.13	5.07	1.88	1.54	2.04	1.65	1.84	1.52	4.91	4.05	4.94	3.95	4.65	4.04	1.96	1.64	1.84	1.49	2.00	1.60	2.09	1.68	1.95	1.63	5.88	4.95
160[3]	11.7	9.30	11.3	9.09	11.8	9.29	3.43	2.68	3.43	2.82	3.10	2.43	9.28	7.05	7.74	5.99	8.27	6.70	3.13	2.58	3.01	2.39	3.35	2.65	3.58	2.90	2.91	2.39	11.6	9.11
150	29.9	22.1	29.1	23.1	29.9	23.3	8.27	6.00	7.21	5.81	7.17	5.70	32.1	21.9	29.2	20.0	31.0	18.6	7.32	5.39	7.34	5.62	7.26	5.78	8.39	6.66	6.89	5.48	28.9	23.0
145[4]	42.2	33.2	42.2	33.7	40.8	33.1	11.6	8.75	9.18	7.51	10.7	8.60	88.7	55.9	77.0	57.1	84.3	62.7	9.82	7.87	10.6	8.60	11.4	8.82	11.3	8.96	9.93	8.27	38.7	30.4
140	57.5	42.6	57.8	44.9	58.8	42.9	16.9	13.1	13.2	10.2	14.0	11.7	>100	/	>100	/	>100	/	12.8	10.4	15.2	12.2	16.6	12.8	17.3	13.2	14.8	11.9	63.9	41.8

[1] Threshold for turtle behavioural disturbance from impulsive noise (McCauley et al. 2000).
[2] Threshold for turtle behavioural response to impulsive noise (McCauley et al. 2000).
[3] Marine mammal behavioural threshold for impulsive sound sources (NOAA 2019).
[4] Human health assessment threshold derived from (Parvin 2005).
A slash indicates that $R_{95\%}$ radius to threshold is not reported when the R_{max} is greater than the maximum modelling extent.

Table 14. *Sites 1-15, Penguin behavioural threshold, SPL, 2820 in³ source*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to modelled maximum-over-depth per-pulse sound pressure level (SPL) isopleths from the modelled single-impulse sites. Water depth at each site is indicated. The results presented are the maxima considering either of the two tow directions modelled for each site.

SPL (L_ρ; dB re 1 µPa²)	Site 1 (49.1 m)		Site 2 (54.8 m)		Site 3 (63.9 m)		Site 4 (81.0 m)		Site 5 (61.9 m)		Site 6 (71.1 m)		Site 7 (124.9 m)		Site 8 (173.6 m)		Site 9 (166.5 m)		Site 10 (67.4 m)		Site 11 (72.0 m)		Site 12 (84.0 m)		Site 13 (99.0 m)		Site 14 (69.2 m)		Site 15 (51.6 m)	
	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$
120 [a]	72.6	52.5	73.9	54.9	66.0	49.6	13.0	9.54	12.3	9.64	11.9	9.35	64.7	44.2	60.3	39.6	57.1	42.0	10.4	8.25	12.1	9.32	13.4	9.63	13.8	11.1	11.4	8.81	77.0	50.4

[a] Penguin behavioural response threshold (weighted) for impulsive noise (Sørensen et al. (2020)).

Table 15. *2820 in³ source*: Maximum (R_{max}) horizontal distances (in km) to modelled maximum-over-depth peak pressure level (PK) thresholds for eight modelled sites. Thresholds are based on Southall et al. (2019) for marine mammals, Popper et al. (2014) for fish and Finneran et al. (2017) for sea turtles. Water depth at each site is indicated. The results presented are the maxima considering either of the two tow directions modelled for each site.

Hearing group	PK threshold (L_{pk}; dB re 1 µPa)	Distance R_{max} (km)							
		Site 1 (49.1 m)	Site 2 (54.8 m)	Site 5 (61.9 m)	Site 7 (124.9 m)	Site 10 (67.4 m)	Site 12 (84.0 m)	Site 14 (69.2 m)	Site 15 (51.6 m)
Low-frequency cetaceans (PTS)	219	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Low-frequency cetaceans (TTS)	213	0.06	0.06	0.07	0.07	0.06	0.07	0.06	0.09
High-frequency cetaceans (PTS)	230	–	–	–	–	–	–	–	–
High-frequency cetaceans (TTS)	224	–	–	–	–	–	–	–	–
Very-high-frequency cetaceans (PTS)	202	0.38	0.41	0.35	0.22	0.36	0.37	0.37	0.39
Very-high-frequency cetaceans (TTS)	196	0.82	0.76	0.70	0.40	0.66	0.71	0.71	0.79
Otariid Pinnipeds (PTS) Also applied to Penguins	232	–	–	–	–	–	–	–	–
Otariid Pinnipeds (TTS) Also applied to Penguins	226	–	–	0.03	0.03	0.03	0.03	0.03	–
Sea turtles (PTS)	232	–	–	0.04	0.04	0.04	0.04	0.04	–
Sea turtles (TTS)	226	–	–	0.08	0.07	0.07	0.08	0.07	–
Fish: No swim bladder (also applied to sharks)[1]	213	0.06	0.06	–	–	–	–	–	0.09
Fish: Swim bladder not involved in hearing[1], Swim bladder involved in hearing[1] Fish eggs, and larvae[2]	207	0.23	0.23	–	–	–	–	–	0.23

[1] Mortality and potential mortal injury, and recoverable injury threshold
[2] Mortality and potential mortal injury threshold
A dash indicates the threshold is not reached within the limits of the modelling resolution (20 m).

4.2.1.2. Seafloor

Ranges presented for seafloor receptors are provided in Tables 16 and 17 for receiver depths of 50 and 5 cm above the seafloor. The seafloor PK results in Table 16 differ from the maximum-over-depth modelled results presented in Table 15. This is because the model used for the water column results, calculated using FWRAM do not represent the maximum sound levels at the seafloor close to the array. FWRAM is based on a wide-angle parabolic equation (PE) algorithm which is valid to only approximately 70° down angle from the horizontal, and while it provides accurate predictions in the horizontal direction, it cannot predict sound levels directly under the array. VSTACK was used to

determine the levels at the seafloor directly under the array and is valid in the very nearfield directly under the source.

Table 16. *2820 in³ source*: Maximum (R_{max}) horizontal distances (in m) from the seismic source to modelled seafloor (receiver located 50 cm above seafloor) peak pressure level thresholds (PK) at ten representative water depths.

Hearing group/animal type	PK threshold (L_{pk}; dB re 1 µPa)	Water Depth									
		50 m	60 m	70 m	80 m	90 m	100 m	120 m	140 m	160 m	170 m
		Distance R_{max} (m)									
Sound levels for sponges and corals[1]	226	*	*	*	*	*	*	*	*	*	*
Fish: No swim bladder (also applied to sharks)	213	113	78	74	72	69	66	56	49	16	*
Fish: Swim bladder not involved in hearing, Swim bladder involved in hearing Fish eggs, and larvae	207	197	207	150	154	157	155	152	153	131	124

[1] Heyward et al. (2018)
An asterisk indicates that the sound level was not reached.

Table 17. 2820 *in³ source*: Maximum (R_{max}) horizontal distances (in m) from the seismic source to modelled seafloor (receiver located 5 cm above seafloor) peak-peak pressure levels (PK-PK) at ten representative water depths. Results included in relation to benthic invertebrates.

PK-PK ($L_{pk\text{-}pk}$; dB re 1 µPa)	Water Depth									
	50 m	60 m	70 m	80 m	90 m	100 m	120 m	140 m	160 m	170 m
	Distance R_{max} (m)									
213[1,2,3]	176	188	143	149	153	152	151	150	127	119
212[2,3]	186	199	153	162	168	171	171	171	156	147
210[1,2]	216	232	176	183	191	198	212	217	217	218
209[1,2]	296	251	187	195	203	212	230	240	238	241
202[4]	639	702	322	338	351	370	391	396	630	638

[1] Day et al. (2019), lobster
[2] Day et al. (2016a), lobster and scallops
[3] Day et al. (2017), scallops.
[4] Payne et al. (2008), lobster

4.2.1.3. Particle Motion Metrics

Particle motion was modelled at a depth of 5 cm above the seafloor for an associated assessment for invertebrates. The maximum distances in metres to a peak particle acceleration magnitude of 37.57 ms^{-2} are presented in Table 18 for ten considered water depths. This particle acceleration threshold was assessed for invertebrates by Day et al. (2016a).

Table 18. 2820 *in^3 source*: Maximum (R_{max}) horizontal distances (in m) from the 2820 in^3 to particle motion level: Peak acceleration magnitude level (m/s^2), 5 cm above the seafloor. Results included in relation to benthic invertebrates (Section 2.5.1).

Hearing group/animal type	Peak Acceleration Magnitude (m/s^2)	Water Depth									
		50 m	60 m	70 m	80 m	90 m	100 m	120 m	140 m	160 m	170 m
		Distance R_{max} (m)									
Benthic invertebrates	37.57	4	*	*	*	*	*	*	*	*	*

An asterisk indicates that the particle motion level was not reached.

4.2.1.4. Sound Levels at Sensitive Receiver Locations

Table 19 provides a summary of whether or not the 145 dB re 1 µPa SPL human health assessment threshold was exceeded at each of the 14 sensitive receiver sites identified in Section 1.3 from any impulse location on the survey lines.

Table 19. Exceedances of the human health assessment threshold (145 dB re 1 µPa) at each the sensitive receivers outlined in Section 1.3.

Receiver ID	Sensitive receiver	Exceedance of 145 dB re 1 µPa SPL human health assessment threshold?	Minimum Received Level (dB re 1 µPa)†	Maximum Received Level (dB re 1 µPa
1	Deen Maar (Lady Julia Percy Island)	Yes	145.0	154.8
2	Middle Island	Yes	145.0	151.8
3	Apollo Marine Park	No	*	*
4	Portland	No	*	*
5	Port Fairy Lighthouse	Yes	145.6	154.6
6	Killarney Beach	Yes	145.0	150.6
7	Merri Sanctuary	Yes	145.0	151.8
8	Rivernook Beach	No	*	*
9	Clifton Beach	No	*	*
10	Gibson Beach	No	*	*
11	Newfield Beach	No	*	*
12	Bay of Islands	No	*	*
13	Massacre Bay	No	*	*
14	Twelve Apostles MP	No	*	*

†Minimum received level above the stated threshold or criteria.
An asterisk indicates that the level did not exceed the stated threshold or criteria.

4.2.2. Sound Field Maps and Graphs

The SPL sound fields, and distances to relevant isopleths can be visualised for the 113° tow direction on the contour maps presented in Figures 8–22. Equivalent maps for the 293° tow direction are included in Appendix F.

The SPL sound fields are also presented as vertical slices for selected azimuths along the endfire and broadside directions out to 50 km, with the airgun array in the centre (Figures 23–27).

Section 4.2.2.3 includes maps showing which modelled impulses on the seismic survey lines result in exceedances of the human health assessment threshold for the sensitive receptor locations outlined in Section 1.3.

4.2.2.1. Sound Level Contour Maps

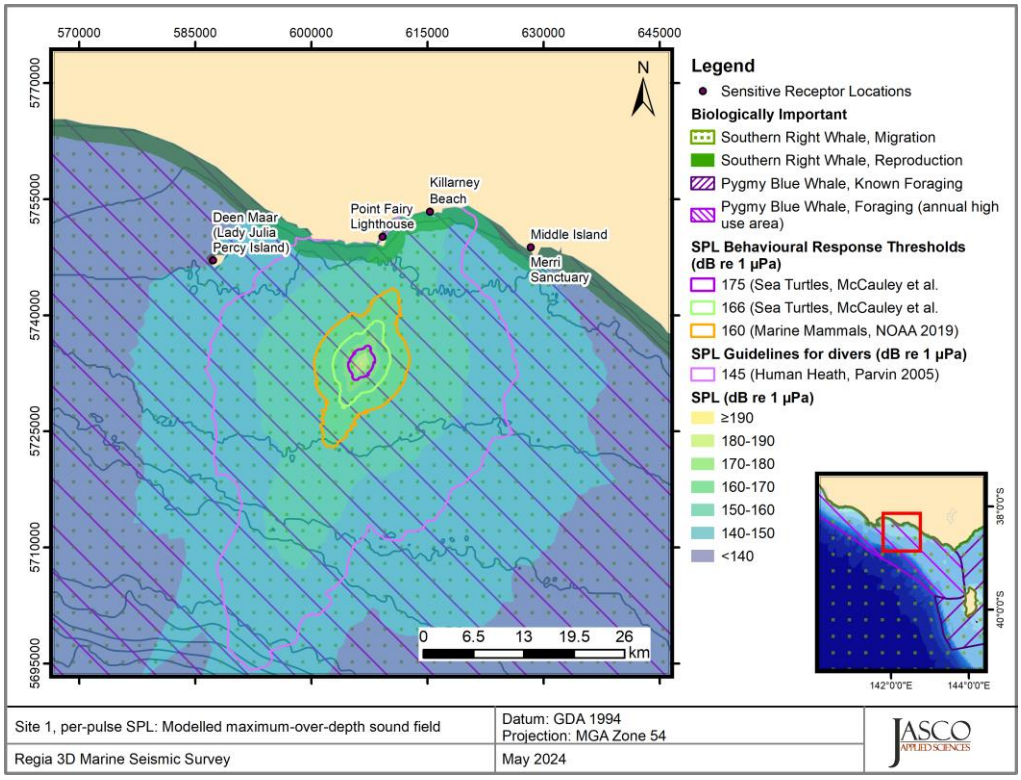

Figure 8. *Site 1, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

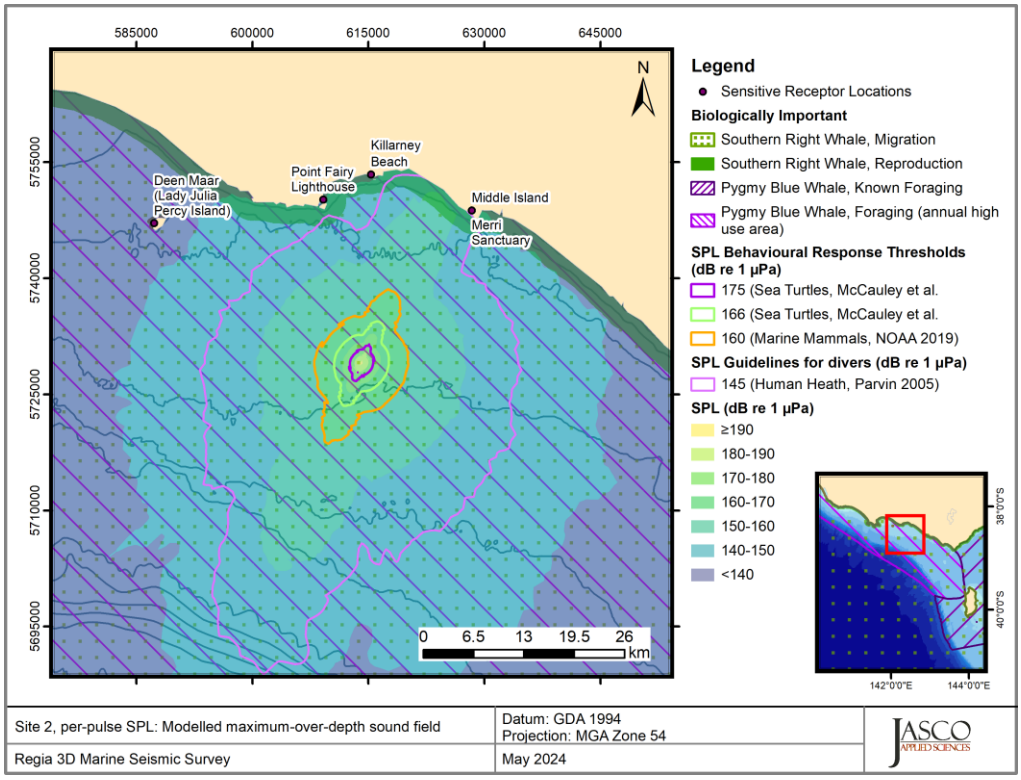

Figure 9. *Site 2, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

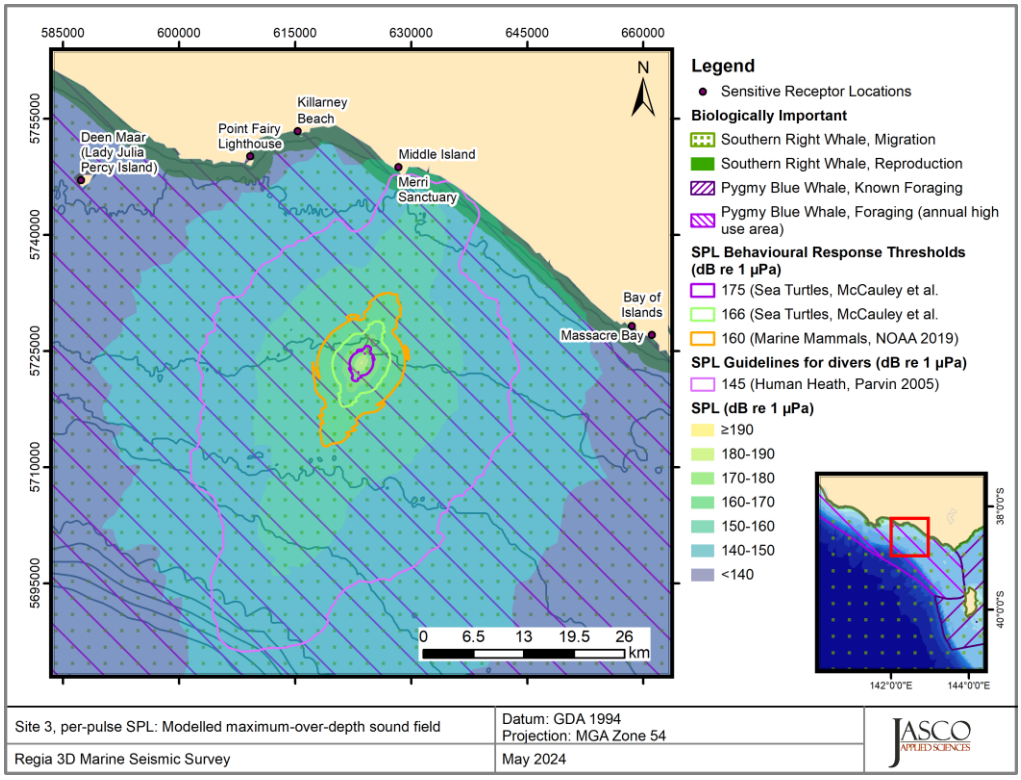

Figure 10. *Site 3, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

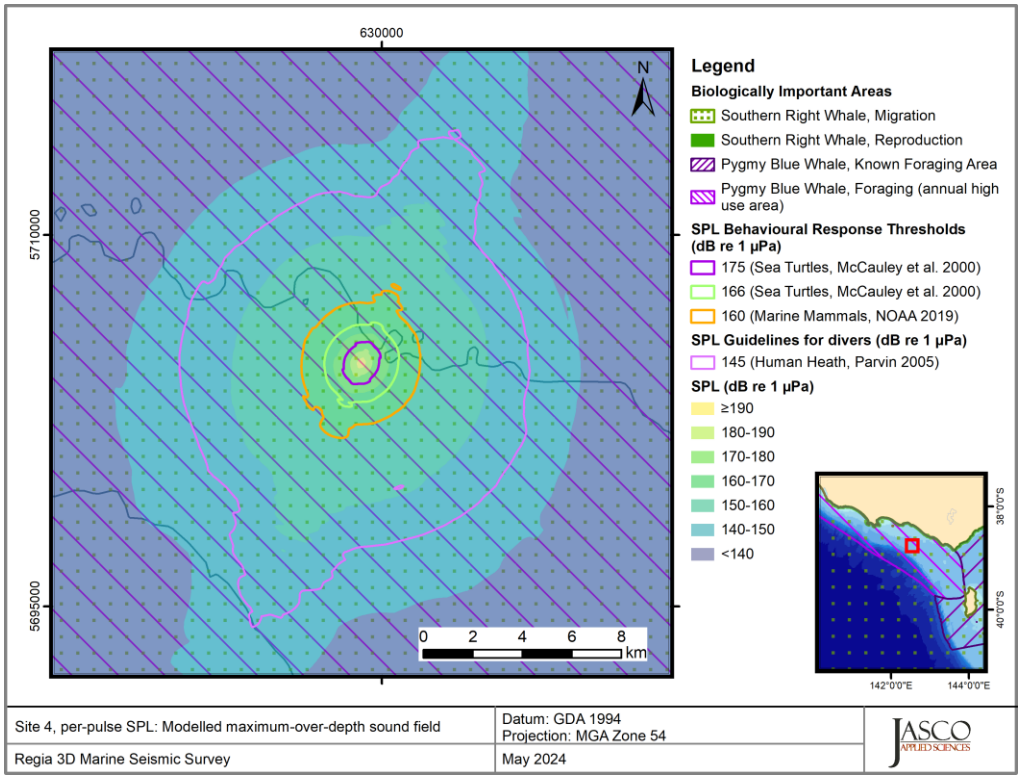

Figure 11. *Site 4, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

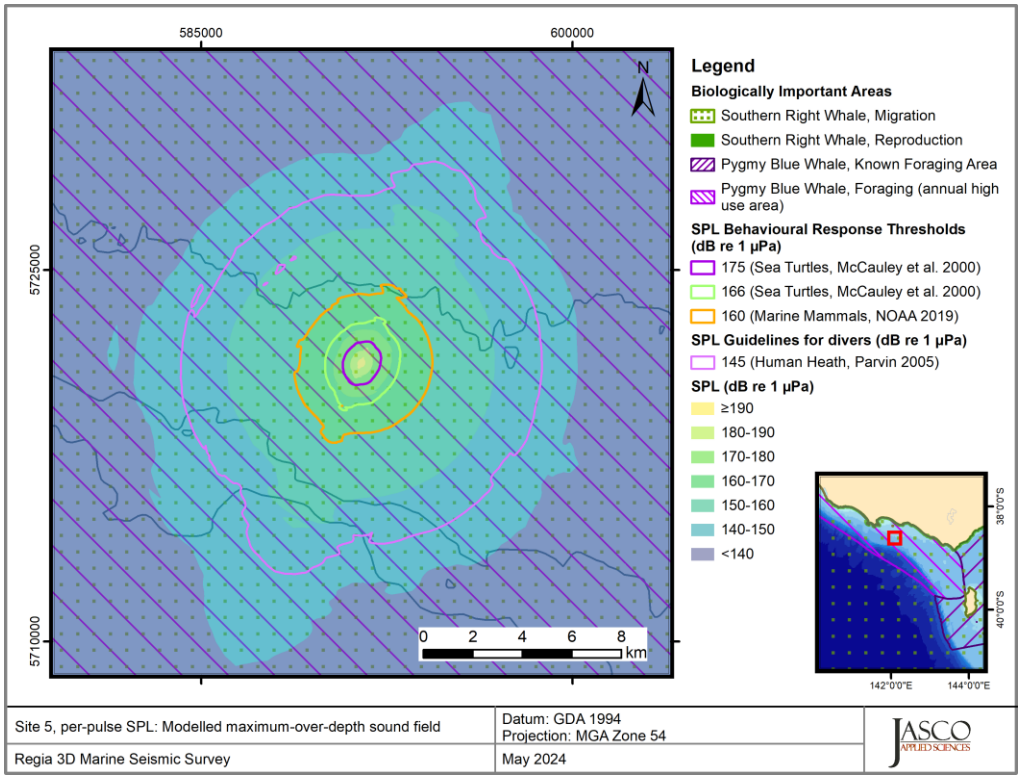

Figure 12. *Site 5, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

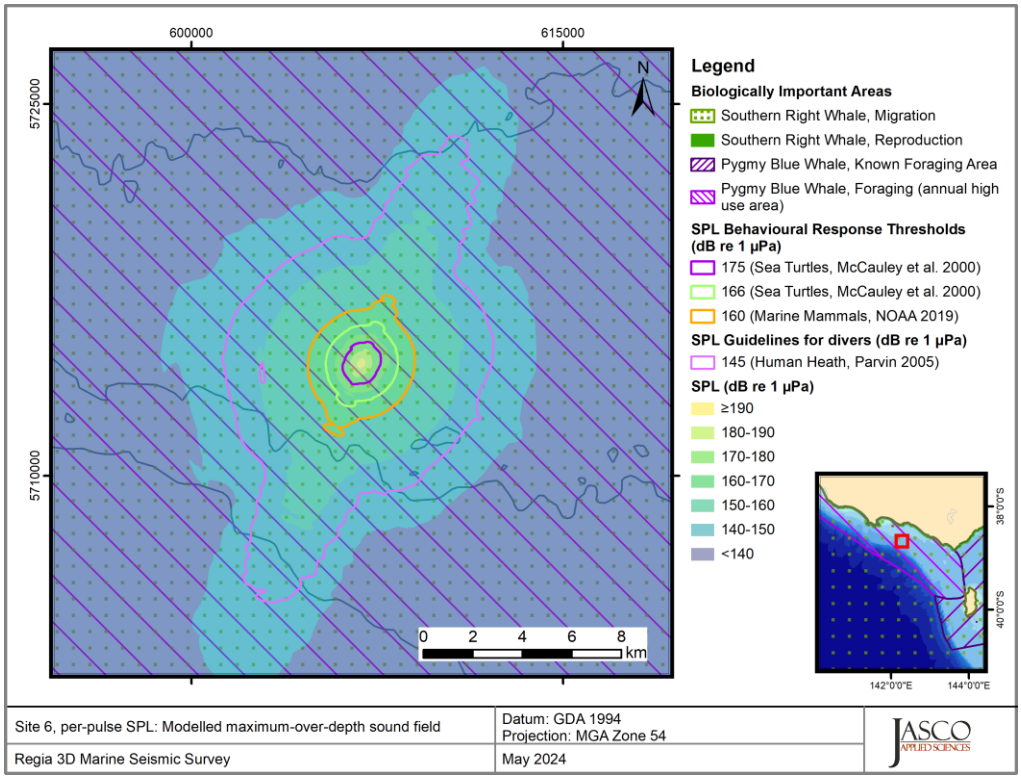

Figure 13. *Site 6, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

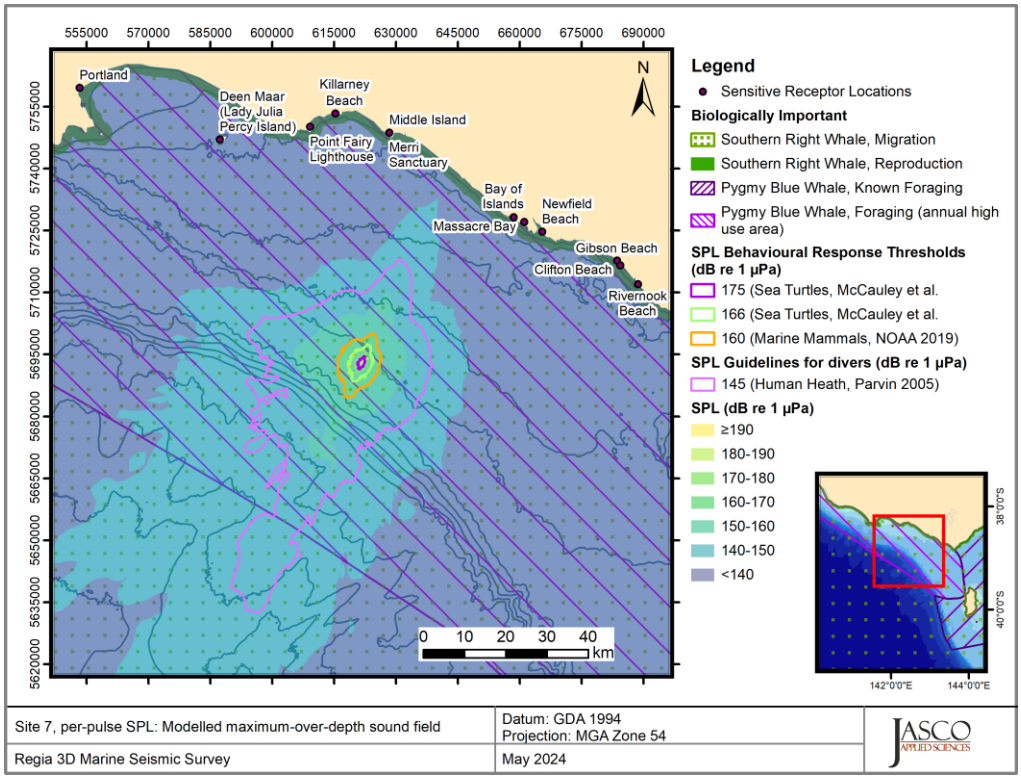

Figure 14. *Site 7, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

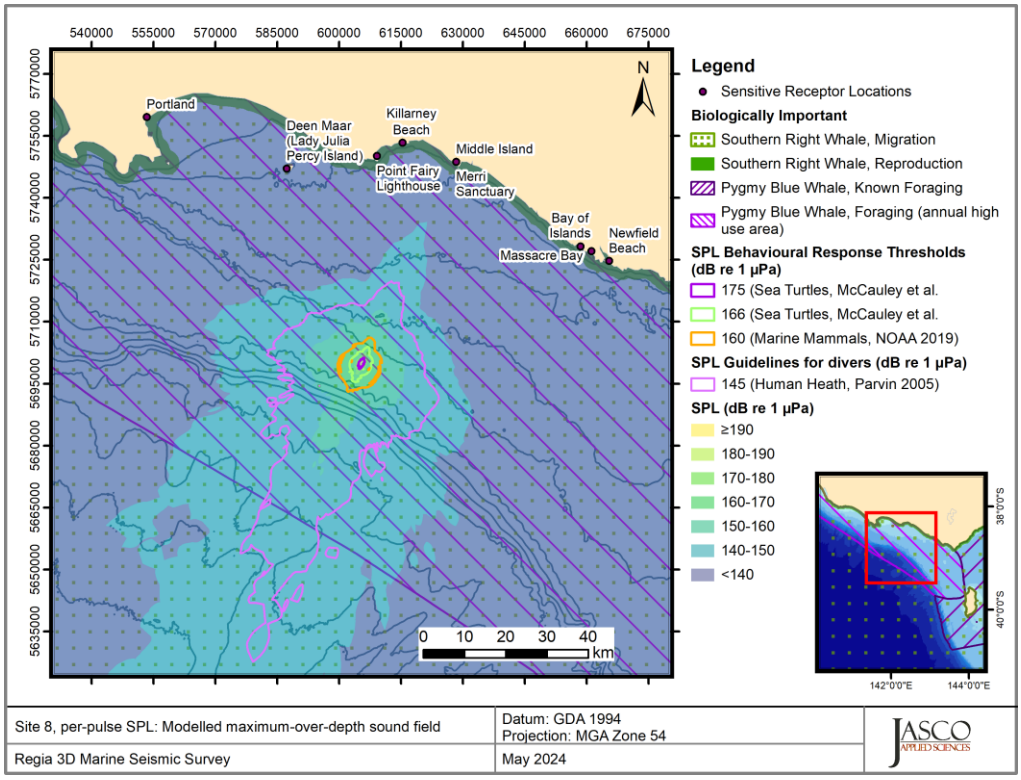

Figure 15. *Site 8, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

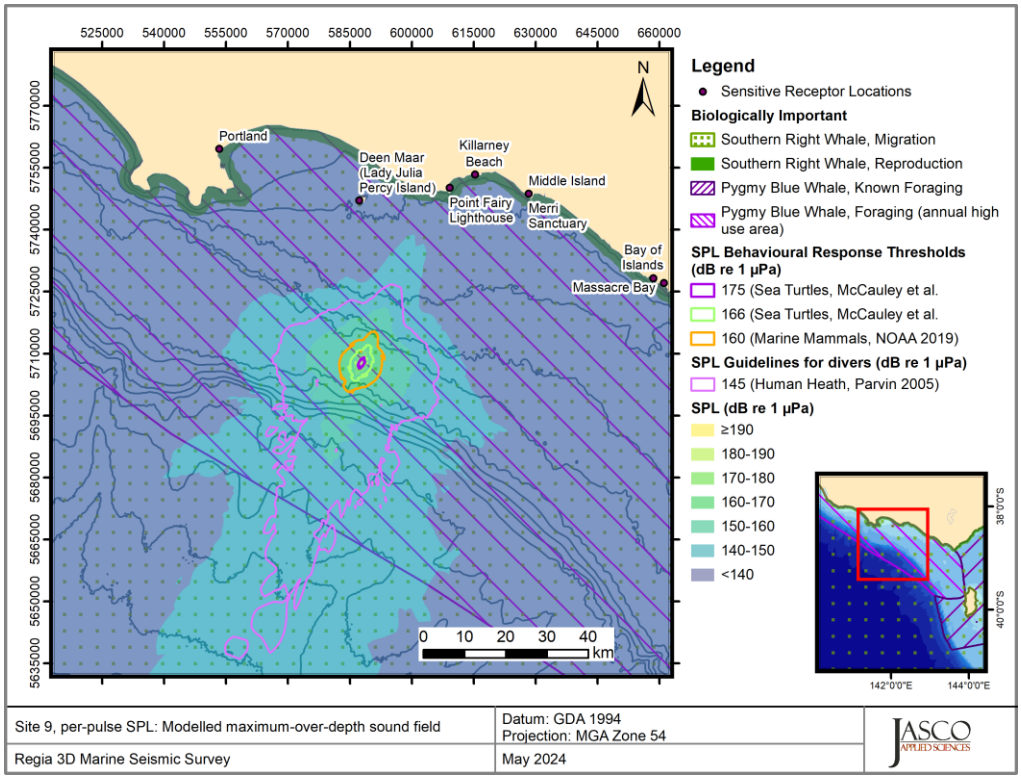

Figure 16. *Site 9, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

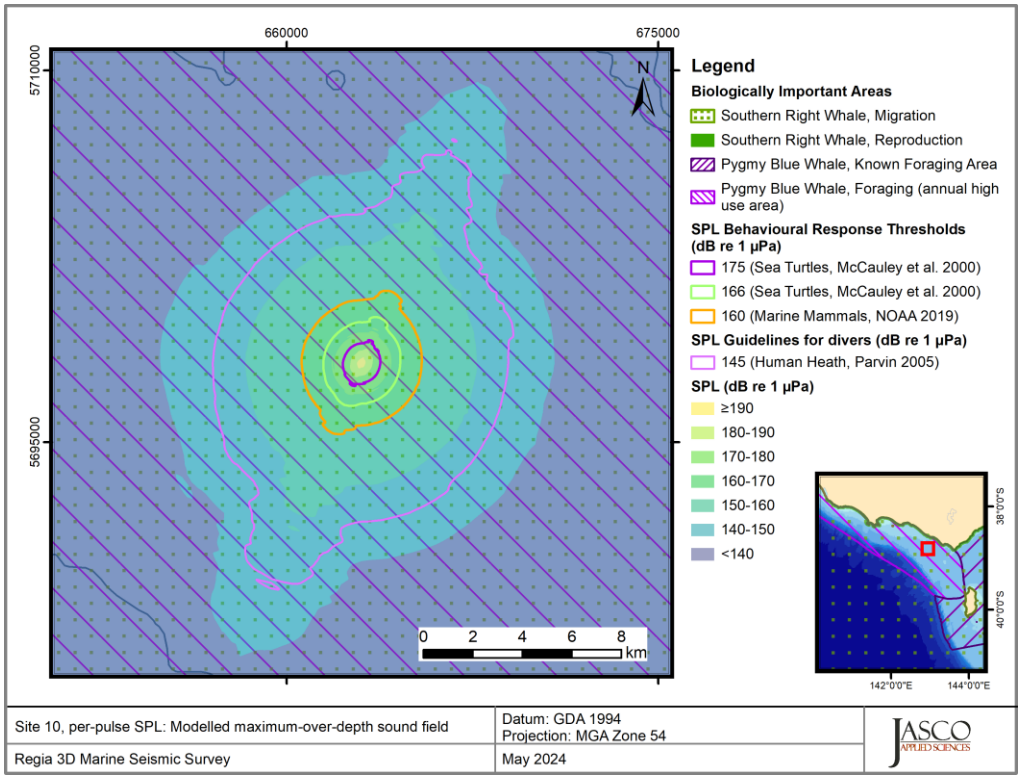

Figure 17. *Site 10, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

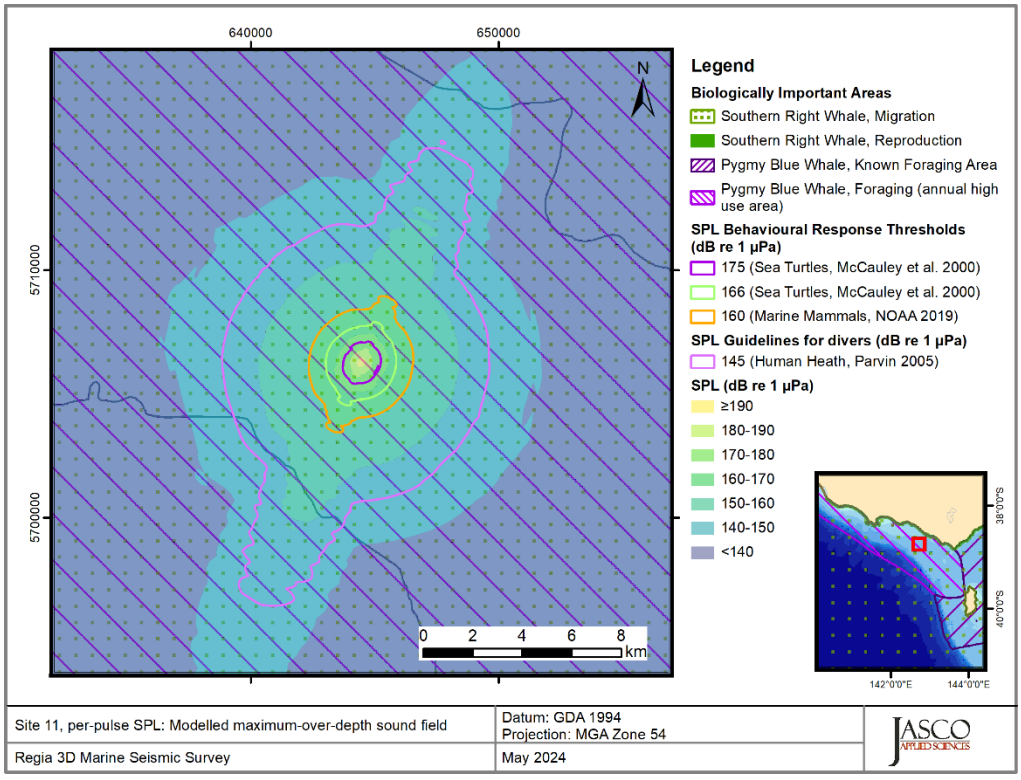

Figure 18. *Site 11, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

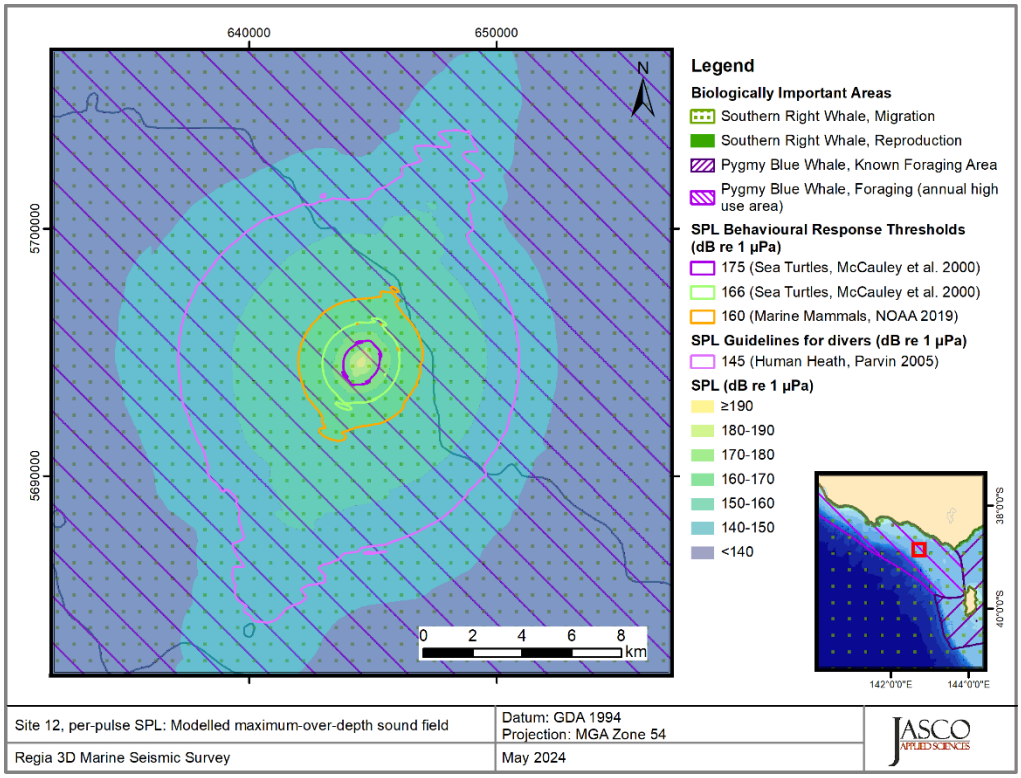

Figure 19. *Site 12, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

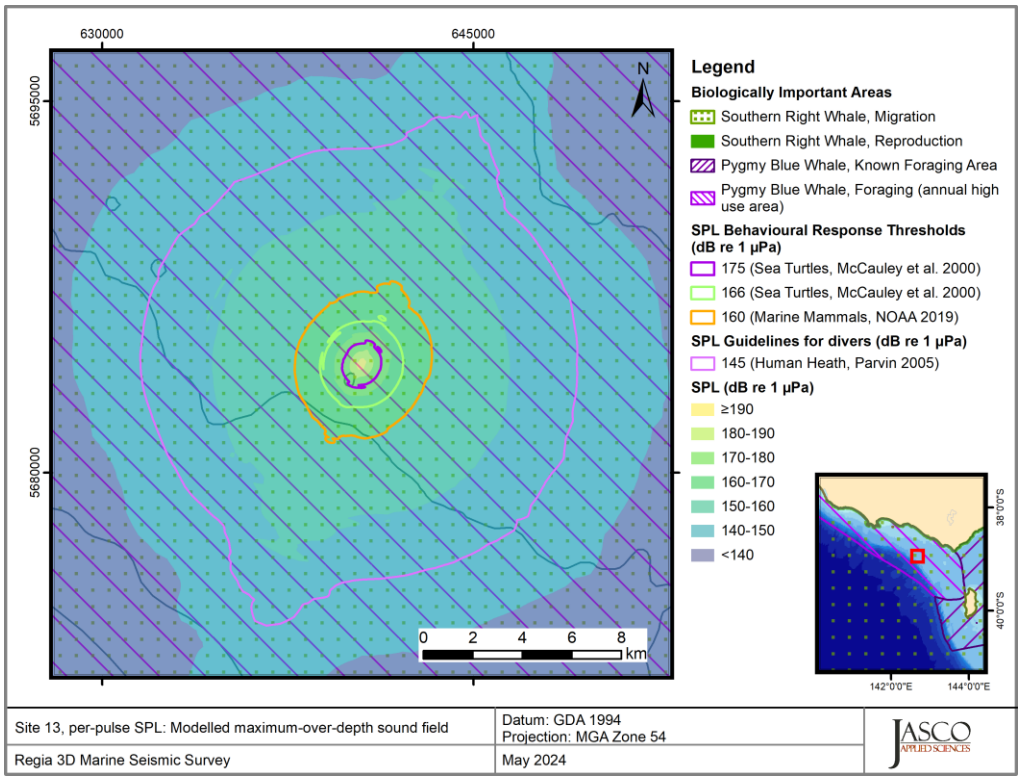

Figure 20. *Site 13, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

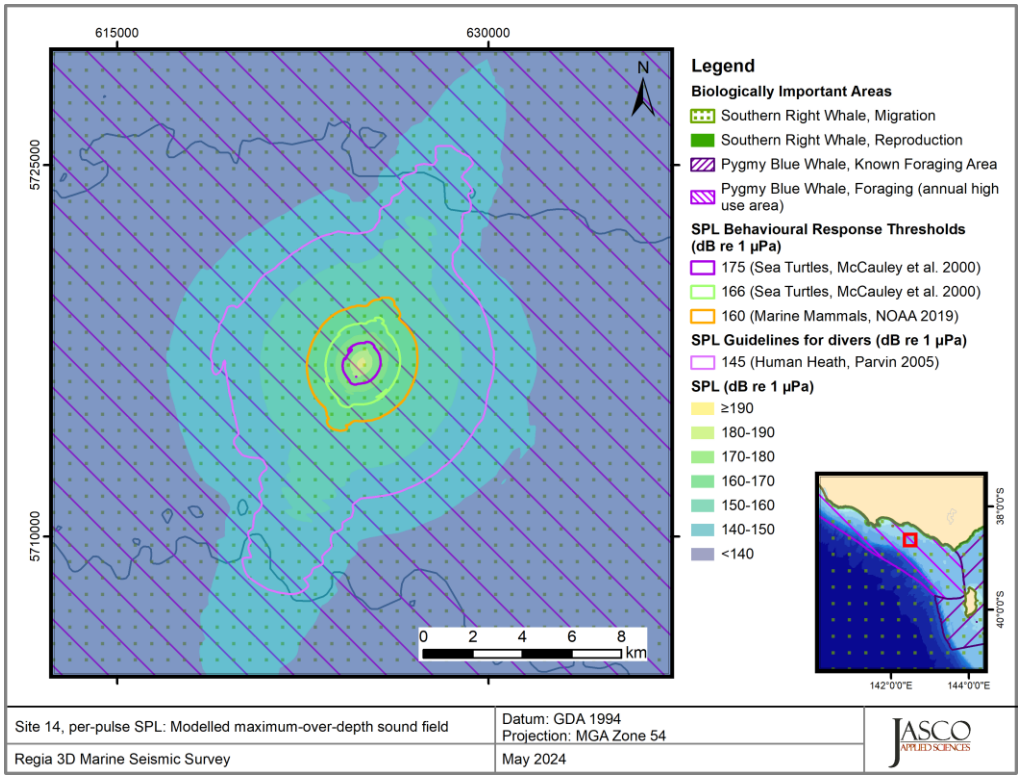

Figure 21. *Site 14, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

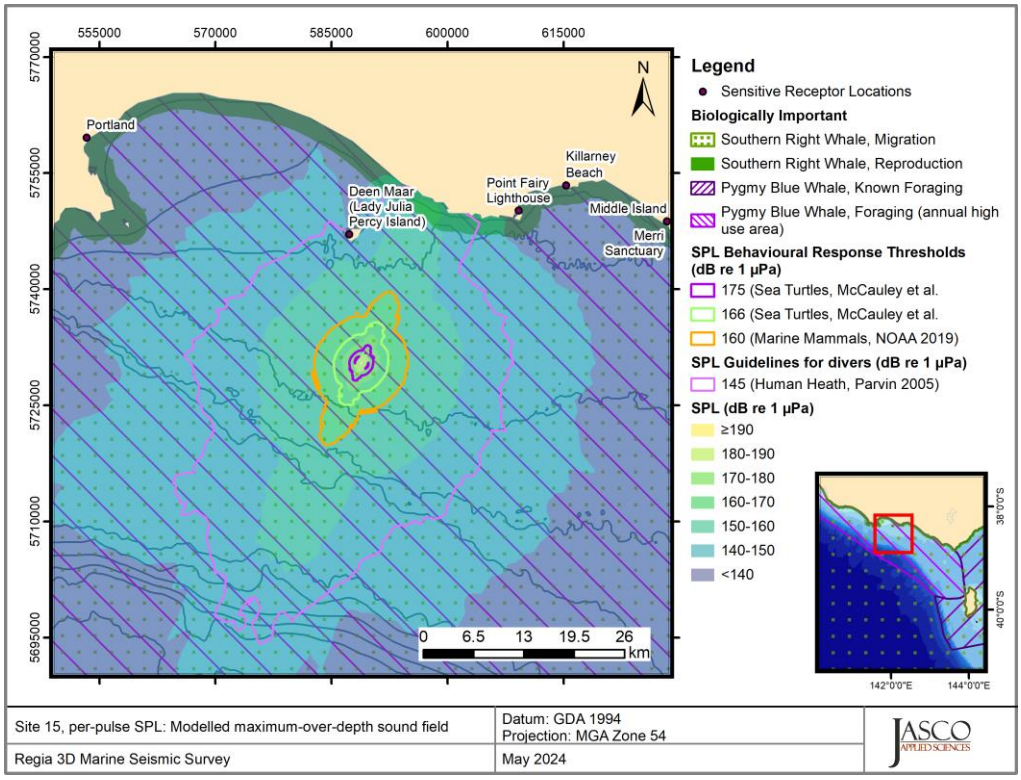

Figure 22. *Site 15, SPL, 2820 in³ source, tow direction 113°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

4.2.2.2. Vertical Slices of Modelled Sound Fields

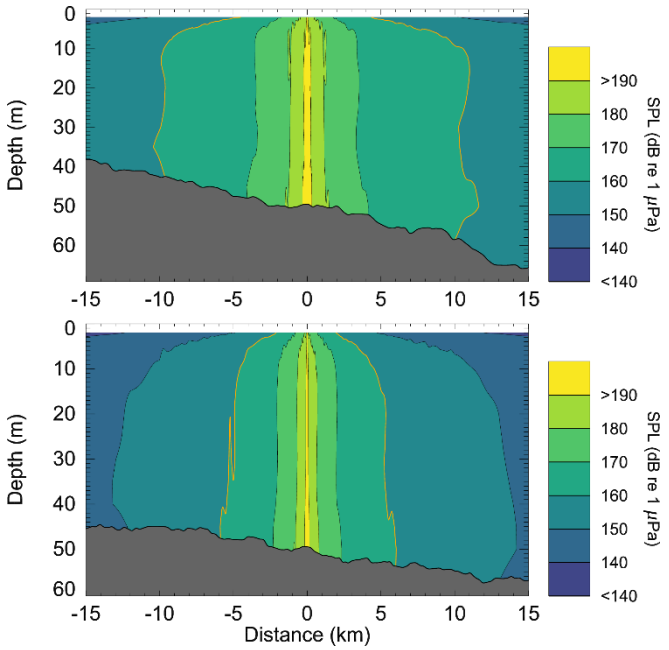

Figure 23. *Site 1, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

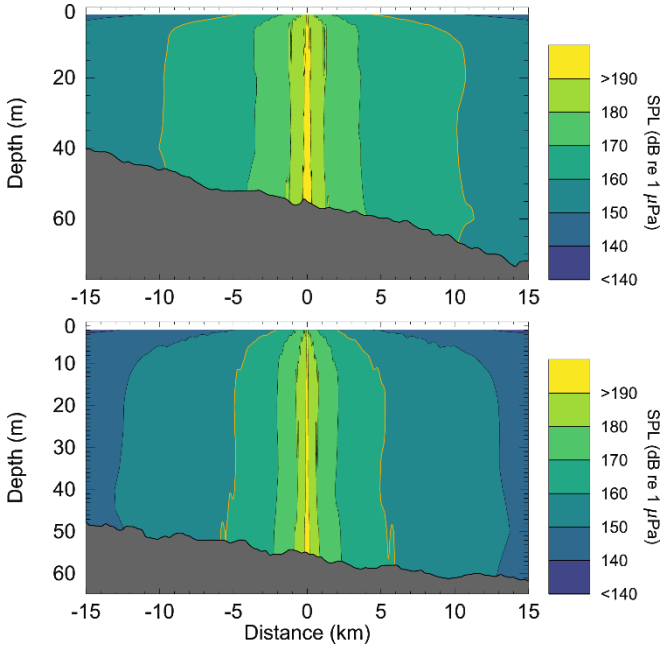

Figure 24. *Site 2, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

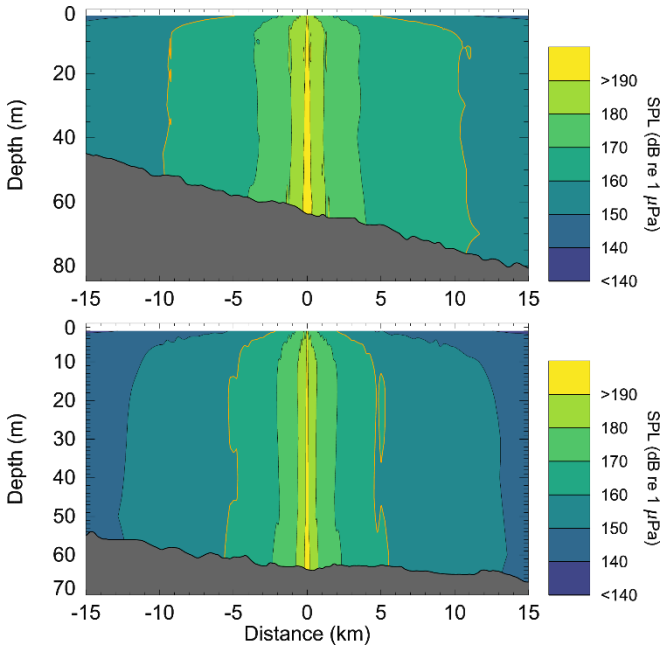

Figure 25. *Site 3, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

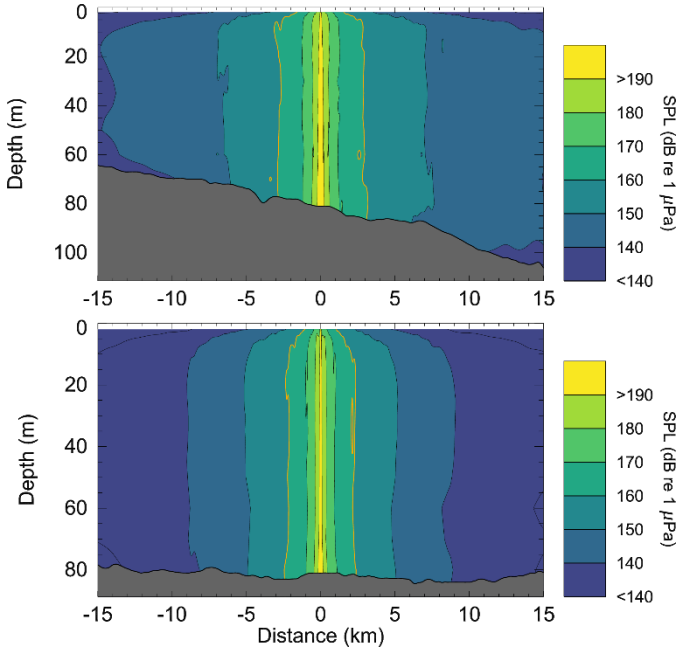

Figure 26. *Site 4, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

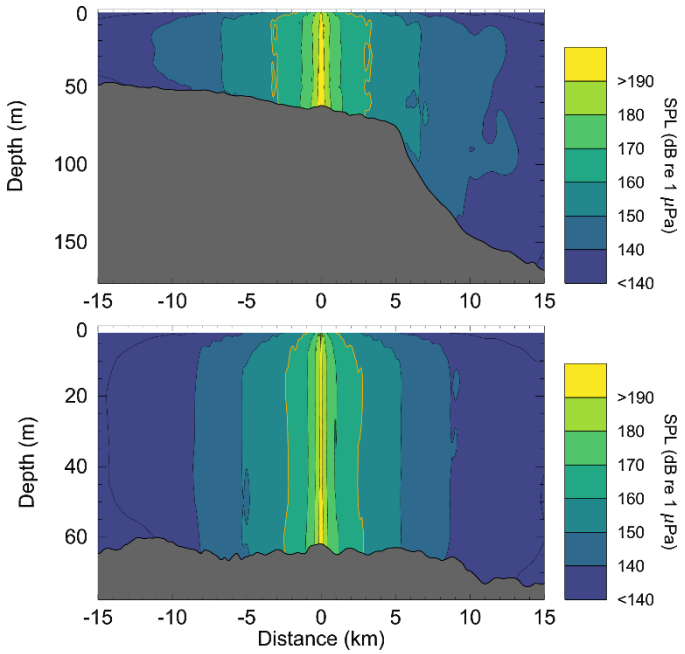

Figure 27. *Site 5, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

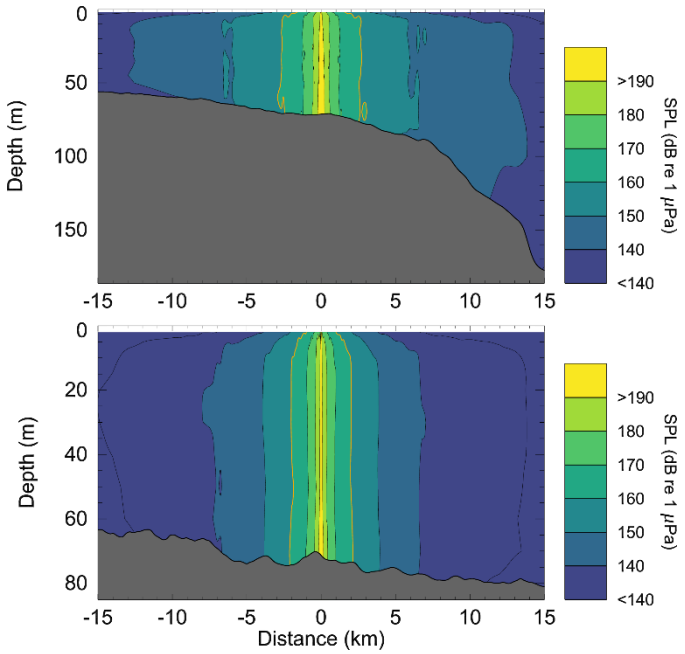

Figure 28. *Site 6, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

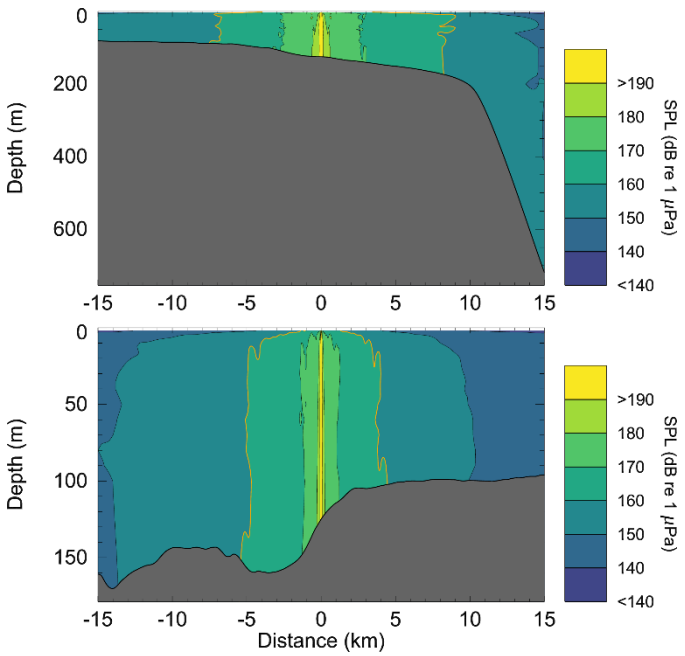

Figure 29. *Site 7, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

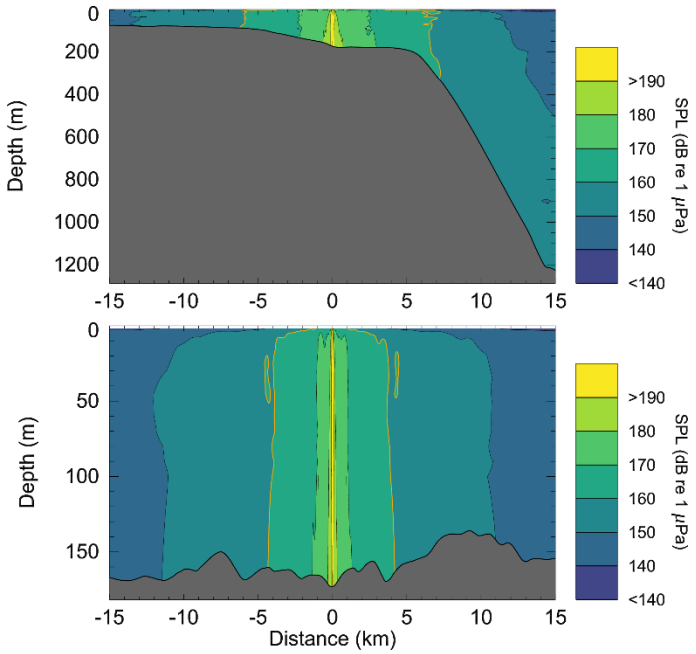

Figure 30. *Site 8, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

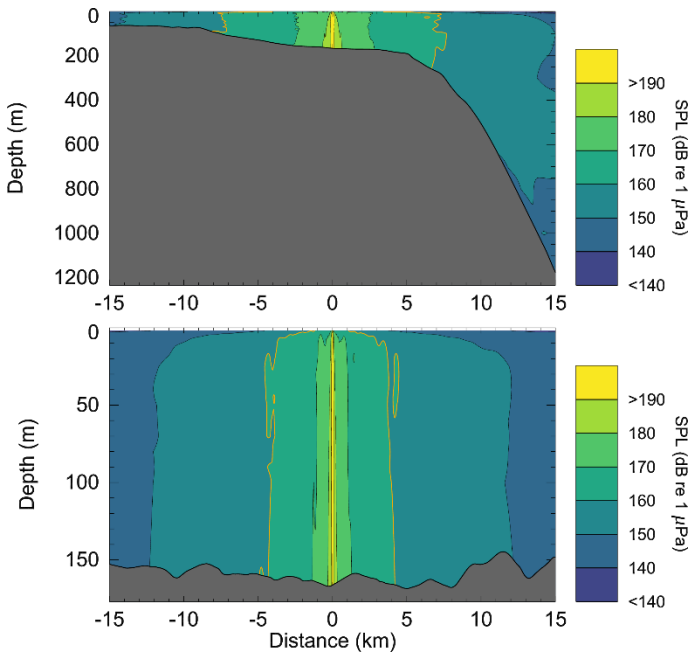

Figure 31. *Site 9, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

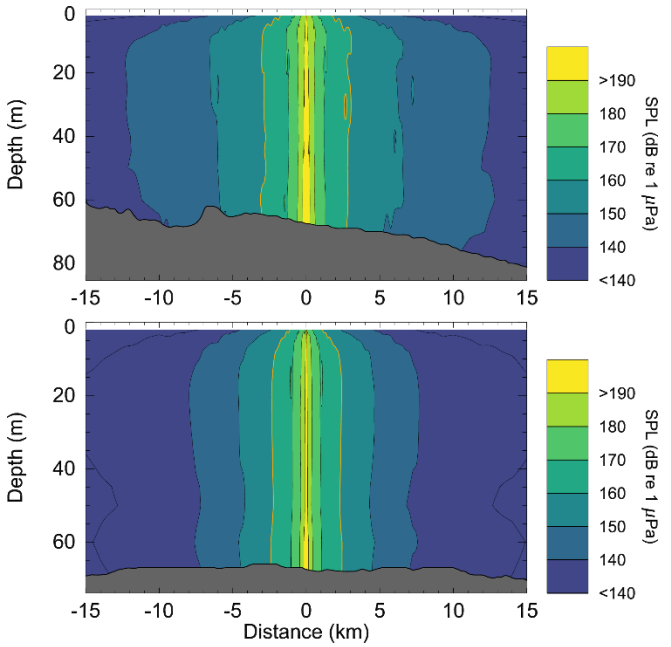

Figure 32. *Site 10, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

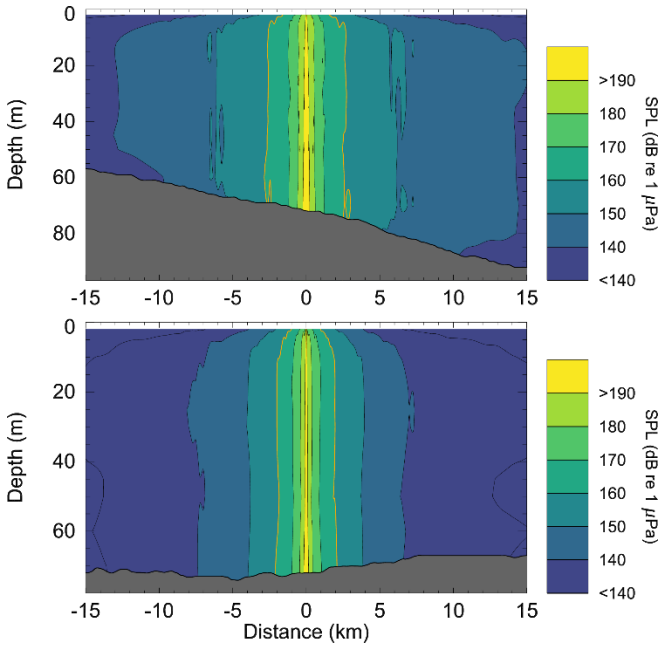

Figure 33. *Site 11, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

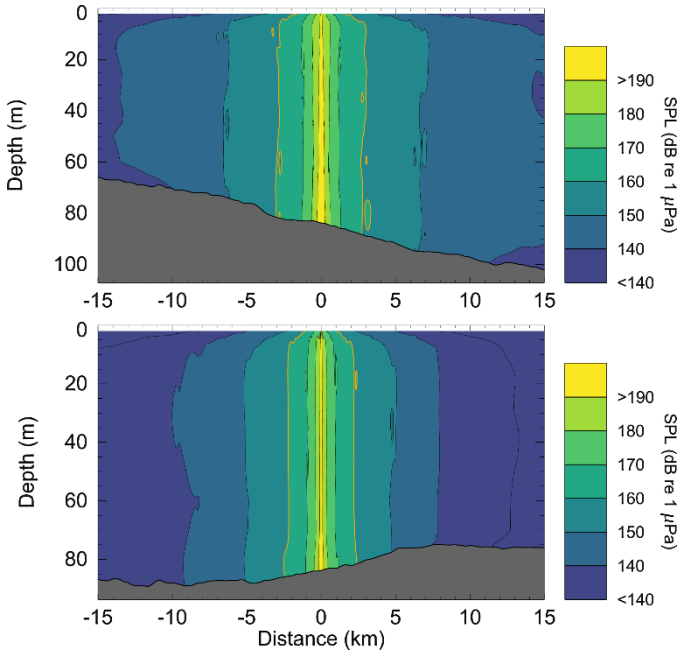

Figure 34. *Site 12, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

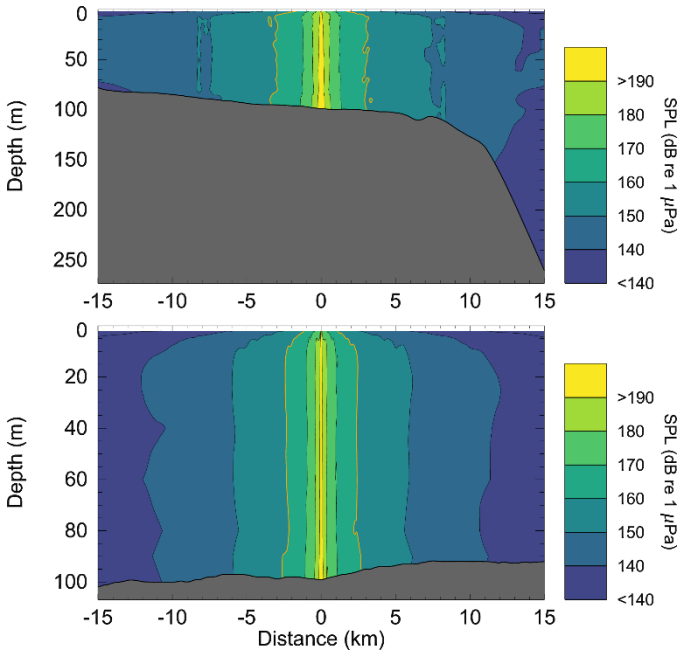

Figure 35. *Site 13, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

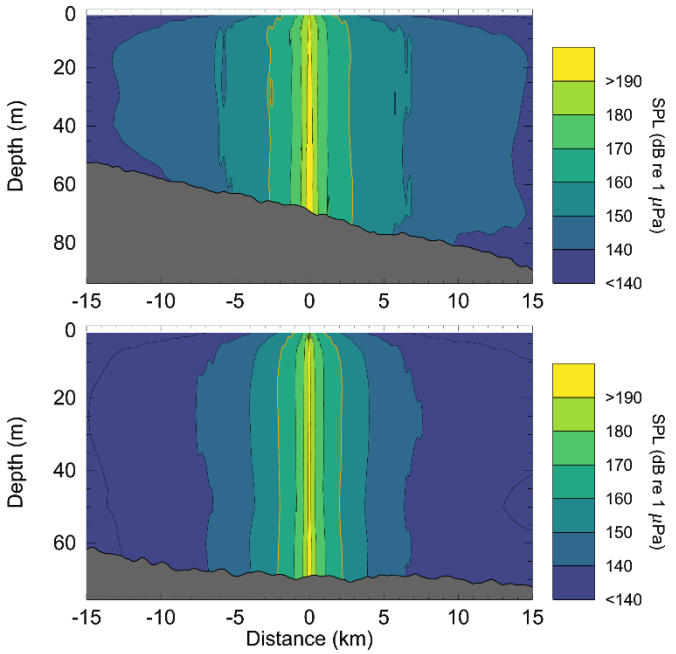

Figure 36. *Site 14, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

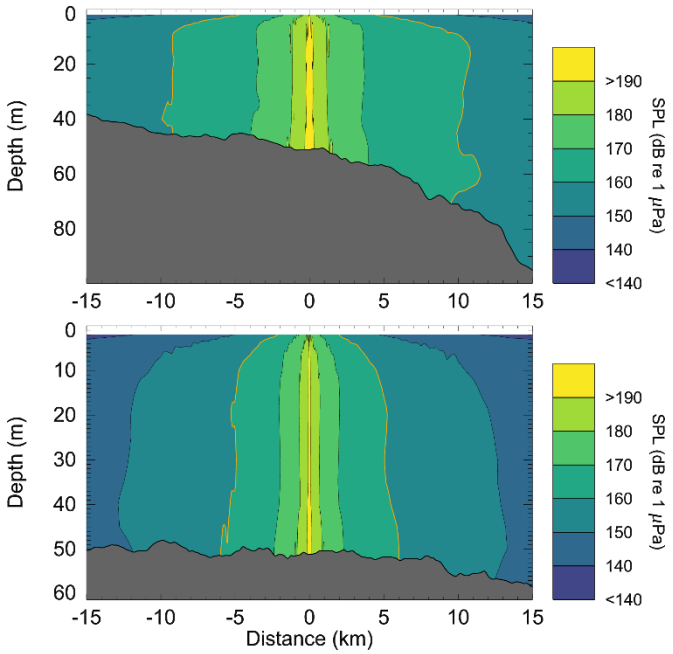

Figure 37. *Site 15, SPL, 2820 in³ source, tow direction 113°*: Sound level contours in vertical slice of the sound field, perpendicular to (broadside, top) and along the tow direction (endfire, bottom). The positive distance direction in each slice is 90° clockwise from the tow direction for broadside, and the tow direction for the endfire slice.

4.2.2.3. Sensitive Receiver Maps

Figure 38 indicates which modelled impulses on the seismic survey lines result in an exceedance in the human health assessment threshold for any of the 14 sensitive receiver locations outlined in Section 1.3.

Figures 39 – 43 indicate which modelled impulses result in an exceedance in the human health assessment threshold for specific sensitive receiver locations. Maps for all other specific sensitive receiver locations where exceedances did not occur are included in Appendix G.

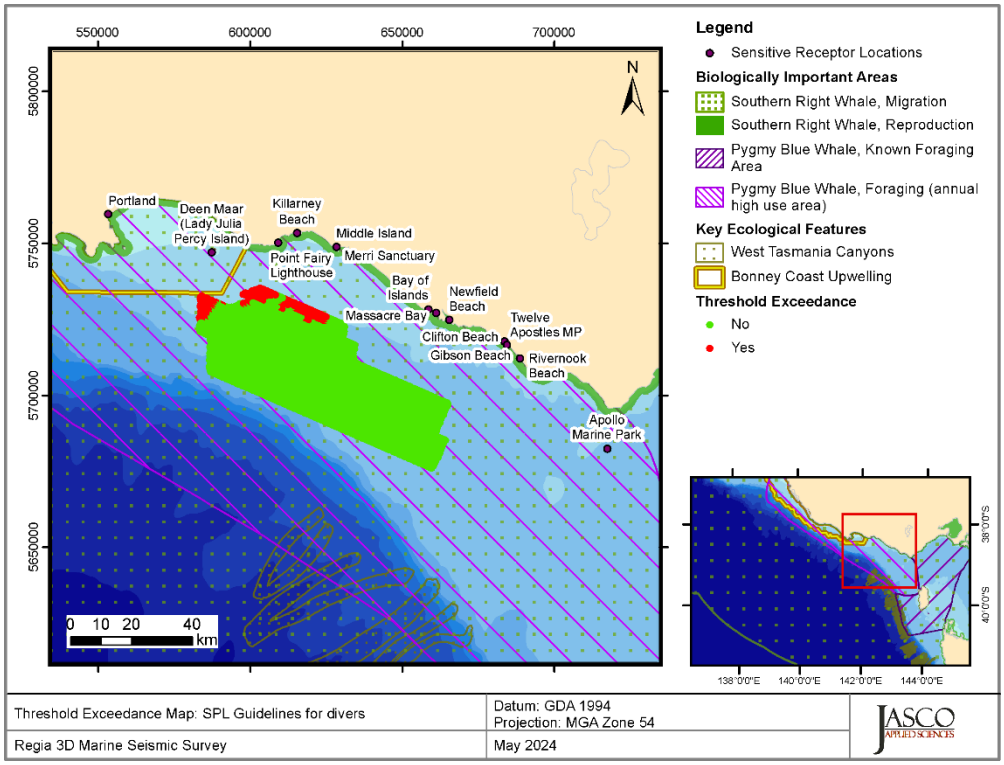

Figure 38. *SPL, 2820 in³ source,* seismic single-impulse locations where the human health assessment threshold at any sensitive receivers is exceeded.

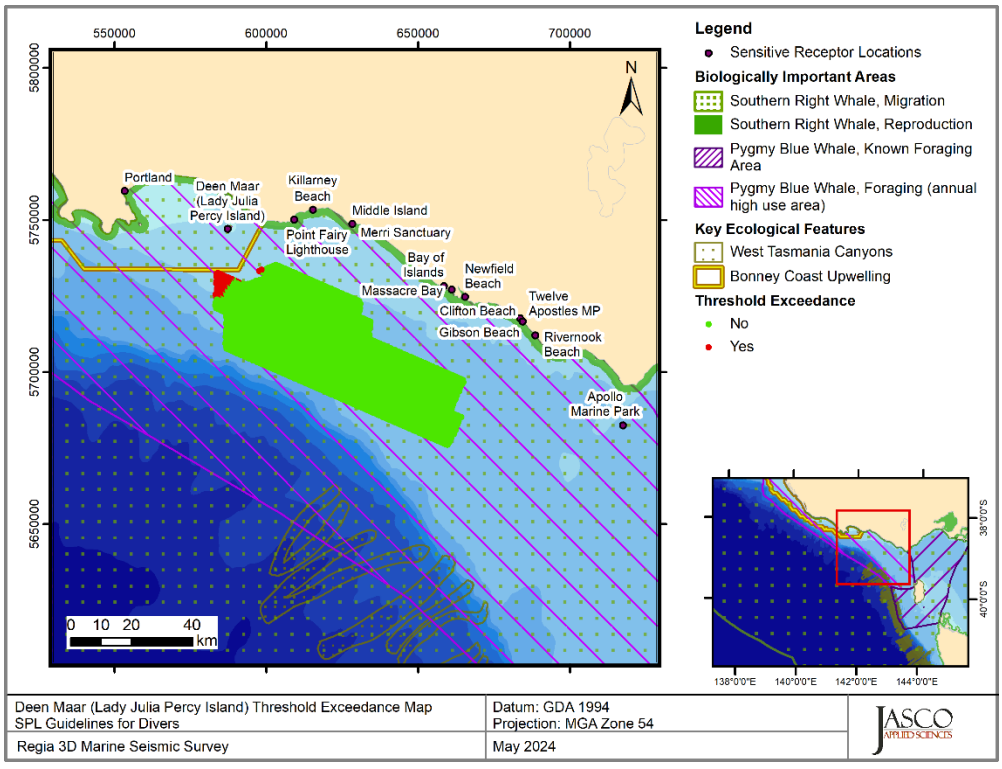

Figure 39. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Deen Maar (Lady Julia Percy Island) is exceeded.

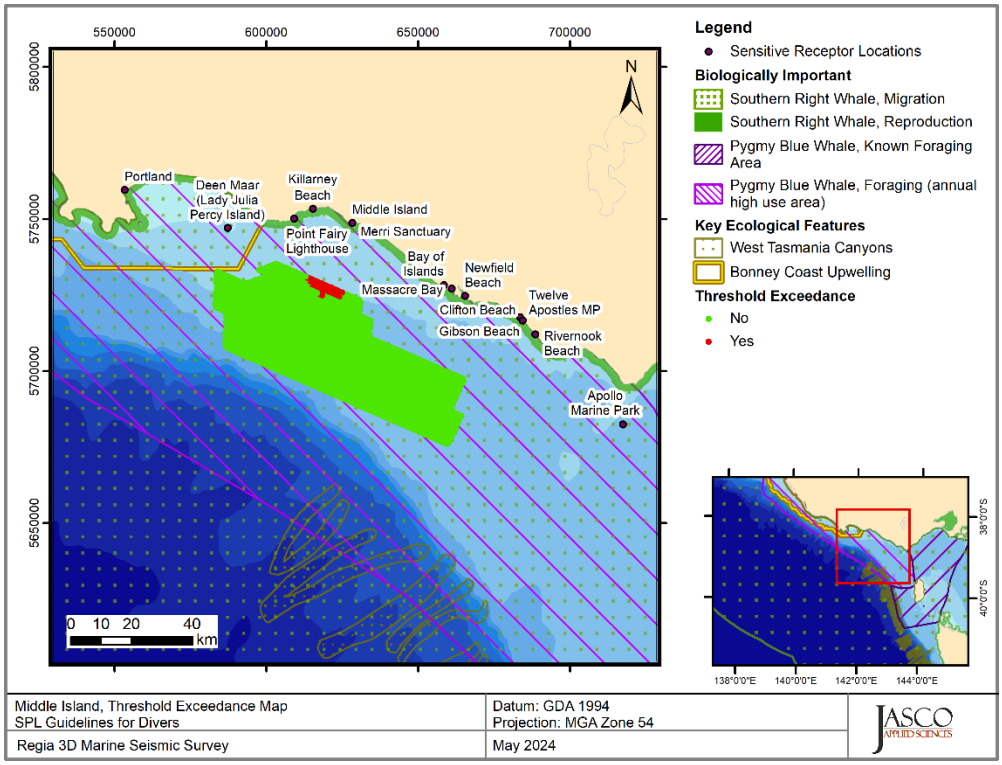

Figure 40. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Middle Island is exceeded.

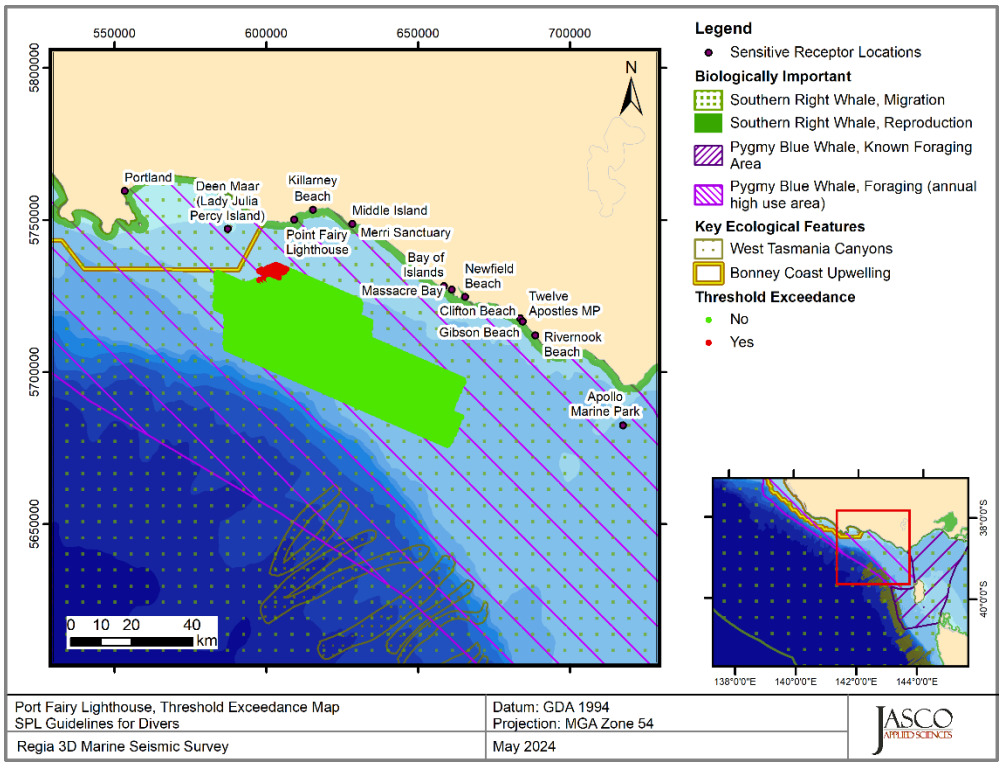

Figure 41. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Port Fairy Lighthouse is exceeded.

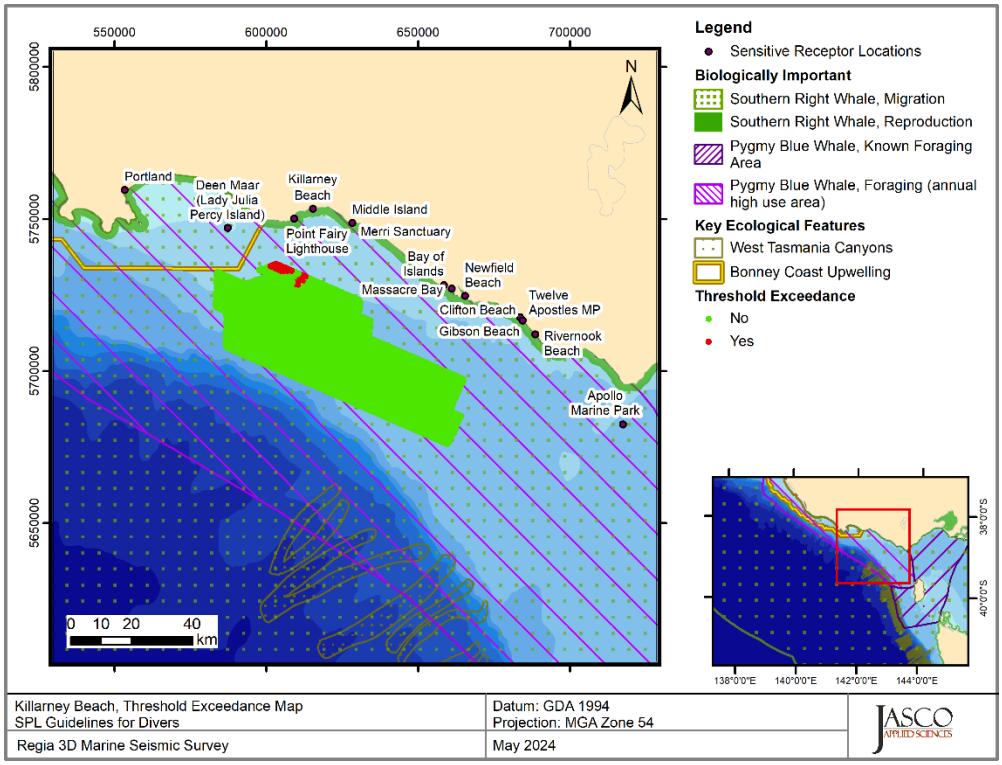

Figure 42. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Killarney Beach is exceeded.

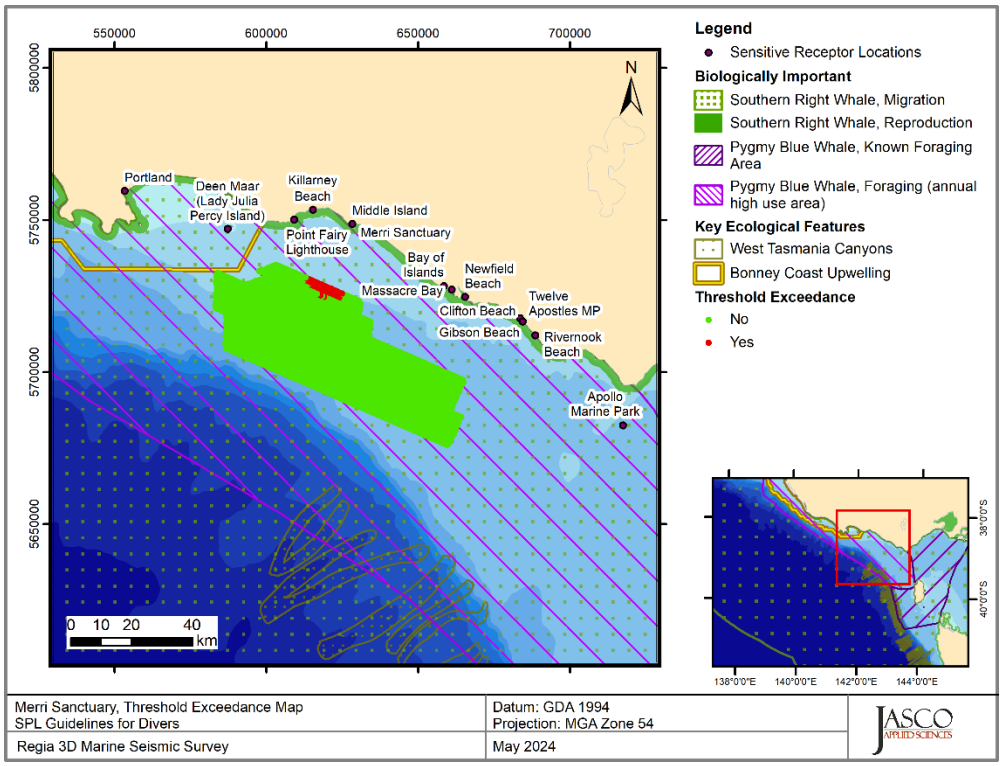

Figure 43. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Merri Sanctuary is exceeded.

4.3. Multiple Source Fields

This section presents the sound fields in terms of SEL accumulated over 24 h for the modelled scenarios (Section 0). Frequency-weighted SEL_{24h} sound fields were used to estimate the maximum horizontal distances (R_{max}) to marine mammal and sea turtle PTS and TTS thresholds (listed in Table 20), and to estimate maximum distance and the area for injury and TTS guidelines for fish (Table 21).

The SEL_{24h} sound fields are presented as contour maps in Figures 44–46. These figures present the unweighted SEL_{24h} in 10 dB steps, as well as the isopleths corresponding to thresholds or guidelines that are large enough to be resolved on a map.

4.3.1. Tabulated Results

Table 20. Maximum-over-depth horizontal distances (R_{max}, in km) to frequency-weighted 24 h sound exposure level (SEL_{24h}) marine mammal and turtle thresholds, and the corresponding area ensonified above the respective threshold (in km^2). Thresholds provided are based on permanent threshold shift (PTS) and temporary threshold shift (TTS) for marine mammals (Southall et al. 2019) and sea turtles (Finneran et al. 2017).

Hearing group	Threshold for SEL_{24h} ($L_{E,24h}$; dB re 1 µPa²·s)	Scenario A		Scenario B		Scenario C		Scenario D	
		R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)
PTS									
LF cetaceans	183	5.07	438.2	4.55	385.4	2.43	215.4	1.00	200.1
HF cetaceans	185	–	–	–	–	–	–	–	–
VHF cetaceans	155	0.07	6.91	0.07	7.96	0.07	16.4	0.07	15.6
Otariid Pinnipeds	203	–	–	–	–	–	–	–	–
Penguins	203	–	–	–	–	–	–	–	–
Sea turtles	204	0.07	7.17	0.07	8.22	0.07	16.5	0.07	15.6
TTS									
LF cetaceans	168	41.9	3230	35.4	2991	20.5	2148	28.6	2916
HF cetaceans	170	0.05	1.55	0.05	0.80	0.03	0.06	0.04	0.09
VHF cetaceans	140	0.35	56.0	0.34	50.9	0.23	59.5	0.19	50.7
Otariid Pinnipeds	188	0.06	2.16	0.06	1.79	0.06	2.02	0.05	1.97
Penguins	188	0.06	2.16	0.06	1.79	0.06	2.02	0.05	1.97
Sea turtles	189	3.35	340.0	3.20	275.2	1.67	168.3	0.60	149.6

A dash indicates the threshold was not reached within the limits of the modelling resolution (20 m).

Table 21. Maximum-over depth horizontal distances (R_{max}, in km) to 24 h sound exposure level (SEL_{24h}) fish thresholds, and the corresponding area ensonified above the respective threshold (in km^2). Thresholds provided are based on injury and temporary threshold shift (TTS) (Popper et al., 2014).

Hearing group	Threshold for SEL_{24h} ($L_{E,24h}$; dB re 1 µPa²·s)	Scenario A		Scenario B		Scenario C		Scenario D	
		R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)
Mortality and potential mortal injury									
Fish I	219	0.06	4.57	0.06	5.33	0.06	8.88	0.06	8.45
Fish II, fish eggs and fish larvae	210	0.07	7.24	0.07	8.40	0.07	17.2	0.07	15.6
Fish III	207	0.07	7.66	0.07	8.95	0.07	17.7	0.07	15.6
Fish recoverable injury									
Fish I	216	0.06	5.11	0.06	6.6	0.06	14.1	0.06	12.0
Fish II, III	203	0.12	15.3	0.11	13.7	0.07	19.0	0.07	16.7
Fish TTS									
Fish I, II, III	186	8.35	665.3	7.22	622.4	4.90	468.9	3.9	584.1

Fish I–No swim bladder; Fish II–Swim bladder not involved with hearing; Fish III–Swim bladder involved with hearing.

4.3.2. Sound Level Contour Maps

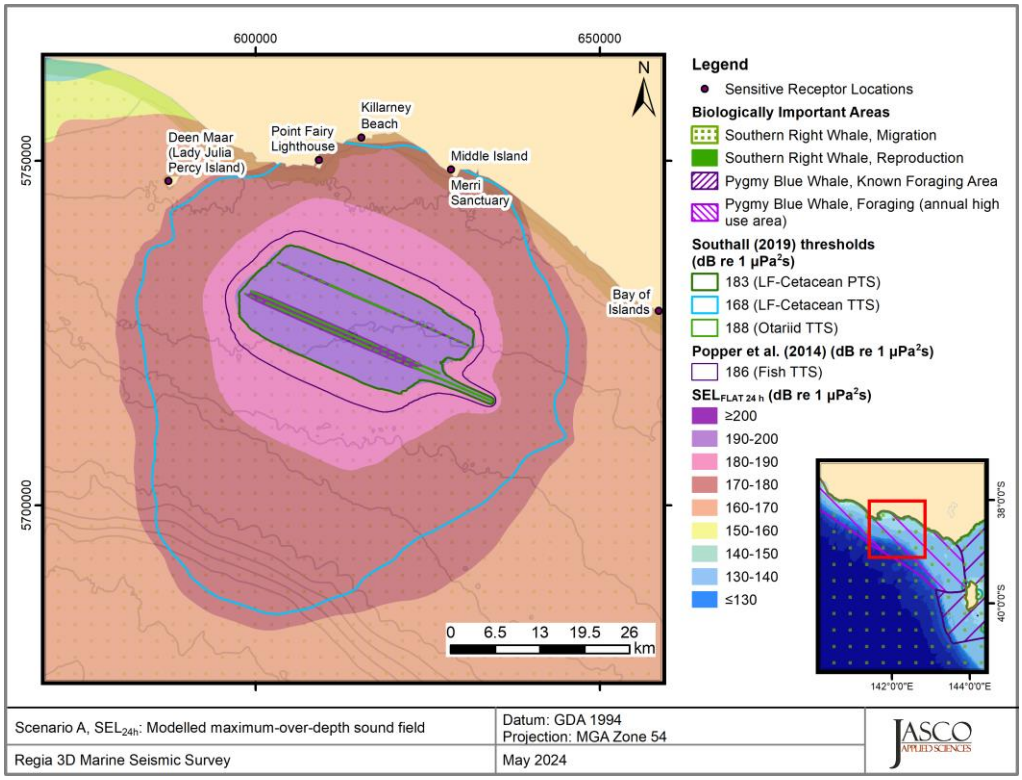

Figure 44. *Scenario A*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. Thresholds omitted here were not reached or not large enough to display graphically. Refer to Tables 20 and 21 for threshold distances.

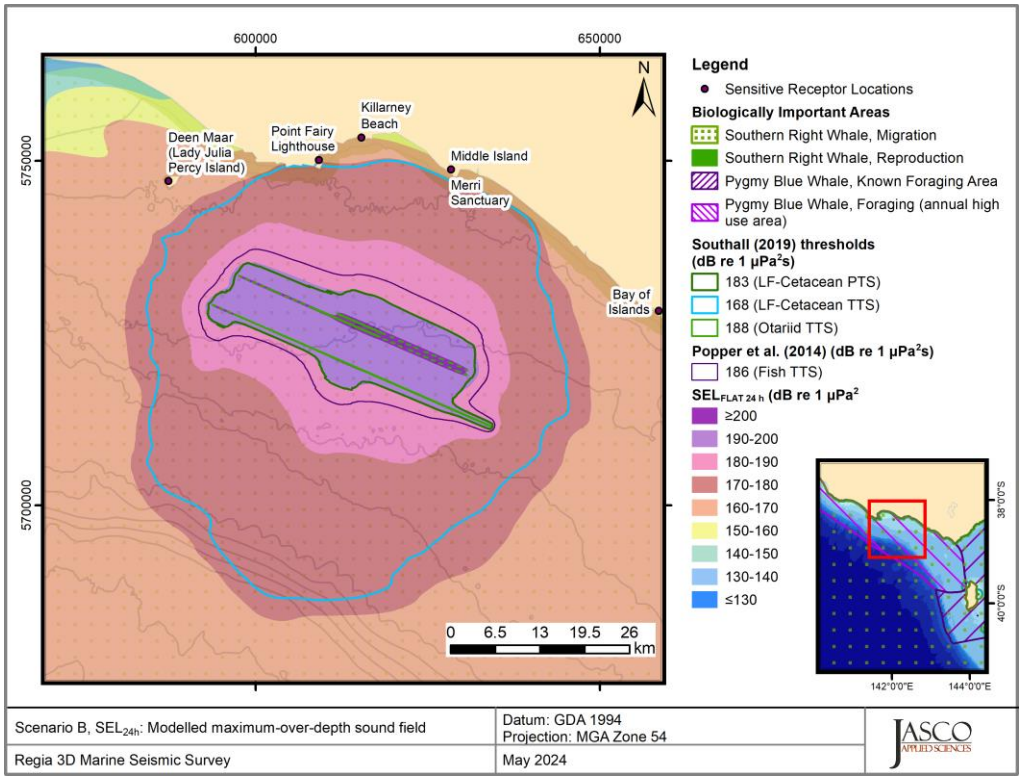

Figure 45. *Scenario B*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. Thresholds omitted here were not reached or not large enough to display graphically. Refer to Tables 20 and 21 for threshold distances.

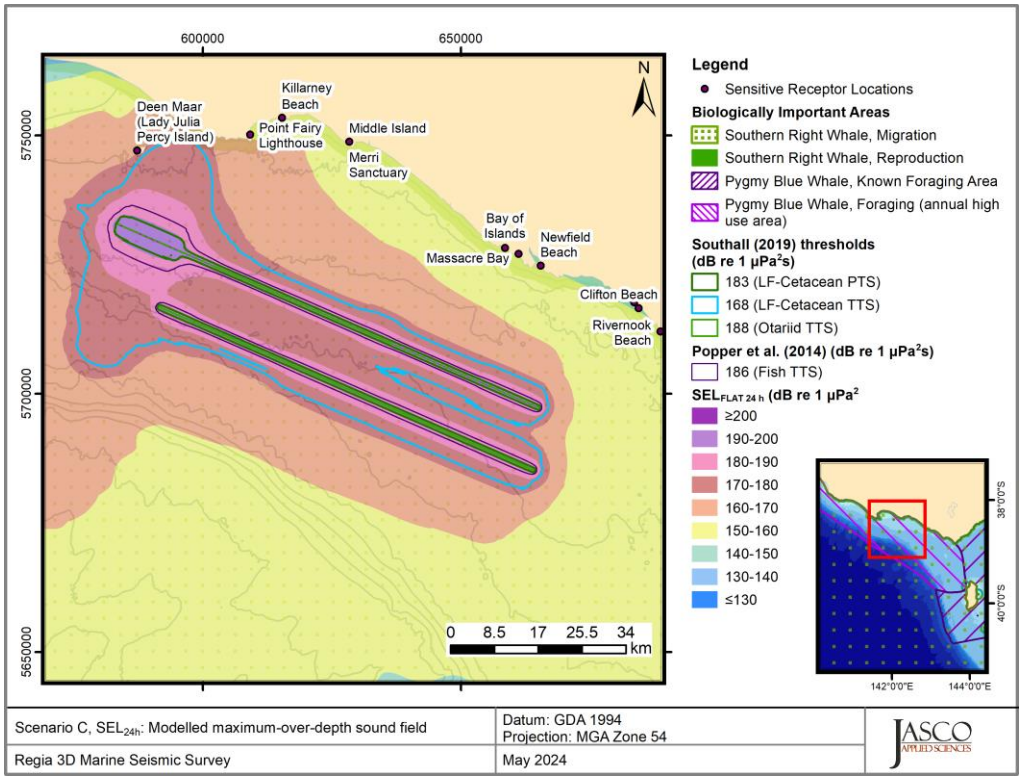

Figure 46. *Scenario C*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for marine mammals and fish. Thresholds omitted here were not reached or not large enough to display graphically. Refer to Tables 20 and 21 for threshold distances.

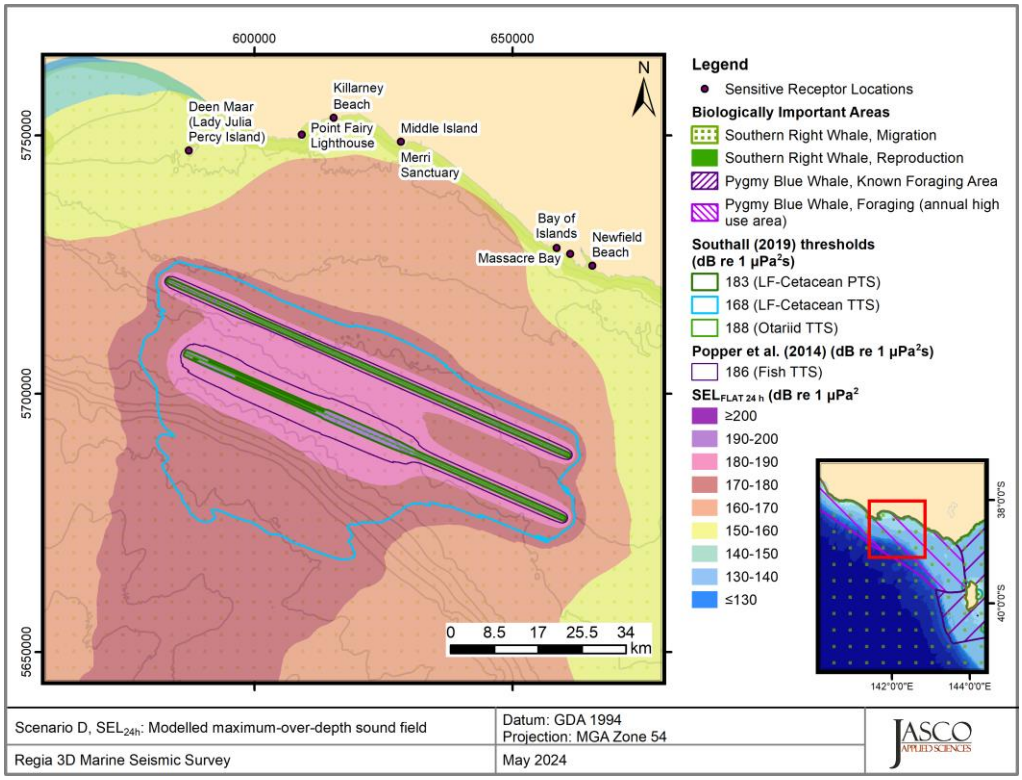

Figure 47. *Scenario D*, sound level contour map of unweighted maximum-over-depth SEL24h results, along with isopleths for marine mammals and fish. Thresholds omitted here were not reached or not large enough to display graphically. Refer to Tables 20 and 21 for threshold distances.

4.4. Animal Movement Exposure Ranges

A summary of radial distances to exposure thresholds for pygmy blue whales and southern right whales, along with probability of exposure for each modelled scenario (Section 0), are included below. Table 22 shows results for scenarios with pygmy blue whale animats with unrestricted seeding, seeding restricted to their foraging BIA, and seeding restricted to the shelf. Tables 23 and 24 show results for scenarios with southern right whale animats within their migration BIA (which is equivalent to unrestricted seeding) and within their reproduction BIA (both unrestricted and restricted seeding), respectively. Reproducing southern right whales restricted to the reproduction BIA were not exposed above any of the three thresholds (PTS, TTS or behavioural response), except in scenario A where SRWs (without a calf) restricted to the reproduction BIA were exposed within 14.2 km with a probability of exposure of 1%. Results include $ER_{95\%}$ exposure ranges calculated for the 160 dB behavioural response threshold and SEL_{24h} thresholds for both TTS and PTS, and the probability of an animat being exposed above the threshold within the $ER_{95\%}$.

Exposure ranges for TTS and PTS PK thresholds were not included in the exposure analysis since acoustic modelling predicted the PK exceedance distances are small and close to the source (see Table 15) such that only minor differences are expected between acoustic and animat exposure predictions.

Sections 4.4.1 and 4.4.2 include histograms of CPA ranges to SEL_{24h} PTS, TTS, and the behavioural response threshold for Scenario A. Additional histograms for the remaining scenarios can be found in Appendix F.

Table 22. Summary of animat simulation results for pygmy blue whales. The 95th percentile exposures ranges ($ER_{95\%}$) in km and probability of animats being exposed above threshold within the $ER_{95\%}$ (P_{exp} (%)) are provided.

Noise Effect Criteria Description	Scenario A				Scenario B				Scenario C				Scenario D			
	Female		Male		Female		Male		Female		Male		Female		Male	
	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)
Unrestricted seeding																
PTS (SEL_{24h})[1]	1.98	58	1.88	59	1.67	52	1.60	57	0.70	43	0.82	34	0.33	65	0.33	65
TTS (SEL_{24h})[2]	21.6	57	20.9	58	18.3	59	18.0	59	10.8	35	10.1	36	8.85	59	8.84	57
Behavioural response (SPL)[3]	9.63	77	9.67	78	9.54	77	9.40	77	8.13	47	8.38	45	6.68	64	6.79	63
Seeding restricted to PBW foraging BIA																
PTS (SEL_{24h})[1]	1.88	61	1.93	59	1.62	55	1.71	51	0.79	38	0.83	36	0.33	68	0.34	65
TTS (SEL_{24h})[2]	21.7	57	21.3	57	18.2	60	17.8	60	10.4	36	10.2	36	8.79	59	8.73	59
Behavioural response (SPL)[3]	9.78	77	9.83	76	9.51	76	9.45	77	8.08	46	8.16	46	6.81	63	6.69	63
Seeding restricted to shelf																
PTS (SEL_{24h})[1]	1.90	62	1.91	60	1.73	50	1.61	55	0.68	45	0.67	45	0.37	59	0.33	64
TTS (SEL_{24h})[2]	22.5	56	21.6	57	18.9	57	18.3	59	10.3	36	10.4	36	8.15	62	8.23	60
Behavioural response (SPL)[3]	9.63	78	9.72	77	9.49	78	9.53	77	8.37	45	8.11	46	6.44	66	6.40	66

[1] LF-weighted SEL_{24h} (183 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al. (2019))
[2] LF-weighted SEL_{24h} (168 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al.)
[3] SPL (160 dB re 1 μPa^2) (NOAA (2019))

Table 23. Summary of animat simulation results for migrating southern right whales. The 95th percentile exposures ranges ($ER_{95\%}$) in km and probability of animats being exposed above threshold within the $ER_{95\%}$ (P_{exp} (%)) are provided.

Noise Effect Criteria Description	Scenario A				Scenario B				Scenario C				Scenario D			
	with calf		without calf		with calf		without calf		with calf		without calf		with calf		without calf	
	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)
Unrestricted seeding																
PTS (SEL_{24h})[1]	1.40	52	0.88	50	1.22	44	0.89	48	0.50	34	0.69	26	0.22	48	0.24	51
TTS (SEL_{24h})[2]	13.2	64	10.3	78	11.3	64	10.3	64	6.21	39	5.82	39	5.81	62	6.23	58
Behavioural response (SPL)[3]	9.38	79	9.51	83	8.86	72	8.91	73	5.85	52	5.35	57	6.60	62	6.84	63

[1] LF-weighted SEL_{24h} (183 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al. (2019))
[2] LF-weighted SEL_{24h} (168 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al. 2019)
[3] SPL (160 dB re 1 μPa^2) (NOAA (2019))

Table 24. Summary of animat simulation results for aggregating southern right whales. The 95th percentile exposures ranges ($ER_{95\%}$) in km and probability of animats being exposed above threshold within the $ER_{95\%}$ (P_{exp} (%)) are provided.

Noise Effect Criteria Description	Scenario A				Scenario B				Scenario C				Scenario D			
	with calf		without calf		with calf		without calf		with calf		without calf		with calf		without calf	
	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)	$ER_{95\%}$ (km)	P_{exp} (%)
Unrestricted seeding																
PTS (SEL_{24h})[1]	1.26	55	1.25	60	1.09	48	1.08	53	0.41	40	0.42	41	0.19	53	0.20	46
TTS (SEL_{24h})[2]	13.2	61	13.2	61	11.1	64	11.3	64	7.10	35	6.83	36	6.13	57	6.14	57
Behavioural response (SPL)[3]	9.14	73	9.38	74	8.85	73	8.97	74	7.33	44	7.39	47	6.44	59	6.55	62
Seeding restricted to SRW reproduction BIA																
PTS (SEL_{24h})[1]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TTS (SEL_{24h})[2]	0	0	14.2	1	0	0	0	0	0	0	0	0	0	0	0	0
Behavioural response (SPL)[3]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] LF-weighted SEL_{24h} (183 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al. (2019))
[2] LF-weighted SEL_{24h} (168 dB re 1 $\mu Pa^2 \cdot s$) (Southall et al.)
[3] SPL (160 dB re 1 μPa^2) (NOAA (2019))

4.4.1. Exposure Range Histograms: Pygmy Blue Whales

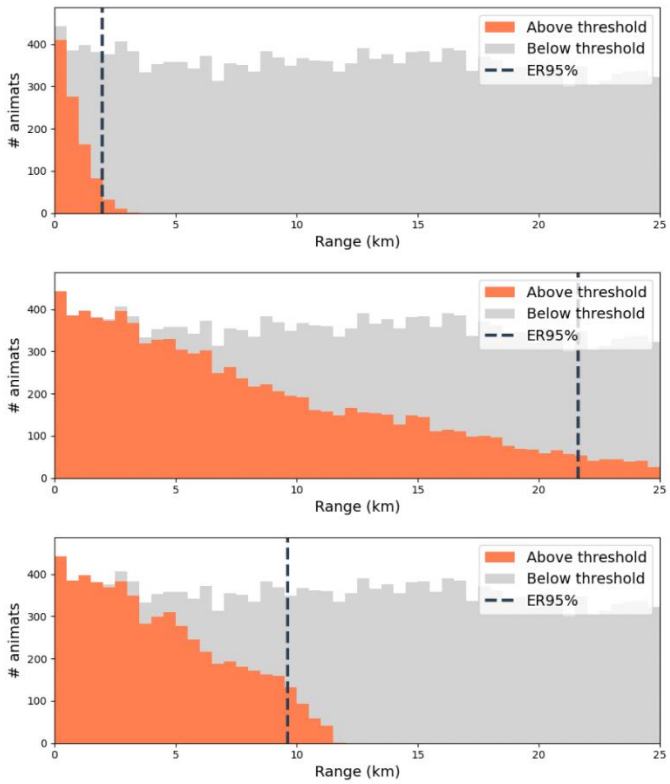

Figure 48. *Scenario A, female pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

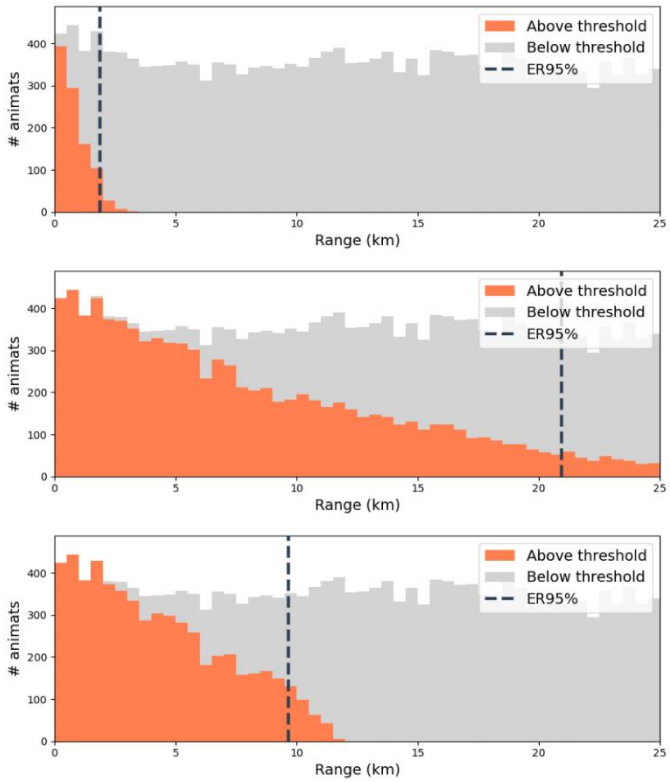

Figure 49. *Scenario A, male pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

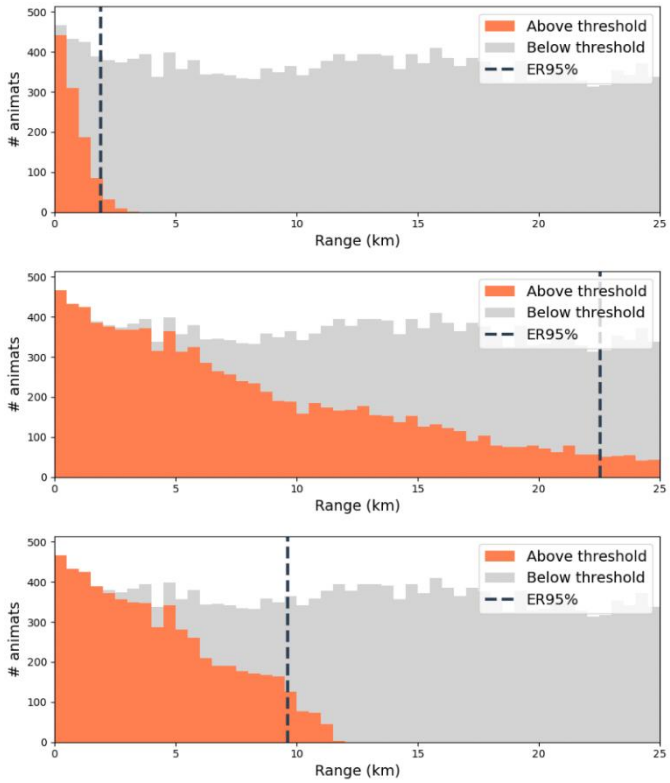

Figure 50. *Scenario A, female pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

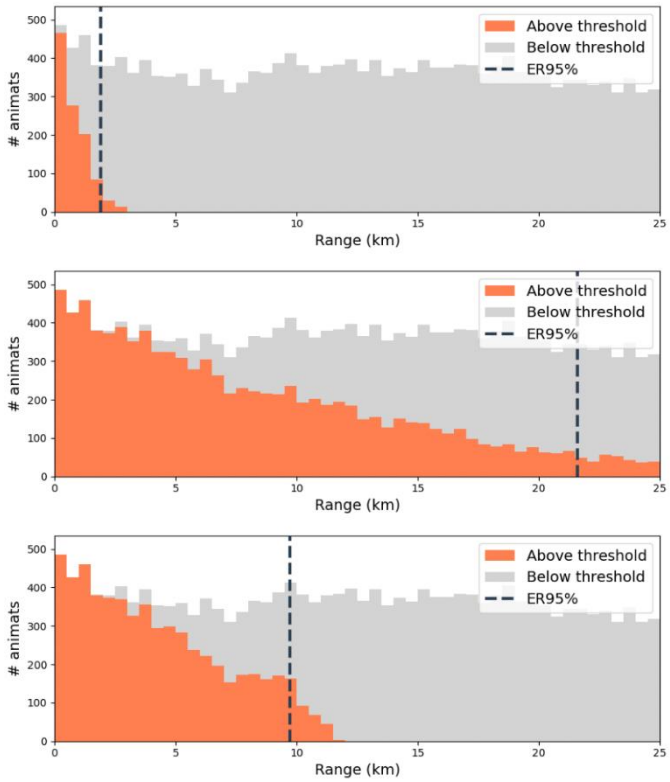

Figure 51. *Scenario A, male pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

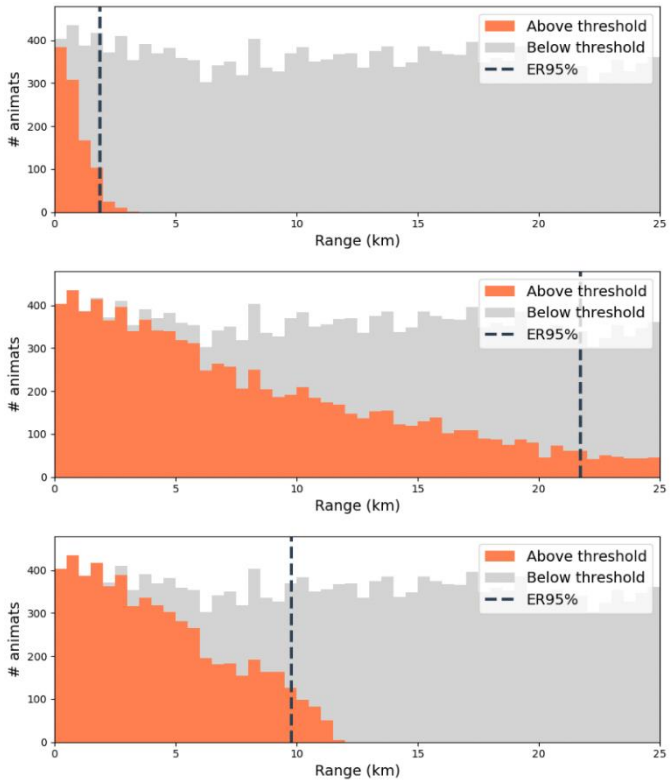

Figure 52. *Scenario A, female pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

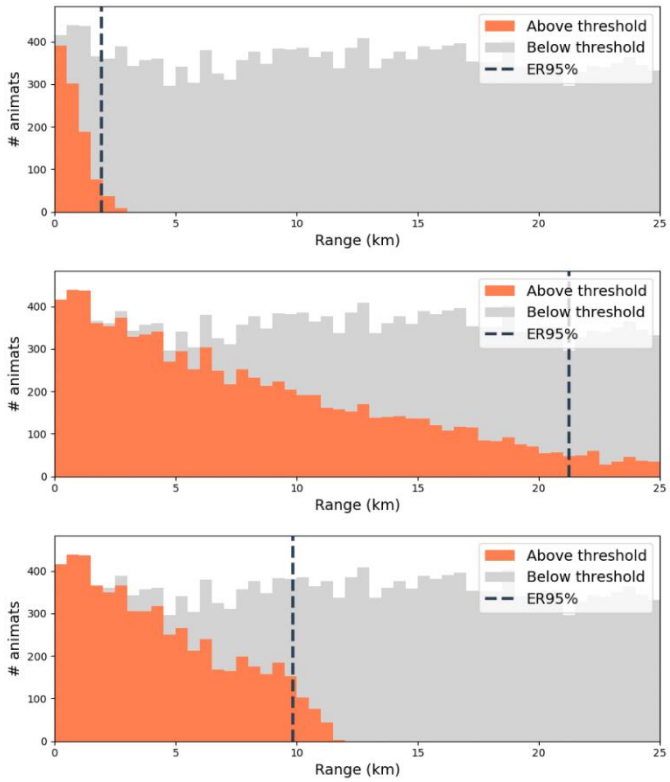

Figure 53. *Scenario A, male pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

4.4.2. Exposure Range Histograms: Southern Right Whales

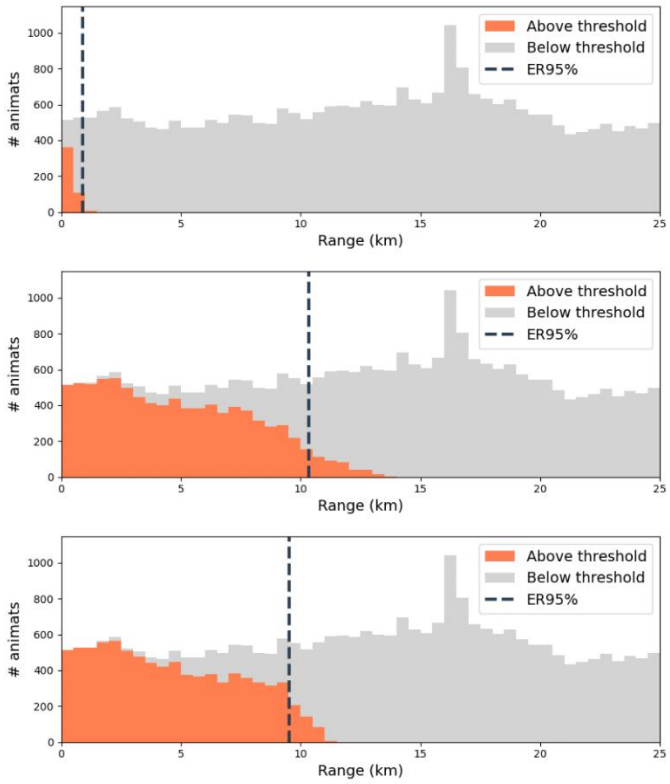

Figure 54. *Scenario A, migrating southern right whale animats, no calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

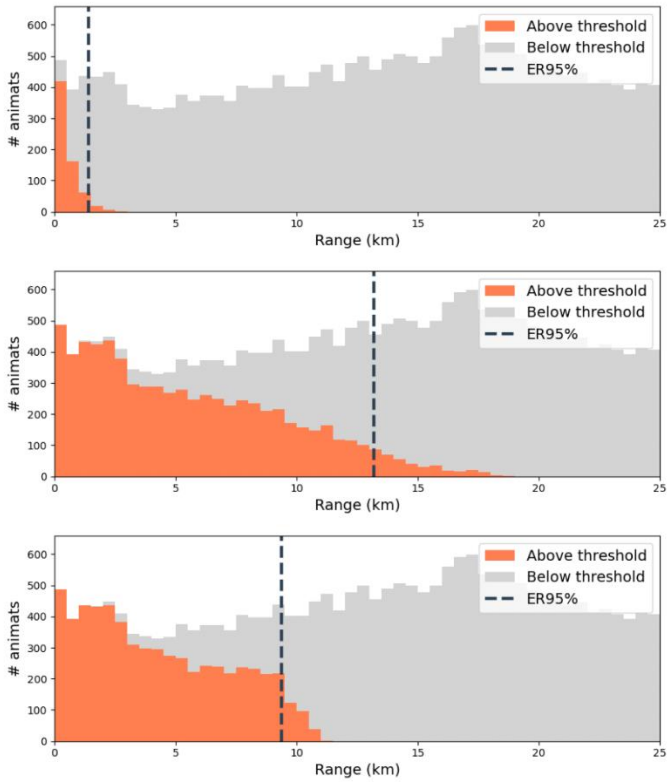

Figure 55. *Scenario A, migrating southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

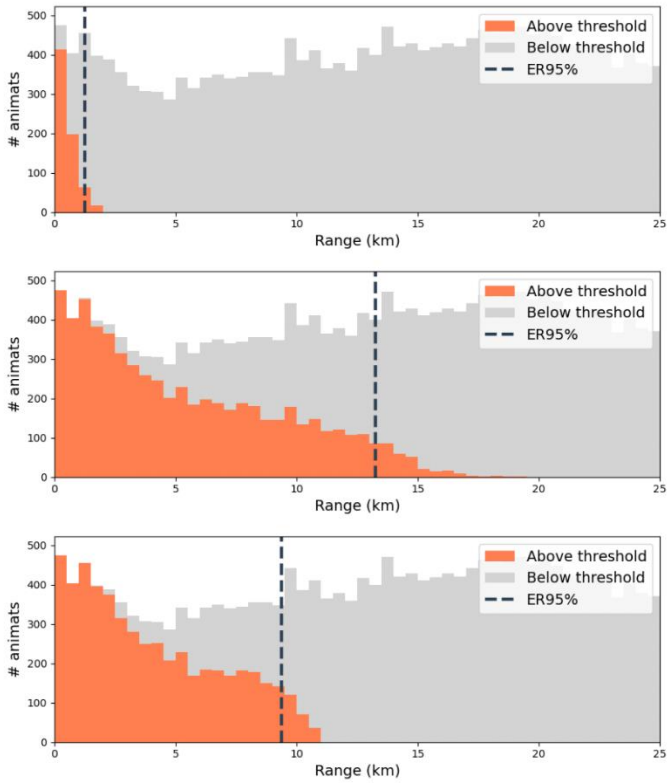

Figure 56. *Scenario A, reproducing southern right whale animats, no calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

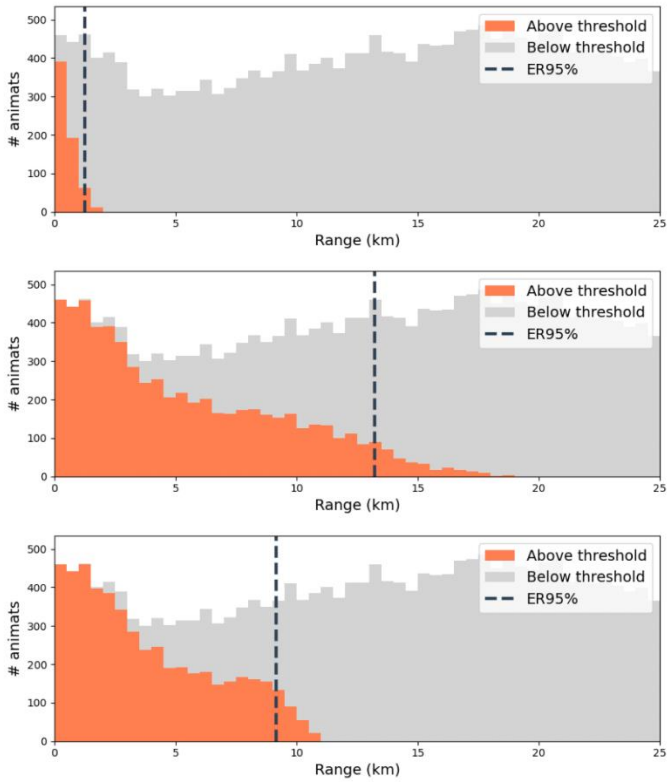

Figure 57. *Scenario A, reproducing southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

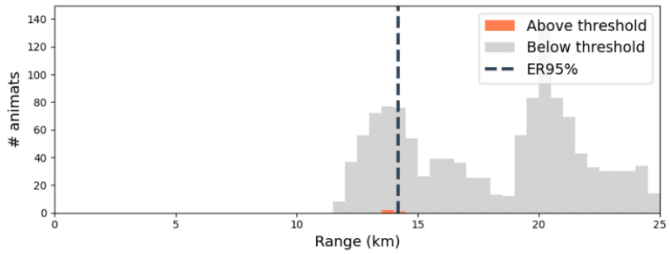

Figure 58. *Scenario A, reproducing southern right whale animats, no calf, restricted to reproduction BIA*: CPA range histogram for animats, SEL_{24h} TTS threshold. Bar colours indicate whether the animats exceeded the threshold.

5. Discussion and Summary

The modelling study predicted underwater sound levels associated with the planned Regia MSS. The underwater sound field from a 2820 in^3 seismic source was modelled (Appendix B.2). An analysis of seasonal sound speed profiles and associated sensitivity comparison indicated that June was likely to be the month most conductive to sound propagation, and hence was selected to ensure a conservative estimation of distances to received sound level (Appendix D.3.2). Modelling also accounted for site-specific bathymetric variations (Appendix D.3.1) and local geoacoustic properties (Appendix D.3.3).

Most acoustic energy from a seismic source is output at lower frequencies, in the tens to hundreds of hertz. The modelled array had a pronounced broadside directivity for decidecade bands between ~100 to 400 Hz (Appendix B.3), which caused a noticeable axial bulge in the modelled acoustic footprints. The overall broadband (10–25000 Hz) unweighted per-pulse SEL and peak pressure source levels of the seismic source operating at 7 m depth are detailed in Table 11.

5.1. Per-Pulse Sound Fields

The single-impulse modelled sites span water depths of 49–174 m across three different geological regions. The bathymetry within the vicinity of the survey varied between approximately 20–150 m; however, along a south-westward transect the environment generally transitions from shallower water of the Otway Shelf to the significantly deeper waters of the continental slope and abyssal plane (>1000 m). The frequency content of the seismic sources coupled with the bathymetry had a considerable effect on propagation at longer distances, with larger lobes of sound energy extending into the deeper waters. The maximum-over-depth sound footprint maps and vertical slice plots (Sections 4.2.2.1 and 4.2.2.2) assist in demonstrating the influence of the bathymetry and seabed composition on the sound field.

The geological profile for single-impulse modelled sites in water depths less than 65 m, consisted of a sand layer underlain by variably cemented limestone (calcarenite). Literature suggests that the sand layer likely begins to thin as water depths increase in an offshore direction, and for water depths greater than 65 m it was considered absent with only the variably cemented calcarenite present at the seafloor interface. Modelled sites located in environments where the seabed was modelled as bare calcarenite generally displayed higher rates of loss with distance away from the source as compared to sites where a layer of sand overlies calcarenite.

The presence of unconsolidated coarse sand overlying semi-cemented calcarenite led to a more reflective seabed which is associated with large isopleths for low level thresholds. This is most evident for the marine mammal behavioural threshold of 160 dB re 1 μPa^2 (SPL) for impulsive sound sources. However, the distribution of a sand layer is not well known and if the thickness of the sand layer is not as uniform as modelled then this variability could potentially lead to smaller radii. It is possible to model a transitioning seabed type, where the sand layer mentioned above thins with distance; however, sufficient information was not available to make that discrimination to develop reliable model inputs.

The array directionality and frequency content coupled with the bathymetry had a considerable effect on propagation at longer distances, with larger lobes of sound energy extending into the deeper waters for all modelled sites. This is particularly evident for modelled Sites 8 and 9 which are situated along the continental shelf break and continental slope. For source locations close to the continental shelf break modelling indicates that significant amounts of energy reflected from the seabed slope can be trapped in the deep sound channel and propagate for large distances within the ocean interior. This phenomenon is evident in the slice plots showing the sound field in the broadside direction, where greater ranges to all isopleths are predicted to occur in the downward sloping offshore

direction. The vertical slice plots in Section 4.2.2.2 assist in demonstrating the influence of the sloping bathymetry on the sound field.

5.2. Multiple Pulse Sound Fields

The accumulated SEL over 24 hours of survey operation was modelled considering four acoustic scenarios and four animal movement modelling scenarios, each with a realistic acquisition pattern based on provided survey designs. The modelling predicted the accumulation of sound energy, considering the change in location and the tow direction of the source at each pulse point, which was used to assess possible injury in marine mammals and the SEL_{24h} based fish criteria. The results were presented as maps of the accumulated exposure levels and tabulated values of ranges to threshold levels and exposure areas for the given effects criteria (Section 2).

The footprints and range maxima for all accumulated SEL thresholds are influenced by the seabed compositions along acquisition lines. The discussion above regarding ranges to isopleths also applies to the accumulated SEL calculations. The farthest ranges to thresholds for PTS and TTS were driven by the source orientation and bathymetry, particularly in the broadside and offshore directions.

5.3. Acoustic Results Summary

This section presents a summary of the distances to the noise effect criteria applied in this study (Section 2) as relevant to the impact assessment. The effect criteria for impairment of marine mammals, fish and sea turtles use dual metrics (PK and SEL_{24h}), and the longest distance associated with either metric is required to be applied, and thus is presented in this summary.

The SEL_{24h} is a cumulative metric that reflects the dosimetric effect of noise levels within 24 h based on the assumption that an animal is consistently exposed to such noise levels at a fixed position. Where the corresponding SEL_{24h} radii are larger than those for peak pressure criteria, they often represent an unlikely worst-case scenario. More realistically, marine mammals, fish, and sea turtles would not remain in the same location for 24 hours, but rather a shorter period, depending upon their behaviour, the proximity and movements of the source. Therefore, a reported radius for SEL_{24h} criteria does not mean that marine fauna travelling within this radius of the source will be impaired, but rather that an animal could be exposed to the sound level associated with impairment (either PTS or TTS) if it remained in that location for 24 h. A more realistic representation of the potential exposures was undertaken using animal movement modelling (‘animat modelling’), with the results summarised separately below.

A summary of predicted distances to criteria from acoustic modelling are presented below.

Marine Mammals

Table 25 summarises the distances to where effect criteria for marine mammals are no longer exceeded. Full results for PK levels were presented in Table 15, while SEL_{24h} results were presented in Table 20.

Table 25. Summary of maximum (R_{max}) horizontal distances (in km) from modelled sites or scenarios to behavioural response thresholds and temporary threshold shift (TTS) and permanent threshold shift (PTS) for marine mammals. Maximum extents are in the broadside direction of the 2820 in^3 seismic source.

Hearing group	Maximum modelled distance to effect threshold (R_{max})								
	Behavioural response[1]	Scenario A		Scenario B		Scenario C		Scenario D	
		TTS[2] (km)	PTS[2] (km)	TTS[2] (km)	PTS[2] (km)	TTS[2] (km)	PTS[2] (km)	TTS[2] (km)	PTS[2] (km)
Low-frequency cetaceans	11.8 (SPL)	41.9 (SEL_{24h})	5.07 (SEL_{24h})	35.4 (SEL_{24h})	4.55 (SEL_{24h})	20.5 (SEL_{24h})	2.43 (SEL_{24h})	28.6 (SEL_{24h})	1.00 (SEL_{24h})
High-frequency cetaceans		0.05 (SEL_{24h})	–	0.05 (SEL_{24h})	–	0.03 (SEL_{24h})	–	0.04 (SEL_{24h})	–
Very high-frequency cetaceans		0.82 (PK)	0.41 (PK)	0.82 (PK)	0.41 (PK)	0.79 (PK)	0.39 (PK)	0.71 (PK)	0.37 (PK)
Otariid Pinnipeds		0.06 (SEL_{24h})	–	0.06 (SEL_{24h})	–	0.06 (SEL_{24h})	–	0.05 (SEL_{24h})	–

Noise exposure criteria: [1] NOAA (2019) and [2] Southall et al. (2019).
A dash indicates the threshold was not reached within the limits of the modelling resolution (20 m).

Sea Turtles

Table 26 summarises the distances to where effect criteria for sea turtles are no longer exceeded, with the results for behavioural thresholds presented in Table 3 while SEL_{24h} results are in Table 20.

Table 26. Summary of horizontal distances (in km) to turtle behavioural response criteria, temporary threshold shift (TTS), and permanent threshold shift (PTS).

Hearing group	Maximum modelled distance to effect threshold (R_{max})									
	Behavioural response[1]	Behavioural disturbance[1]	Scenario A		Scenario B		Scenario C		Scenario D	
			TTS[2]	PTS[2]	TTS[2]	PTS[2]	TTS[2]	PTS[2]	TTS[2]	PTS[2]
Sea Turtles	6.30 (SPL)	2.62 (SPL)	3.35 (SEL_{24h})	0.07 (SEL_{24h})	3.20 (SEL_{24h})	0.07 (SEL_{24h})	1.67 (SEL_{24h})	0.07 (SEL_{24h})	0.60 (SEL_{24h})	0.07 (SEL_{24h})

Noise exposure criteria: [1] McCauley et al. (2000), and [2] Finneran et al. (2017)

Penguins

- The maximum distance to where the OCW-weighted penguin TTS SEL_{24h} threshold of 188 dB re 1 μPa^2s was no longer exceeded was 0.06 km for scenarios A–C and 0.05 km for scenario D. PTS and PK thresholds were not resolved within the modelled resolution of 20 m. As is the case with marine mammals, a reported radius for SEL_{24h} criteria does not mean that a penguin underwater travelling within this radius of the source will be injured, but rather that an animal

could be exposed to the sound level associated with either PTS or TTS if it remained in that location for 24 hours.

- The maximum distance where the OCW-weighted penguin behavioural response threshold of 120 dB re 1 μPa^2 (SPL) for impulsive noise could be exceeded varied between 10.4 and 77.0 km for the 2820 in^3 seismic source, depending on modelled site.

Fish, fish eggs, and fish larvae

- This modelling study assessed the ranges for quantitative criteria based on Popper et al. (2014) and considered both PK (seafloor and water column) and SEL_{24h} metrics associated with mortality and potential mortal injury as well as impairment in the following groups:
  - Fish without a swim bladder (also appropriate for sharks in the absence of other information),
  - Fish with a swim bladder that do not use it for hearing,
  - Fish that use their swim bladders for hearing,
  - Fish eggs and fish larvae.
- Table 27 summarises distances to effect criteria for fish, fish eggs, and fish larvae along with the relevant metric. Results for PK are presented in Tables 15 whilst SEL_{24h} results are in Tables 21.

Table 27. Summary of maximum fish, fish eggs, and larvae injury and temporary threshold shift (TTS) onset distances for single impulse and 24 hr sound exposure level (SEL_{24h}) modelled scenarios.

Relevant hearing group	Effect criteria	Water column	
		Metric associated with longest distance to criteria	R_{max} (km)
Fish: No swim bladder	Mortality and Potential Mortal Injury	PK	0.11
	Recoverable injury	PK	0.11
	TTS	SEL_{24h}	8.35
Fish: Swim bladder not involved in hearing and Swim bladder involved in hearing	Mortality and Potential Mortal Injury	PK	0.21
	Recoverable injury	PK	0.23
	TTS	SEL_{24h}	8.35
Fish eggs, and larvae (relevant to plankton)	Mortality and Potential Mortal Injury	PK	0.23

Benthic invertebrates

To assist with assessing the potential effects on these receptors, the following results were determined:

- Crustaceans: The sound level of 202 dB re 1 µPa PK-PK from Payne et al. (2008), which is representative of no effects, was considered for seafloor sound levels; the sound level was reached at ranges between 322 and 715 m for the 2820 in^3 source.
- Bivalves: The distance where a particle acceleration of 37.57 ms^{-2} at the seafloor could occur was determined for comparing to results presented in Day et al. (2016a). This particle acceleration was

reached at a range of 4 m for a water depth of 50 m, and was not reached at any greater water depth.

- Sponges and coral: The PK sound level at the seafloor directly underneath the seismic source was estimated at all modelled sites and compared to the sound level of 226 dB re 1 µPa PK for sponges and corals (Heyward et al. 2018); the threshold was not reached in water depths greater than 50

Divers and Swimmers

An SPL human health assessment of 145 dB re 1 µPa^2 (SPL; L_P) derived from (Parvin 2005) was considered for recreational swimmers and divers. This criterion was considered for all single-impulse modelled sites and cumulative scenarios, and specifically at 14 coastal sensitive receiver locations. The human health assessment threshold was predicted to be exceeded at Deen Maar (Lady Julia Percy Island), Middle Island, Port Fairy Lighthouse, Killarney Beach and Merri Sanctuary. It is important to review the provided contour maps (Section 4.2.2.1) and sensitive receiver maps (Section 4.2.2.3, Appendix G) to contextualise levels at coastal areas and understand which portions of the survey may result in the human health assessment level being exceeded.

5.4. Animal Movement Modelling

The estimated sound fields produced by source and propagation models for the planned Regia MSS were incorporated into animat sound exposure models for pygmy blue whales and southern right whales to estimate the radial distances within which 95% of exposure exceedances occur ($ER_{95\%}$), along with the probability that an animat with the closest point of approach within that distance would be exposed above the relevant threshold (P_{exp}).

For the exposure analysis, all four acquisition scenarios were run with multiple animat seeding approaches (see Figure 2). Survey lines from all nominal acquisition scenarios overlap with the foraging BIA for pygmy blue whales and migrating BIA for southern right whales. The reproduction BIA for southern right whales lies inshore of the nominal acquisition scenarios.

Sections 5.4.1 and 5.4.2 summarise the PTS, TTS, and behavioural exposure range results, with all tabulated results presented in Tables 22 to 24. Table 28 summarises the maximum exposure range results for pygmy blue whales and southern right whales across the different species profiles and seeding regimes considered. Figure 59 summarises results for each modelled scenario, species profile and seeding regime. Reproducing southern right whales restricted to the reproduction BIA were not exposed above any of the three considered thresholds (PTS, TTS or behavioural response).

Table 28. Summary of animat simulation results for PTS, TTS and SPL behavioural response criteria for pygmy blue whales and southern right whales Maximum exposure ranges show $ER_{95\%}$ (km) first and associated probability of exposure of animats travelling within maximum $ER_{95\%}$ (P_{exp} (%)) in parentheses.

Species	Scenario	Behavioural response (SPL)[4]	TTS (SEL_{24h})[3]	PTS (SEL_{24h})[3]
		160[2]	168[1]	183[1]
Pygmy blue whale	A	9.83 (76%)	22.5 (56%)	1.98 (58%)
	B	9.54 (77%)	18.9 (57%)	1.73 (50%)
	C	8.38 (45%)	10.8 (35%)	0.83 (36%)
	D	6.69 (63%)	8.85 (59%)	0.37 (59%)
Southern right whale	A	9.51 (83%)	14.2 (1%)	1.40 (52%)
	B	8.97 (73%)	11.3 (64%)	1.22 (44%)
	C	7.39 (47%)	7.10 (35%)	0.69 (26%)
	D	6.84 (63%)	6.23 (58%)	0.24 (51%)

1 LF-weighted SEL_{24h} ($L_{E,24h}$; dB re 1 $\mu Pa^2 \cdot s$)
2 SPL (L_p; dB re 1 μPa^2)
3 Southall et al. (2019) criteria for marine fauna.
4 NOAA (2019) recommended unweighted behavioural threshold for marine mammals.

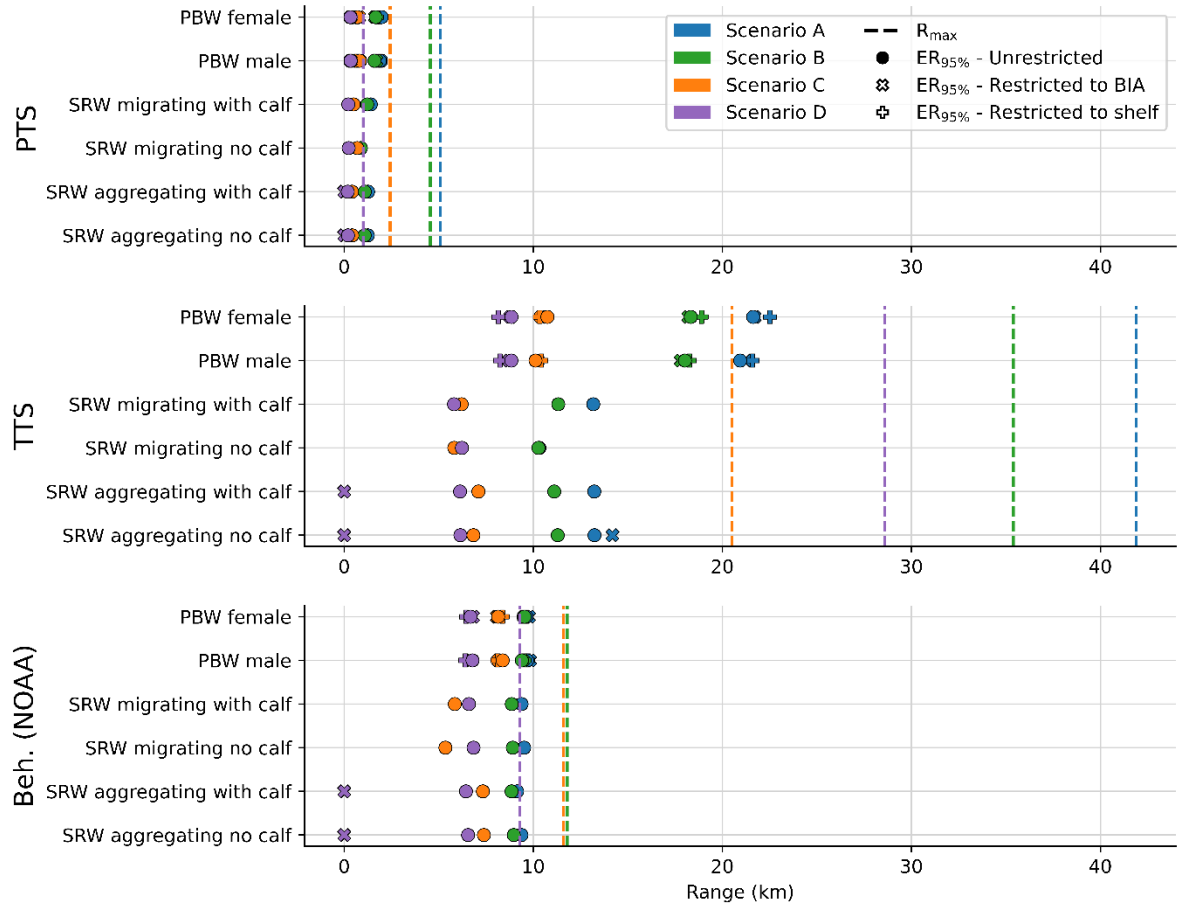

Figure 59. Acoustic (R_{max}) and exposure ranges ($ER_{95\%}$) for PTS, TTS and the behavioural thresholds, shown for each species. Colour represents the acoustic modelled scenario. The "restricted to BIA" sub-set refers to the pygmy blue whale foraging BIA and southern right whale reproduction BIA for pygmy blue whales and southern right whales respectively, presented in Figure 2. The "restricted to shelf" sub-set refers to pygmy blue whales, presented in Figure 2.

5.4.1. PTS and TTS

Exposure ranges from animal movement modelling for PTS and TTS criteria are typically shorter than those predicted using acoustic propagation modelling because of the generally shorter time ('dwell time') for moving animats to accumulate sound energy. In this study, PTS and TTS exposure ranges were substantially shorter than acoustic ranges to threshold, as shown in Figure 59.

All considered scenarios resulted in exposures above the PTS and TTS thresholds with the exception of scenarios B, C and D for reproducing southern right whales restricted to the reproduction BIA.

The maximum $ER_{95\%}$ for pygmy blue whale scenarios was 22.5 and 1.98 km for TTS and PTS, respectively. The associated probability of exposure above threshold within these $ER_{95\%}$ was 56% and 58%, respectively. For southern right whales, the maximum $ER_{95\%}$ for TTS and PTS were 14.2 and 1.40 km, respectively, with associated probabilities of exposure above threshold of 1% and 52%. The fact that some, but not all, animats that travelled within the 95th percentile range were exposed above threshold is because animats alter their horizontal position in the modelling area as well as their vertical position in the water column, thus potentially limiting the length of time they are within ensonified areas. For example, an animat might travel within the predicted exposure range but if they

are traveling more quickly on average than other animats, they may not accumulate as much exposure, or they may be spending more time at depths with quieter sound levels.

Female pygmy blue whale scenarios did not result in significantly or consistently different exposure ranges than the corresponding male pygmy blue whale scenarios. Based on the vertical distribution of the sound field (see Section 4.2.2.2), the sound fields are relatively constant with depth, and hence female pygmy blue whale animats accumulated similar exposure as the males even though females generally dive deeper than males (Section 3.7.3.1).

Exposure ranges are not significantly affected by seeding restrictions for pygmy blue whales. This is due to the survey being located within the boundaries of the restricted scenarios (pygmy blue whales foraging BIA and restricted to the shelf). Exposure ranges from the seismic survey were generally comparable or less than the distance to the edge of the restrictions, therefore restricted scenarios resulted in similar exposure ranges as unrestricted scenarios.

No southern right whales restricted to the reproduction BIA were exposed above PTS, TTS or behavioural threshold, except for limited exposures above TTS in scenario A. The SRW reproduction BIA is both narrow and close to shore, and in comparison with the modelled acoustic ranges, relatively little sound energy reaches the BIA. Sufficient sound energy from scenario A reaches the SRW reproduction BIA to result in TTS exposures, however, very few animats were exposed above this threshold (1% probability of exposure above the TTS criterion, Table 24).

The animat modelling was included in the scope of work to provide context to possible exposures to pygmy blue and southern right whales over an entire day. The distances to isopleths associated with the effect thresholds for PTS and TTS are more realistic than those from the static sound fields as they consider potential animal movements passing through the operational region.

5.4.2. Behavioural Effects

Exposure ranges ($ER_{95\%}$) for single exposure metrics, such as the SPL behavioural response criteria, are typically comparable to the predicted acoustic ranges. Maximum acoustic ranges (e.g., R_{max}) are conservatively calculated using the maximum-over-depth sound fields and assuming static receivers, while exposure ranges account for animats sampling the sound field vertically and horizontally based on species-specific diving parameters, so exposure ranges are generally slightly lower than the R_{max} acoustic ranges. In this case, exposure ranges were slightly shorter than acoustic ranges to threshold for most modelled scenarios (Figure 59).

Overall, ranges were longest for Scenario A. For all considered pygmy blue whale scenarios, the $ER_{95\%}$ to behavioural threshold ranged from 6.40 to 9.83 km for pygmy blue whales, with associated P_{exp} of 66 and 76%. For southern right whales, the $ER_{95\%}$ to behavioural threshold ranged from 5.35 to 9.51 km, with associated P_{exp} of 57 and 83%, notwithstanding reproducing southern right whales restricted to the reproduction BIA which were not exposed above the behavioural response threshold.

Glossary

Unless otherwise stated in an entry, these definitions are consistent with ISO 80000-3 (2017).

1/3-octave

One third of an octave. *Note*: A one-third octave is approximately equal to one decidecade (1/3 oct ≈ 1.003 ddec).

1/3-octave-band

Frequency band whose bandwidth is one one-third octave. *Note*: The bandwidth of a one-third octave-band increases with increasing centre frequency.

A-weighting

Frequency-selective weighting for human hearing in air that is derived from the inverse of the idealized 40-phon equal loudness hearing function across frequencies.

absorption

The reduction of acoustic pressure amplitude due to acoustic particle motion energy converting to heat in the propagation medium.

attenuation

The gradual loss of acoustic energy from absorption and scattering as sound propagates through a medium.

auditory frequency weighting

The process of applying an auditory frequency weighting function. In human audiometry, C-weighting is the most commonly used function, an example for marine mammals are the auditory frequency weighting functions published by Southall et al. (2007).

auditory frequency weighting function

Frequency weighting function describing a compensatory approach accounting for a species' (or functional hearing group's) frequency-specific hearing sensitivity. Example hearing groups are low-, mid-, and high-frequency cetaceans, phocid and otariid pinnipeds.

azimuth

A horizontal angle relative to a reference direction, which is often magnetic north or the direction of travel. In navigation it is also called bearing.

bandwidth

The range of frequencies over which a sound occurs. Broadband refers to a source that produces sound over a broad range of frequencies (e.g., seismic airguns, vessels) whereas narrowband sources produce sounds over a narrow frequency range (e.g., sonar) (ANSI S1.13-2005 (R2010)).

bar

Unit of pressure equal to 100 kPa, which is approximately equal to the atmospheric pressure on Earth at sea level. 1 bar is equal to 10^5 Pa or 10^{11} µPa.

boxcar averaging

A signal smoothing technique that returns the averages of consecutive segments of a specified width.

broadband level

The total level measured over a specified frequency range.

broadside direction

Perpendicular to the travel direction of a source. Compare with endfire direction.

cetacean

Any animal in the order Cetacea. These are aquatic species and include whales, dolphins, and porpoises.

compressional wave

A mechanical vibration wave in which the direction of particle motion is parallel to the direction of propagation. Also called primary wave or P-wave.

conductivity-temperature-depth (CTD)

Measurement data of the ocean's conductivity, temperature, and depth; used to compute sound speed and salinity.

decade

Logarithmic frequency interval whose upper bound is ten times larger than its lower bound (ISO 80000-3:2006).

decidecade

One tenth of a decade. *Note*: An alternative name for decidecade (symbol ddec) is "one-tenth decade". A decidecade is approximately equal to one third of an octave (1 ddec ≈ 0.3322 oct) and for this reason is sometimes referred to as a "one-third octave".

decidecade band

Frequency band whose bandwidth is one decidecade. *Note*: The bandwidth of a decidecade band increases with increasing centre frequency.

decibel (dB)

Unit of level used to express the ratio of one value of a power quantity to another on a logarithmic scale. Unit: dB.

duty cycle

The time when sound is periodically recorded by an acoustic recording system.

endfire direction

Parallel to the travel direction of a source. Also see **broadside direction**.

energy source level

A property of a sound source obtained by adding to the sound exposure level measured in the far field the propagation loss from the acoustic centre of the source to the receiver position. Unit: decibel (dB). Reference value: 1 μPa^2m^2s.

energy spectral density source level

A property of a sound source obtained by adding to the energy spectral density level of the sound pressure measured in the far field the propagation loss from the acoustic centre of the source to the receiver position. Unit: decibel (dB). Reference value: 1 $\mu Pa^2m^2s/Hz$.

ensonified

Exposed to sound.

far field

The zone where, to an observer, sound originating from an array of sources (or a spatially distributed source) appears to radiate from a single point.

Fourier transform (or Fourier synthesis)

A mathematical technique which, although it has varied applications, is referenced in the context of this report as a method used in the process of deriving a spectrum estimate from time-series data (or the reverse process, termed the inverse Fourier transform). A computationally efficient numerical algorithm for computing the Fourier transform is known as fast Fourier transform (FFT).

flat weighting

Term indicating that no frequency weighting function is applied. Synonymous with unweighted.

frequency

The rate of oscillation of a periodic function measured in cycles-per-unit-time. The reciprocal of the period. Unit: hertz (Hz). Symbol: *f*. 1 Hz is equal to 1 cycle per second.

frequency weighting

The process of applying a frequency weighting function.

frequency-weighting function

The squared magnitude of the sound pressure transfer function. For sound of a given frequency, the frequency weighting function is the ratio of output power to input power of a specified filter, sometimes expressed in decibels. Examples include the following:

- *Auditory frequency weighting function*: compensatory frequency weighting function accounting for a species' (or functional hearing group's) frequency-specific hearing sensitivity.
- *System frequency weighting function*: frequency weighting function describing the sensitivity of an acoustic acquisition system, typically consisting of a hydrophone, one or more amplifiers, and an analogue to digital converter.

geoacoustic

Relating to the acoustic properties of the seabed.

harmonic

A sinusoidal sound component that has a frequency that is an integer multiple of the frequency of a sound to which it is related. For example, the second harmonic of a sound has a frequency that is double the fundamental frequency of the sound.

hearing group

Category of animal species when classified according to their hearing sensitivity and to the susceptibility to sound. Examples for marine mammals include very low-frequency (VLF) cetaceans, low-frequency (LF) cetaceans, mid-frequency (MF) cetaceans, high-frequency (HF) cetaceans, very high-frequency (VHF) cetaceans, otariid pinnipeds in water (OPW), phocid pinnipeds in water (PPW), sirenians (SI), other marine carnivores in air (OCA), and other marine carnivores in water (OCW) (NMFS 2018, Southall et al. 2019). See **auditory frequency weighting functions**, which are often applied to these groups. Examples for fish include species for which the swim bladder is involved in hearing, species for which the swim bladder is not involved in hearing, and species without a swim bladder (Popper et al. 2014).

hearing threshold

The sound pressure level for any frequency of the hearing group that is barely audible for a given individual for specified background noise during a specific percentage of experimental trials.

hertz (Hz)

A unit of frequency defined as one cycle per second.

high-frequency (HF) cetacean

See **hearing group**.

intermittent sound

A sound whose level abruptly drops below the background noise level several times during an observation period.

impulsive sound

Qualitative term meaning sounds that are typically transient, brief (less than 1 second), broadband, with rapid rise time and rapid decay. They can occur in repetition or as a single event. Examples of impulsive sound sources include explosives, seismic airguns, and impact pile drivers.

isopleth

A line drawn on a map through all points having the same value of some quantity.

knot

One nautical mile per hour. Symbol: kn.

level

A measure of a quantity expressed as the logarithm of the ratio of the quantity to a specified reference value of that quantity. Examples include sound pressure level, sound exposure level, and peak sound pressure level. For example, a value of sound exposure level with reference to 1 μPa^2 s can be written in the form *x* dB re 1 μPa^2 s.

low-frequency (LF) cetacean

See **hearing group**.

median

The 50th percentile of a statistical distribution.

mid-frequency (MF) cetacean

See **hearing group**.

M-weighting

See **auditory frequency weighting function** (as proposed by Southall et al. 2007).

mysticete

A suborder of cetaceans that use baleen plates to filter food from water. Members of this group include rorquals (Balaenopteridae), right whales (Balaenidae), and grey whales (*Eschrichtius robustus*).

non-impulsive sound

Sound that is not an impulsive sound. A non-impulsive sound is not necessarily a continuous sound.

octave

The interval between a sound and another sound with double or half the frequency. For example, one octave above 200 Hz is 400 Hz, and one octave below 200 Hz is 100 Hz.

otariid

A common term used to describe members of the Otariidae, eared seals, commonly called sea lions and fur seals. Otariids are adapted to a semi-aquatic life; they use their large fore flippers for propulsion. Their ears distinguish them from phocids. Otariids are one of the three main groups in the superfamily Pinnipedia; the other two groups are phocids and walrus.

otariid pinnipeds in water (OPW)

See **hearing group**.

other marine carnivores in air (OCA)

See **hearing group**.

other marine carnivores in water (OCW)

See **hearing group**.

parabolic equation method

A computationally efficient solution to the acoustic wave equation that is used to model propagation loss. The parabolic equation approximation omits effects of back-scattered sound, simplifying the computation of propagation loss. The effect of back-scattered sound is negligible for most ocean-acoustic propagation problems.

particle acceleration, particle displacement, particle motion, particle velocity

See sound particle acceleration, sound particle displacement, sound particle motion, and sound particle velocity.

peak sound pressure level (zero-to-peak sound pressure level)

The level ($L_{p,pk}$ or L_{pk}) of the squared maximum magnitude of the sound pressure (p_{pk}^2).
Unit: decibel (dB). Reference value (p_0^2) for sound in water: 1 μPa^2.

$$L_{p,\mathrm{pk}} := 10\log_{10}\left(p_{\mathrm{pk}}^2/p_0^2\right)\,\mathrm{dB} = 20\log_{10}\left(p_{\mathrm{pk}}/p_0\right)\,\mathrm{dB}$$

The frequency band and time window should be specified. Abbreviation: PK or L_{pk}.

peak-to-peak sound pressure

The difference between the maximum and minimum sound pressure over a specified frequency band and time window. Unit: pascal (Pa).

permanent threshold shift (PTS)

An irreversible loss of hearing sensitivity caused by excessive noise exposure. PTS is considered auditory injury.

phocid

A common term used to describe all members of the family Phocidae. These true/earless seals are more adapted to in-water life than are otariids, which have more terrestrial adaptations. Phocids use their hind flippers to propel themselves. Phocids are one of the three main groups in the superfamily Pinnipedia; the other two groups are otariids and walrus.

phocid pinnipeds in water (PPW)

See **hearing group**.

pinniped

A common term used to describe all three groups that form the superfamily Pinnipedia: phocids (true seals or earless seals), otariids (eared seals or fur seals and sea lions), and walrus.

point source

A source that radiates sound as if from a single point.

pressure, acoustic

The deviation from the ambient pressure caused by a sound wave. Also called sound pressure. Unit: pascal (Pa).

pressure, hydrostatic

The pressure at any given depth in a static liquid that is the result of the weight of the liquid acting on a unit area at that depth, plus any pressure acting on the surface of the liquid. Unit: pascal (Pa).

propagation loss (PL)

Difference between a source level (SL) and the level at a specified location, PL(x) = SL − L(x). Also see **transmission loss**.

received level

The level measured (or that would be measured) at a defined location. The type of level should be specified.

reference values

standard underwater references values used for calculating sound **levels**, e.g., the reference value for expressing sound pressure level in decibels is 1 µPa.

Quantity	Reference value
Sound pressure	1 µPa
Sound exposure	1 μPa^2 s
Sound particle displacement	1 pm
Sound particle velocity	1 nm/s
Sound particle acceleration	1 $\mu m/s^2$

rms

abbreviation for root-mean-square.

shear wave

A mechanical vibration wave in which the direction of particle motion is perpendicular to the direction of propagation. Also called a secondary wave or S-wave. Shear waves propagate only in solid media, such as sediments or rock. Shear waves in the seabed can be converted to compressional waves in water at the water-seabed interface.

sound

A time-varying disturbance in the pressure, stress, or material displacement of a medium propagated by local compression and expansion of the medium.

sound exposure

Time integral of squared sound pressure over a stated time interval. The time interval can be a specified time duration (e.g., 24 hours) or from start to end of a specified event (e.g., a pile strike, an airgun pulse, a construction operation). Unit: Pa^2 s.

sound exposure level

The level (L_E) of the sound exposure (E). Unit: decibel (dB). Reference value (E_0) for sound in water: 1 μPa^2 s.

$$L_E := 10 \log_{10}(E/E_0)\,\mathrm{dB} = 20 \log_{10}\left(E^{1/2}/E_0^{1/2}\right)\,\mathrm{dB}$$

The frequency band and integration time should be specified. Abbreviation: SEL.

sound exposure spectral density

Distribution as a function of frequency of the time-integrated squared sound pressure per unit bandwidth of a sound having a continuous spectrum. Unit: Pa^2 s/Hz.

sound field

Region containing sound waves.

sound intensity

Product of the sound pressure and the sound particle velocity. The magnitude of the sound intensity is the sound energy flowing through a unit area perpendicular to the direction of propagation per unit time.

sound particle acceleration

The rate of change of sound particle velocity. Unit: metre per second squared (m/s^2). Symbol: *a*.

sound particle motion

smallest volume of a medium that represents its mean physical properties.

sound particle displacement

Displacement of a material element caused by the action of sound, where a material element is the smallest element of the medium that represents the medium's mean density.

sound particle velocity

The velocity of a particle in a material moving back and forth in the direction of the pressure wave. Unit: metre per second (m/s). Symbol: *v*.

sound pressure

The contribution to total pressure caused by the action of sound.

sound pressure level (rms sound pressure level)

The level ($L_{p,\mathrm{rms}}$) of the time-mean-square sound pressure (p^2_{rms}). Unit: decibel (dB). Reference value (p_0^2) for sound in water: 1 μPa^2.

$$L_{p,\mathrm{rms}} := 10\log_{10}(p^2_{\mathrm{rms}}/p_0^2)\ \mathrm{dB} = 20\log_{10}(p_{\mathrm{rms}}/p_0)\ \mathrm{dB}$$

The frequency band and averaging time should be specified. Abbreviation: SPL or Lrms.

sound speed profile

The speed of sound in the water column as a function of depth below the water surface.

soundscape

The characterization of the ambient sound in terms of its spatial, temporal, and frequency attributes, and the types of sources contributing to the sound field.

source level (SL)

A property of a sound source obtained by adding to the sound pressure level measured in the far field the propagation loss from the acoustic centre of the source to the receiver position. Unit: decibel (dB). Reference value: 1 μPa^{2}m^2.

spectrum

An acoustic signal represented in terms of its power, energy, mean-square sound pressure, or sound exposure distribution with frequency.

surface duct

The upper portion of a water column within which the sound speed profile gradient causes sound to refract upward and therefore reflect off the surface resulting in relatively long-range sound propagation with little loss.

temporary threshold shift (TTS)

Reversible loss of hearing sensitivity. TTS can be caused by noise exposure.

thermocline

The depth interval near the ocean surface that experiences temperature gradients due to warming or cooling by heat conduction from the atmosphere and by warming from solar heating.

transmission loss (TL)

The difference between a specified level at one location and that at a different location, TL(x1,x2) = L(x1) − L(x2). Also see **propagation loss**.

unweighted

Term indicating that no frequency weighting function is applied. Synonymous with flat weighting.

very high-frequency (VHF) cetacean

See **hearing group**.

very low-frequency (VLF) cetacean

See **hearing group**.

wavelength

Distance over which a wave completes one cycle of oscillation. Unit: metre (m). Symbol: λ.

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Appendix A. Acoustic Metrics

A.1. Pressure Related Acoustic Metrics

Underwater sound pressure amplitude is measured in decibels (dB) relative to a fixed reference pressure of p_0 = 1 µPa. Because the perceived loudness of sound, especially pulsed sound such as from seismic airguns, pile driving, and sonar, is not generally proportional to the instantaneous acoustic pressure, several sound level metrics are commonly used to evaluate sound and its effects on marine life. Here we provide specific definitions of relevant metrics used in the accompanying report. Where possible, we follow the American National Standard Institute and International Organization for Standardization definitions and symbols for sound metrics (e.g., ISO 2017, ANSI R2013), but these standards are not always consistent.

The zero-to-peak sound pressure, or peak sound pressure (PK or $L_{p,pk}$; dB re 1 µPa), is the decibel level of the maximum instantaneous acoustic pressure in a stated frequency band attained by an acoustic pressure signal, $p(t)$:

$$L_{p,\mathrm{pk}} = 10\log_{10}\frac{\max|p^2(t)|}{p_0^2} = 20\log_{10}\frac{\max|p(t)|}{p_0} \tag{A-1}$$

PK is often included as a criterion for assessing whether a sound is potentially injurious; however, because it does not account for the duration of an acoustic event, it is generally a poor indicator of perceived loudness.

The peak-to-peak sound pressure (PK-PK or $L_{p,pk\text{-}pk}$; dB re 1 µPa) is the difference between the maximum and minimum instantaneous sound pressure, possibly filtered in a stated frequency band, attained by an impulsive sound, $p(t)$:

$$L_{p,\mathrm{pk\text{-}pk}} = 10\log_{10}\frac{[\max(p(t)) - \min(p(t))]^2}{p_0^2} \tag{A-2}$$

The sound pressure level (SPL or L_p; dB re 1 µPa^2) is the root-mean-square (rms) pressure level in a stated frequency band over a specified time window (T; s). It is important to note that SPL always refers to an rms pressure level and therefore not instantaneous pressure:

$$L_p = 10\log_{10}\left(\frac{1}{T}\int_T g(t)\,p^2(t)\,dt \Big/ p_0^2\right) \tag{A-3}$$

where $g(t)$ is an optional time weighting function. In many cases, the start time of the integration is marched forward in small time steps to produce a time-varying SPL function. For short acoustic events, such as sonar pulses and marine mammal vocalizations, it is important to choose an appropriate time window that matches the duration of the signal. For in-air studies, when evaluating the perceived loudness of sounds with rapid amplitude variations in time, the time weighting function $g(t)$ is often set to a decaying exponential function that emphasizes more recent pressure signals. This function mimics the leaky integration nature of mammalian hearing. For example, human-based fast time-weighted SPL ($L_{p,fast}$) applies an exponential function with time constant 125 ms. A related simpler approach used in underwater acoustics sets $g(t)$ to a boxcar (unity amplitude) function of width 125 ms; the results can be referred to as $L_{p,boxcar\ 125ms}$. Another approach, historically used to evaluate SPL of impulsive signals underwater, defines $g(t)$ as a boxcar function with edges set to the times corresponding to 5% and 95% of the cumulative square pressure function encompassing the duration of an impulsive acoustic event. This calculation is applied individually to each impulse signal, and the results are referred to as 90% SPL ($L_{p,90\%}$).

The sound exposure level (SEL or L_E; dB re 1 µPa²·s) is the time-integral of the squared acoustic pressure over a duration (T):

$$L_E = 10 \log_{10} \left(\int_T p^2(t)\, dt \Big/ T_0 p_0^2 \right) \quad \text{(A-4)}$$

where T_0 is a reference time interval of 1 s. SEL continues to increase with time when non-zero pressure signals are present. It is a dose-type measurement, so the integration time applied must be carefully considered for its relevance to impact to the exposed recipients.

SEL can be calculated over a fixed duration, such as the time of a single event or a period with multiple acoustic events. When applied to pulsed sounds, SEL can be calculated by summing the SEL of the N individual pulses. For a fixed duration, the square pressure is integrated over the duration of interest. For multiple events, the SEL can be computed by summing (in linear units) the SEL of the N individual events:

$$L_{E,N} = 10 \log_{10} \sum_{i=1}^{N} 10^{\frac{L_{E,i}}{10}} \quad \text{(A-5)}$$

If applied, the frequency weighting of an acoustic event should be specified, as in the case of weighted SEL (e.g., $L_{E,LF,24h}$; see Appendix A.5) or auditory-weighted SPL ($L_{p,ht}$). The use of fast, slow, or impulse exponential-time-averaging or other time-related characteristics should also be specified.

A.2. Particle Acceleration and Velocity Metrics

Since sound is a mechanical wave, it can also be measured in terms of the vibratory motion of fluid particles. Particle motion can be measured in terms of three different (but related) quantities: displacement, velocity, or acceleration. Acoustic particle velocity is the time derivative of particle displacement, and likewise acceleration is the time derivative of velocity. For the present study, acoustic particle motion has been reported in terms of acceleration and velocity.

The particle velocity (v) is the physical speed of a particle in a material moving back and forth in the direction of the pressure wave. It can be derived from the pressure gradient and Euler's linearised momentum equation where ρ_0 is the density of the medium:

$$v = -\int \nabla p(t) dt / \rho_0 \quad \text{(A-6)}$$

The particle acceleration (a) is the rate of change of the velocity with respect to time, and it can be obtained from equation A-6 as:

$$a = \frac{dv}{dt} = -\frac{\nabla p(t)}{\rho_0} \quad \text{(A-7)}$$

Unlike sound pressure, particle motion is a vector quantity, meaning that it has both magnitude and direction: at any given point in space, acoustic particle motion has three different time-varying components (x, y, and z). Given the particle velocity in the x, y, and z, directions, v_x, v_y, and v_z, the particle velocity magnitude $|v|$ is computed per the Pythagorean equation:

$$|v| = \sqrt{v_x + v_y + v_z} \quad \text{(A-8)}$$

The magnitude of particle acceleration is calculated similarly from the particle acceleration in the *x*, *y*, and *z* directions.

A.3. Decidecade Band Analysis

The distribution of a sound's power with frequency is described by the sound's spectrum. The sound spectrum can be split into a series of adjacent frequency bands. Splitting a spectrum into 1 Hz wide bands, called passbands, yields the power spectral density of the sound. This splitting of the spectrum into passbands of a constant width of 1 Hz, however, does not represent how animals perceive sound.

Because animals perceive exponential increases in frequency rather than linear increases, analysing a sound spectrum with passbands that increase exponentially in size better approximates real-world scenarios. In underwater acoustics, a spectrum is commonly split into decidecade bands, which are one tenth of a decade wide. They are approximately one third of an octave (base 2) wide and are therefore often referred to as 1/3-octave-bands. Each octave represents a doubling in sound frequency. The centre frequency of the ith band, $f_c(i)$, is defined as:

$$f_c(i) = 10^{\frac{i}{10}} \text{ kHz} \tag{A-9}$$

and the low (f_{lo}) and high (f_{hi}) frequency limits of the ith decade band are defined as:

$$f_{lo,i} = 10^{\frac{-1}{20}} f_c(i) \quad \text{and} \quad f_{hi,i} = 10^{\frac{1}{20}} f_c(i) \tag{A-10}$$

The decidecade bands become wider with increasing frequency, and on a logarithmic scale the bands appear equally spaced (Figure A-1). The acoustic modelling spans from band 7 (f_c (7) = 5 Hz) to band 44 ($f_c(44)$ = 25 kHz).

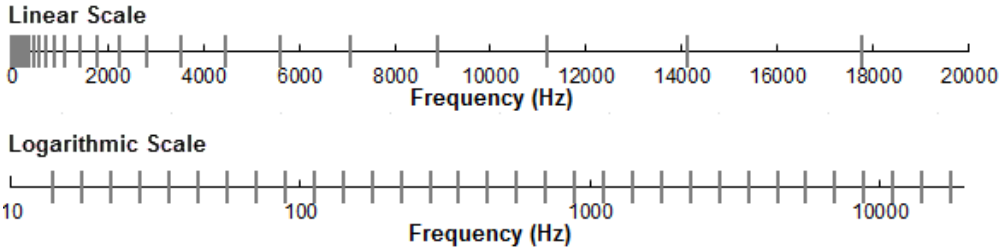

Figure A-1. Decidecade frequency bands (vertical lines) shown on a linear frequency scale and a logarithmic scale.

The sound pressure level in the ith band ($L_{p,i}$) is computed from the spectrum $S(f)$ between $f_{lo,i}$ and $f_{hi,i}$:

$$L_{p,i} = 10 \log_{10} \int_{f_{lo,i}}^{f_{hi,i}} S(f)\, df \tag{A-11}$$

Summing the sound pressure level of all the bands yields the broadband sound pressure level:

$$\text{Broadband SPL} = 10 \log_{10} \sum_{i} 10^{\frac{L_{p,i}}{10}} \tag{A-12}$$

Figure A-2 shows an example of how the decidecade band sound pressure levels compare to the sound pressure spectral density levels of an ambient noise signal. Because the decidecade bands are wider with increasing frequency, the decidecade band SPL is higher than the spectral levels at higher frequencies. Acoustic modelling of decidecade bands requires less computation time than 1 Hz bands and still resolves the frequency-dependence of the sound source and the propagation environment.

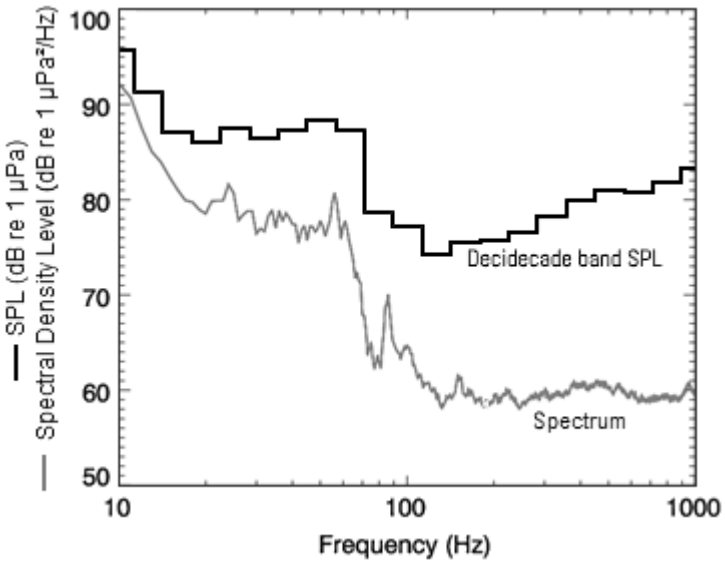

Figure A-2. Sound pressure spectral density levels and the corresponding decidecade band sound pressure levels of example ambient noise shown on a logarithmic frequency scale.

A.4. Marine Mammal Impact Criteria

It has been long recognised that marine mammals can be adversely affected by underwater anthropogenic noise. For example, Payne and Webb (1971) suggested that communication distances of fin whales are reduced by shipping sounds. Subsequently, similar concerns arose regarding effects of other underwater noise sources and the possibility that impulsive sources—primarily airguns used in seismic surveys—could cause auditory injury. This led to a series of workshops held in the late 1990s, conducted to address acoustic mitigation requirements for seismic surveys and other underwater noise sources (NMFS 1998, ONR 1998, Nedwell and Turnpenny 1998, HESS 1999, Ellison and Stein 1999). In the years since these early workshops, a variety of thresholds have been proposed for both injury and disturbance. The following sections summarize the recent development of thresholds; however, this field remains an active research topic.

A.4.1. Injury

In recognition of shortcomings of the SPL-only based injury criteria, in 2005 NMFS sponsored the Noise Criteria Group to review literature on marine mammal hearing to propose new noise exposure criteria. Some members of this expert group published a landmark paper (Southall et al. 2007) that suggested assessment methods similar to those applied for humans. The resulting recommendations introduced dual acoustic injury criteria for impulsive sounds that included peak pressure level thresholds and SEL_{24h} thresholds, where the subscripted 24h refers to the accumulation period for calculating SEL. The peak pressure level criterion is not frequency weighted whereas the SEL_{24h} is frequency weighted according to one of four marine mammal species hearing groups: low-, mid- and high-frequency cetaceans (LF, MF, and HF cetaceans, respectively) and Pinnipeds in Water (PINN). These weighting functions are referred to as M-weighting filters (analogous to the A-weighting filter for human; Appendix A.5). The SEL_{24h} thresholds were obtained by extrapolating measurements of onset levels of Temporary Threshold Shift (TTS) in belugas by the amount of TTS required to produce Permanent Threshold Shift (PTS) in chinchillas. The Southall et al. (2007) recommendations do not specify an exchange rate, which suggests that the thresholds are the same regardless of the duration of exposure (i.e., it implies a 3 dB exchange rate).

Wood et al. (2012) refined Southall et al.'s (2007) thresholds, suggesting lower injury values for LF and HF cetaceans while retaining the filter shapes. Their revised thresholds were based on TTS-onset levels in harbour porpoises from Lucke et al. (2009), which led to a revised impulsive sound PTS threshold for HF cetaceans of 179 dB re 1 $\mu Pa^2 \cdot s$. Because there were no data available for baleen whales, Wood et al. (2012) based their recommendations for LF cetaceans on results obtained from MF cetacean studies. In particular they referenced Finneran and Schlundt (2010) research, which found mid-frequency cetaceans are more sensitive to non-impulsive sound exposure than Southall et al. (2007) assumed. Wood et al. (2012) thus recommended a more conservative TTS-onset level for LF cetaceans of 192 dB re 1 $\mu Pa^2 \cdot s$.

As of present, an optimal approach is not apparent. There is consensus in the research community that an SEL-based method is preferable either separately or in addition to an SPL-based approach to assess the potential for injuries. In August 2016, after substantial public and expert input into three draft versions and based largely on the above-mentioned literature (NOAA 2013, 2015, 2016), NMFS finalised technical guidance for assessing the effect of anthropogenic sound on marine mammal hearing (NMFS 2016). The guidance describes injury criteria with new thresholds and frequency weighting functions for the five hearing groups described by Finneran and Jenkins (2012). The latest revision to this work was published in 2018; with the criteria defined in NMFS (2018). The latest criteria are from Southall et al. (2019) which is applied in this report.

A.4.2. Behavioural Response

Numerous studies on marine mammal behavioural responses to sound exposure have not resulted in consensus in the scientific community regarding the appropriate metric for assessing behavioural reactions. However, it is recognised that the context in which the sound is received affects the nature and extent of responses to a stimulus (Southall et al. 2007, Ellison and Frankel 2012, Southall et al. 2016).

For impulsive noise, NMFS currently uses step function thresholds of 160 dB re 1 μPa^2 SPL (unweighted) to assess and regulate noise-induced behavioural impacts for marine mammals (NOAA 2018, NOAA 2019). The threshold for impulsive sound is derived from the High-Energy Seismic Survey (HESS) panel (HESS 1999) report that, in turn, is based on the responses of migrating mysticete whales to airgun sounds (Malme et al. 1984). The HESS team recognised that behavioural responses to sound may occur at lower levels, but significant responses were only likely to occur above a SPL of 140 dB re 1 μPa^2. Southall et al. (2007) found varying responses for most marine mammals between a SPL of 140 and 180 dB re 1 μPa^2, consistent with the HESS (1999) report, but lack of convergence in the data prevented them from suggesting explicit step functions.

A.5. Marine Mammal Frequency Weighting

The potential for noise to affect animals depends on how well the animals can hear it. Noises are less likely to disturb or injure an animal if they are at frequencies that the animal cannot hear well. An exception occurs when the sound pressure is so high that it can physically injure an animal by non-auditory means (i.e., barotrauma). For sound levels below such extremes, the importance of sound components at particular frequencies can be scaled by frequency weighting relevant to an animal's sensitivity to those frequencies (Nedwell and Turnpenny 1998, Nedwell et al. 2007).

A.5.1. Marine Mammal Frequency Weighting Functions

In 2015, a US Navy technical report by Finneran (2015) recommended new auditory weighting functions. The overall shape of the auditory weighting functions is similar to human A-weighting functions, which follows the sensitivity of the human ear at low sound levels. The new frequency-weighting function is expressed as:

$$G(f) = K + 10\log_{10}\left[\left(\frac{(f/f_{lo})^{2a}}{\left[1+(f/f_{lo})^{2}\right]^{a}\left[1+(f/f_{hi})^{2}\right]^{b}}\right)\right] \quad \text{(A-13)}$$

Finneran (2015) proposed five functional hearing groups for marine mammals in water: low-, mid- and high-frequency cetaceans (LF, MF, and HF cetaceans, respectively), phocid pinnipeds, and otariid pinnipeds. The parameters for these frequency-weighting functions were further modified the following year (Finneran 2016) and were adopted in NOAA's technical guidance that assesses acoustic impacts on marine mammals (NMFS 2018), and in the latest guidance by Southall (2019). The updates did not affect the content related to either the definitions of frequency-weighting functions or the threshold values. Table A-1 lists the frequency-weighting parameters for each hearing group. Figure A-3 shows the resulting frequency-weighting curves.

Table A-1. Parameters for the auditory weighting functions used in this project as recommended by Southall et al. (2019).

Hearing group	a	b	f_{lo} (Hz)	f_{hi} (kHz)	K (dB)
Low-frequency cetaceans (baleen whales)	1.0	2	200	19,000	0.13
High-frequency cetaceans (dolphins, plus toothed, beaked, and bottlenose whales)	1.6	2	8,800	110,000	1.20
Very-high-frequency cetaceans (true porpoises, *Kogia*, river dolphins, cephalorhynchid, *Lagenorhynchus cruciger* and *L. australis*)	1.8	2	12,000	140,000	1.36
Other marine carnivores in water (Australian sea lion, Australian fur seal, New Zealand fur seal, Penguins)	2.0	2	940	25,000	0.64

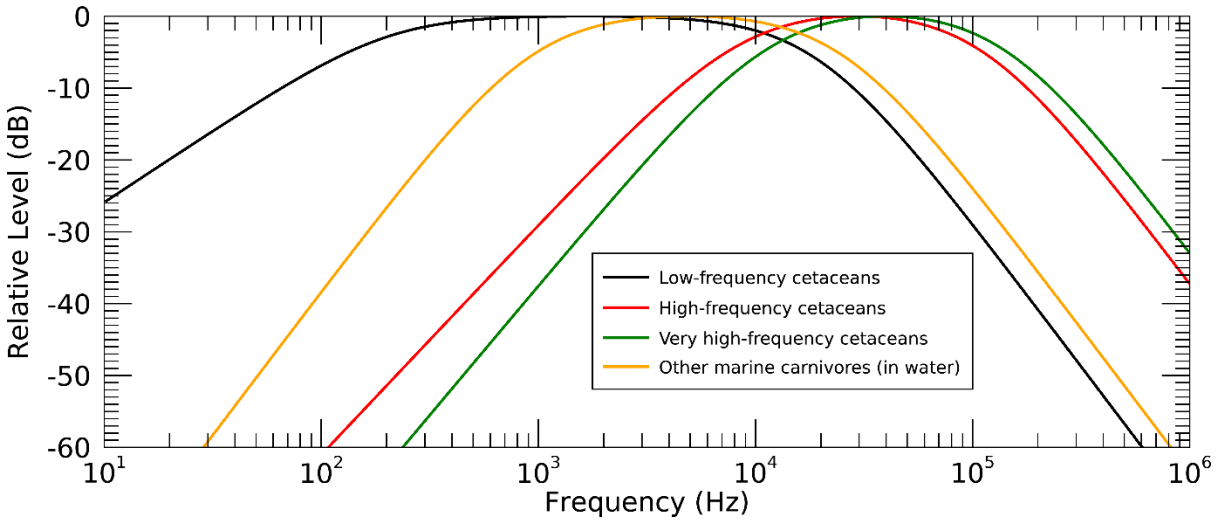

Figure A-3. Auditory weighting functions for functional marine mammal hearing groups used in this project as recommended by Southall et al. (2019).

Appendix B. Acoustic Source Model

B.1. Airgun Array Source Model

The source levels and directivity of the seismic source were predicted with JASCO's Airgun Array Source Model (AASM). AASM includes low- and high-frequency modules for predicting different components of the seismic source spectrum. The low-frequency module is based on the physics of oscillation and radiation of airgun bubbles, as originally described by Ziolkowski (1970), that solves the set of parallel differential equations that govern bubble oscillations. Physical effects accounted for in the simulation include pressure interactions between airguns, port throttling, bubble damping, and generator-injector (GI) gun behaviour discussed by Dragoset (1984), Laws et al. (1990), and Landrø (1992). A global optimisation algorithm tunes free parameters in the model to a large library of airgun source signatures.

While airgun signatures are highly repeatable at the low frequencies, which are used for seismic imaging, their sound emissions have a large random component at higher frequencies that cannot be predicted using a deterministic model. Therefore, AASM uses a stochastic simulation to predict the high-frequency (800−25,000 Hz) sound emissions of individual airguns, using a data-driven multiple-regression model. The multiple-regression model is based on a statistical analysis of a large collection of high quality seismic source signature data recently obtained from the Joint Industry Program (JIP) on Sound and Marine Life (Mattsson and Jenkerson 2008). The stochastic model uses a Monte-Carlo simulation to simulate the random component of the high-frequency spectrum of each airgun in an array. The mean high-frequency spectra from the stochastic model augment the low-frequency signatures from the physical model, allowing AASM to predict airgun source levels at frequencies up to 25,000 Hz.

AASM produces a set of "notional" signatures for each array element based on:

- Array layout
- Volume, tow depth, and firing pressure of each airgun
- Interactions between different airguns in the array

These notional signatures are the pressure waveforms of the individual airguns at a standard reference distance of 1 m; they account for the interactions with the other airguns in the array. The signatures are summed with the appropriate phase delays to obtain the far-field source signature of the entire array in all directions. This far-field array signature is filtered into decidecade-bands to compute the source levels of the array as a function of frequency band and azimuthal angle in the horizontal plane (at the source depth), after which it is considered a directional point source in the far field.

A seismic array consists of many sources and the point source assumption is invalid in the near field where the array elements add incoherently. The maximum extent of the near field of an array (R_{nf}) is:

$$R_{\mathrm{nf}} < \frac{l^2}{4\lambda} \tag{B-1}$$

where λ is the sound wavelength and l is the longest dimension of the array (Lurton 2002, §5.2.4). For example, a seismic source length of l = 21 m yields a near-field range of 147 m at 2 kHz and 7 m at 100 Hz. Beyond this R_{nf} range, the array is assumed to radiate like a directional point source and is treated as such for propagation modelling.

The interactions between individual elements of the array create directionality in the overall acoustic emission. Generally, this directionality is prominent mainly at frequencies in the mid-range between

tens of hertz to several hundred hertz. At lower frequencies, with acoustic wavelengths much larger than the inter-airgun separation distances, the directionality is small. At higher frequencies, the pattern of lobes is too finely spaced to be resolved and the effective directivity is less.

B.2. Seismic Source

The layout of the 2820 in^3 seismic sources used for modelling in this study is provided in Figure B-1. Details of the airgun parameters are provided in Table B-1.

For the modelled array, the layout is presented in a nominal cartesian coordinate system. In this coordinate system the direction of vessel travel determines the relative position of the array elements as plotted and tabulated. The layout used for acoustic modelling was produced by transforming the coordinates of client supplied layouts such that the resultant layouts correspond to a vessel travel direction along the positive X-axis and the array is centred on the X-Y origin. When used with an acoustic model the positive X-axis in this nominal coordinate system aligns with the vessel tow direction or survey line azimuth.

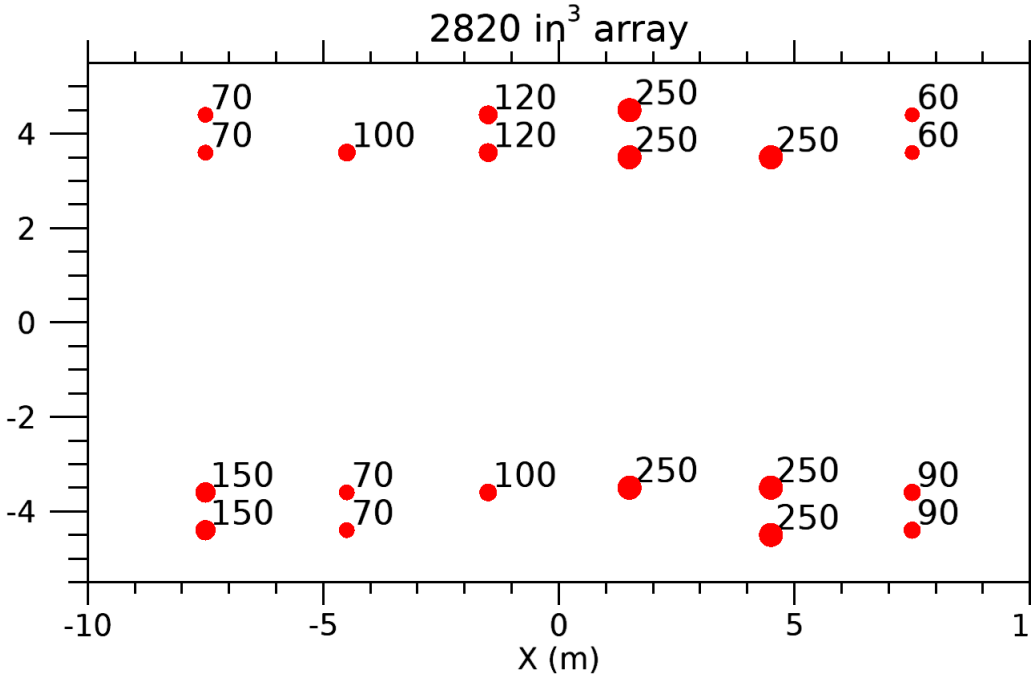

Figure B-1. Layout of the modelled 2820 in^3 seismic source where the plotted layout is such that the array is centred on the origin and vessel travel direction is in the positive x-direction. Tow depth was 7 m. The labels indicate the firing volume (in cubic inches) for each airgun. Also see Table B-1.

Table B-1. Layout of the modelled 2820 in^3 seismic source. Tow depth was 7 m. Firing pressure for all guns was 2000 psi. Greyed out values indicate spares. Also see Figure B-1.

String	Gun	*x* (m)	*y* (m)	*z* (m)	Vol (in^3)	String	Gun	*x* (m)	*y* (m)	*z* (m)	Vol (in^3)
1	1	7.5	-4.4	7	90	2	13	7.5	3.6	7	60
	2	7.5	-3.6	7	90		14	7.5	4.4	7	60
	3	4.5	-4.5	7	250		15	4.5	3.5	7	250
	4	4.5	-3.5	7	250		16	4.5	4.5	7	220
	5	1.5	-4.5	7	250		17	1.5	3.5	7	250
	6	1.5	-3.5	7	250		18	1.5	4.5	7	250
	7	-1.5	-4.4	7	100		19	-1.5	3.6	7	120
	8	-1.5	-3.6	7	100		20	-1.5	4.4	7	120
	9	-4.5	-4.4	7	70		21	-4.5	3.6	7	100
	10	-4.5	-3.6	7	70		22	-4.5	4.4	7	100
	11	-7.5	-4.4	7	150		23	-7.5	3.6	7	70
	12	-7.5	-3.6	7	150		24	-7.5	4.4	7	70

B.3. Array Source Levels and Directivity

Figure B-2 shows the broadside (perpendicular to the tow direction), endfire (parallel to the tow direction) and vertical overpressure signature and corresponding power spectrum levels for the 2820 in^3 seismic source (Appendix B.2). Horizontal decidecade-band source levels are shown as a function of band centre frequency and azimuth in Figure B-3.

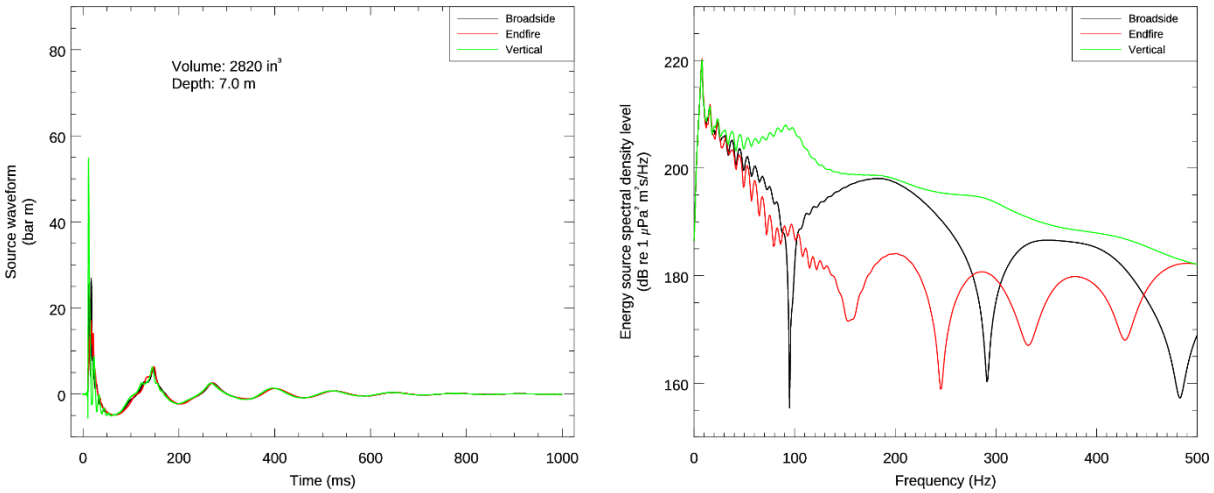

Figure B-2. Predicted source level details for the 2820 in^3 seismic source with a 7 m tow depth. (Left) the overpressure signature and (right) the power spectrum for in-plane horizontal (broadside), perpendicular (endfire), and vertical directions (no surface ghost).

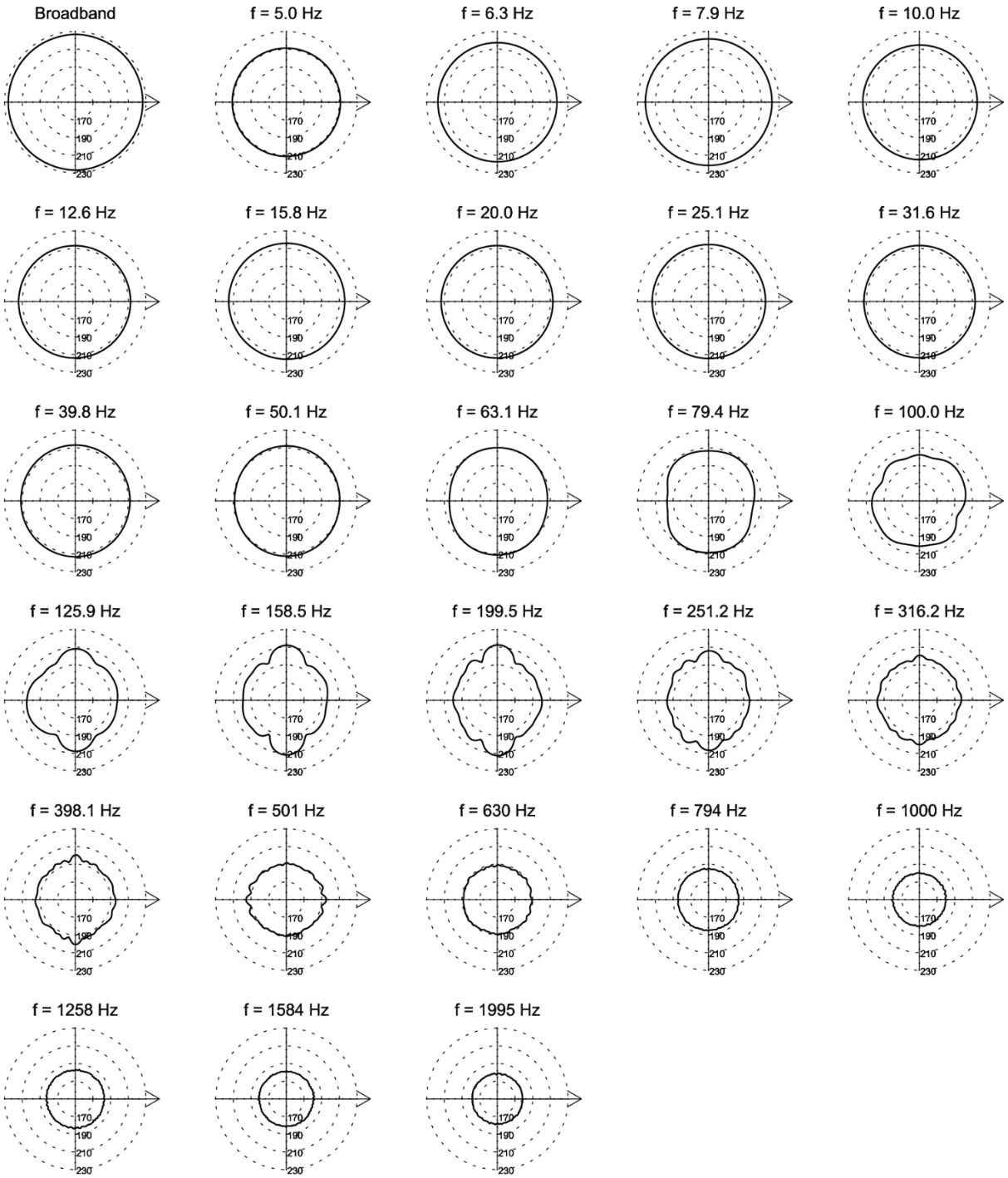

Figure B-3. Directionality of the predicted horizontal source levels for the 2820 in^3 seismic source, 5 Hz to 2 kHz. Source levels (in dB re 1 $\mu Pa^2 \cdot s\ m^2$) are shown as a function of azimuth for the centre frequencies of the decidecade bands modelled; frequencies are shown above the plots. The perpendicular direction to the frame is to the right. Tow depth was 7 m (see Table B-1).

Appendix C. Sound Propagation Models

C.1. MONM-BELLHOP

Long-range sound fields were computed using JASCO's Marine Operations Noise Model (MONM). Compared to VSTACK, MONM less accurately predicts steep-angle propagation for environments with higher shear speed but is well suited for effective longer-range estimation. This model computes sound propagation at frequencies of 5 Hz to 1 kHz via a wide-angle parabolic equation solution to the acoustic wave equation (Collins 1993) based on a version of the US Naval Research Laboratory's Range-dependent Acoustic Model (RAM), which has been modified to account for a solid seabed (Zhang and Tindle 1995). MONM computes sound propagation at frequencies >1 kHz via the BELLHOP Gaussian beam acoustic ray-trace model (Porter and Liu 1994).

The parabolic equation method has been extensively benchmarked and is widely employed in the underwater acoustics community (Collins et al. 1996). MONM accounts for the additional reflection loss at the seabed, which results from partial conversion of incident compressional waves to shear waves at the seabed and sub-bottom interfaces, and it includes wave attenuations in all layers. MONM incorporates the following site-specific environmental properties: a bathymetric grid of the modelled area, underwater sound speed as a function of depth, and a geoacoustic profile based on the overall stratified composition of the seafloor.

This version of MONM accounts for sound attenuation due to energy absorption through ion relaxation and viscosity of water in addition to acoustic attenuation due to reflection at the medium boundaries and internal layers (Fisher and Simmons 1977). The former type of sound attenuation is significant for frequencies higher than 5 kHz and cannot be neglected without noticeably affecting the model results.

MONM computes acoustic fields in three dimensions by modelling transmission loss within two-dimensional (2-D) vertical planes aligned along radials covering a 360° swath from the source, an approach commonly referred to as N×2-D. These vertical radial planes are separated by an angular step size of $\Delta\theta$, yielding N = 360°/$\Delta\theta$ number of planes (Figure C-1).

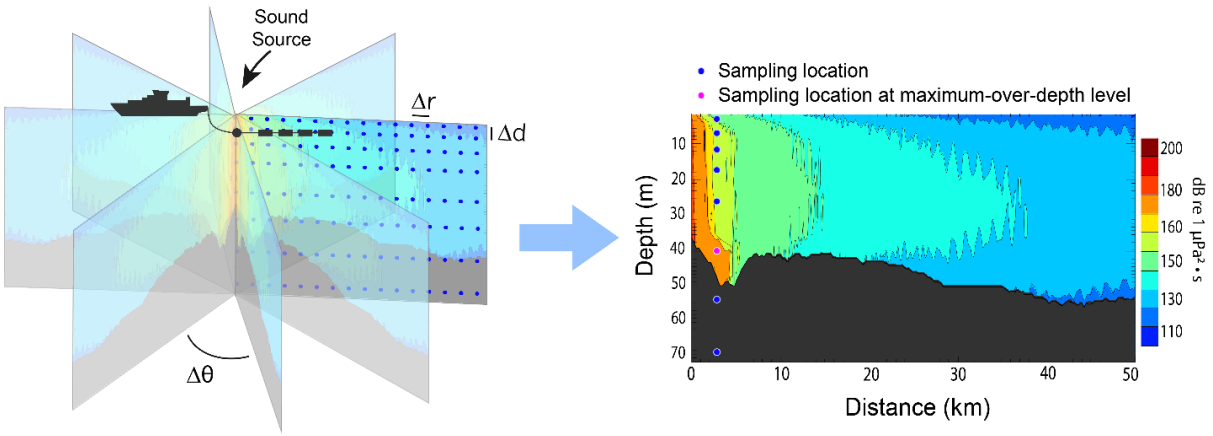

Figure C-1. The N×2-D and maximum-over-depth modelling approach used by MONM.

MONM treats frequency dependence by computing acoustic transmission loss at the centre frequencies of decidecade bands. Sufficiently many decidecade bands, starting at 5 Hz, are modelled to include most of the acoustic energy emitted by the source. At each centre frequency, the transmission loss is modelled within each of the N vertical planes as a function of depth and range from the source. The decidecade band received per-pulse SEL are computed by subtracting the band transmission loss values from the directional source level in that frequency band. Composite

broadband received per-pulse SEL are then computed by summing the received decidecade band levels.

The received per-pulse SEL sound field within each vertical radial plane is sampled at various ranges from the source, generally with a fixed radial step size. At each sampling range along the surface, the sound field is sampled at various depths, with the step size between samples increasing with depth below the surface. The step sizes are chosen to provide increased coverage near the depth of the source and at depths of interest in terms of the sound speed profile. The maximum received per-pulse SEL at many sampling depths are taken over all samples within the water column, i.e., the maximum-over-depth received per-pulse SEL. These maximum-over-depth per-pulse SEL are presented as contours around the source.

C.2. Full Waveform Range-dependent Acoustic Model: FWRAM

For impulsive sounds from the seismic source, time-domain representations of the pressure waves generated in the water are required to calculate SPL and PK. Furthermore, the seismic source must be represented as a distributed source to accurately characterise vertical directivity effects in the near-field zone. For this study, synthetic pressure waveforms were computed using FWRAM, which is a time-domain acoustic model based on the same wide-angle parabolic equation (PE) algorithm as MONM. FWRAM computes synthetic pressure waveforms versus range and depth for range-varying marine acoustic environments, and it takes the same environmental inputs as MONM (bathymetry, water sound speed profile, and seafloor geoacoustic profile). Unlike MONM, FWRAM computes pressure waveforms via Fourier synthesis of the modelled acoustic transfer function in closely spaced frequency bands. FWRAM employs the array starter method to accurately model sound propagation from a spatially distributed source (MacGillivray and Chapman 2012).

Besides providing direct calculations of the PK and SPL, the synthetic waveforms from FWRAM can also be used to convert the SEL values from MONM to SPL.

C.3. Wavenumber Integration Model

Sound pressure levels near the seismic source were modelled using JASCO's VSTACK wavenumber integration model. VSTACK computes synthetic pressure waveforms versus depth and range for arbitrarily layered, range-independent acoustic environments using the wavenumber integration approach to solve the exact (range-independent) acoustic wave equation. This model is valid over the full angular range of the wave equation and can fully account for the elasto-acoustic properties of the sub-bottom. Wavenumber integration methods are extensively used in the field of underwater acoustics and seismology where they are often referred to as reflectivity methods or discrete wavenumber methods. VSTACK computes sound propagation in arbitrarily stratified water and seabed layers by decomposing the outgoing field into a continuum of outward-propagating plane cylindrical waves. Seabed reflectivity in the model is dependent on the seabed layer properties: compressional and shear wave speeds, attenuation coefficients, and layer densities. The output of the model can be post-processed to yield estimates of the SEL, SPL, and PK.

VSTACK accurately predicts steep-angle propagation in the proximity of the source, but it is computationally slow at predicting sound pressures at large distances due to the need for smaller wavenumber steps with increasing distance. Additionally, VSTACK assumes range-invariant bathymetry with a horizontally stratified medium (i.e., a range-independent environment) which is azimuthally symmetric about the source. VSTACK is thus best suited to modelling the sound field near the source.

C.3.1. Particle Motion

VSTACK was also used to compute estimates of particle acceleration and velocity at four sites for the 2820 in^3 seismic source. Particle motion waveforms were modelled, and pulse metrics were computed from the time-domain traces. VSTACK uses the wavenumber integration approach to solve the exact acoustic wave equation for arbitrarily layered range-independent acoustic environments.

The VSTACK model setup for the particle velocity scenarios was identical to that for the peak pressure scenarios (Section 4.2.1.2) in terms of source treatment, frequency range and environmental model. The particle acceleration and velocity waveforms were computed to a maximum distance of 1000 m in the broadside and endfire directions from the centre of the airgun array for a receiver 5 cm above the seafloor.

As discussed above in Appendix A.2, particle velocity (v) is the physical speed of a particle in a material. It can be derived from the pressure gradient and Euler's linearised momentum equation where ρ_0 is the density of the medium. Since the wavenumber integration kernel is a product of analytic expressions in terms of range and depth, VSTACK computes particle velocity by computing the spatial gradient of the pressure field analytically in the frequency domain. Fourier synthesis is applied to compute time series synthetic pressure and/or velocity waveforms at depth and range receivers by convolving the source waveforms with the impulse response of the waveguide. Particle velocity metrics at each receiver location were calculated from the modelled particle motion along three perpendicular axes (horizontal and along the source-receiver path, horizontal and perpendicular to the source-receiver path, and vertical).

The particle velocity results were converted to acceleration by time differentiation. The peak particle acceleration and velocity were calculated from the maximum of the predicted acceleration and velocity magnitude, defined as "peak magnitude".

C.3.2. Limestone Seabed Propagation Loss

For all modelled sites, an additional broadband correction was applied to the propagation loss results from MONM to better account for the additional propagation loss associated with a calcarenite/limestone seabed. The differences between the broadband per-pulse SEL from MONM and VSTACK were extracted at the same modelled ranges and depths for corresponded range independent environments. The 90th percentile of the resultant dB differences in range bins were selected to generate a correction function for representative sites to be modelled. The conversion functions were applied after to the summed decidecade band levels from MONM, but before gridding, and radii calculations for each modelled site in each modelled scenario considered.

Appendix D. Methods and Parameters

D.1. Estimating Range to Thresholds Levels

Sound level contours were calculated based on the underwater sound fields predicted by the propagation models, sampled by taking the maximum value over all modelled depths above the sea floor for each location in the modelled region. The predicted distances to specific levels were computed from these contours. Two distances relative to the source are reported for each sound level: 1) R_{max}, the maximum range to the given sound level over all azimuths, and 2) $R_{95\%}$, the range to the given sound level after the 5% farthest points were excluded (see examples in Figure D-1).

The $R_{95\%}$ is used because sound field footprints are often irregular in shape. In some cases, a sound level contour might have small protrusions or anomalous isolated fringes. This is demonstrated in the image in Figure D-1(a). In cases such as this, where relatively few points are excluded in any given direction, R_{max} can misrepresent the area of the region exposed to such effects, and $R_{95\%}$ is considered more representative. In strongly asymmetric cases such as shown in Figure D-1(b), on the other hand, $R_{95\%}$ neglects to account for significant protrusions in the footprint. In such cases R_{max} might better represent the region of effect in specific directions. Cases such as this are usually associated with bathymetric features affecting propagation. The difference between R_{max} and $R_{95\%}$ depends on the source directivity and the non-uniformity of the acoustic environment.

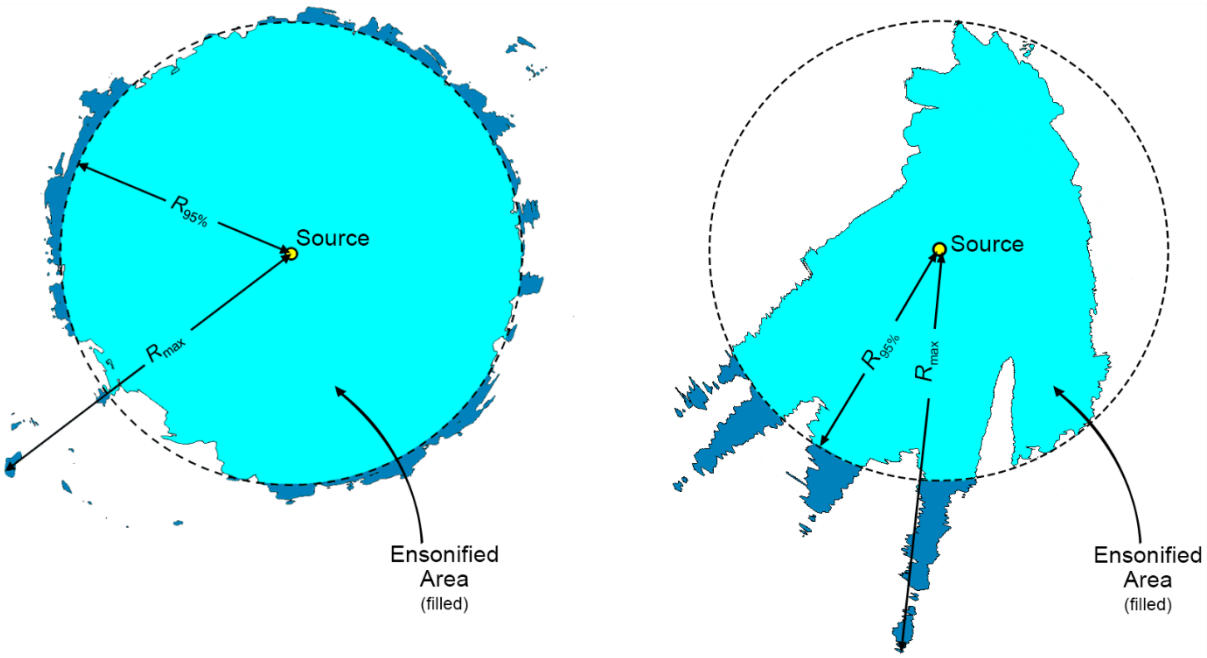

Figure D-1. Sample areas ensonified to an arbitrary sound level with R_{max} and $R_{95\%}$ ranges shown for two scenarios. (a) Largely symmetric sound level contour with small protrusions. (b) Strongly asymmetric sound level contour with long protrusions. Light blue indicates the ensonified areas bounded by $R_{95\%}$; darker blue indicates the areas outside this boundary which determine R_{max}.

D.2. Estimating SPL from Modelled SEL Results

The per-pulse SEL of sound pulses is an energy-like metric related to the dose of sound received over a pulse's entire duration. The pulse SPL on the other hand, is related to its intensity over a specified time interval. Seismic pulses typically lengthen in duration as they propagate away from their source, due to seafloor and surface reflections, and other waveguide dispersion effects. The changes in pulse length, and therefore the time window considered, affect the numeric relationship between SPL and SEL. This study has applied a fixed window duration to calculate SPL (T_{fix} = 125 ms; see Appendix A.1), as implemented in Martin et al. (2017b). Full-waveform modelling was used to estimate SPL, but this type of modelling is computationally intensive, and can be prohibitively time consuming when run at high spatial resolution over large areas.

For the current study, FWRAM (Appendix C.2) was used to model synthetic seismic pulses over the frequency range 5–1024 Hz. This was performed along all broadside and endfire radials at five sites. FWRAM uses Fourier synthesis to recreate the signal in the time domain so that both the SEL and SPL from the source can be calculated. The differences between the SEL and SPL were extracted for all ranges and depths that corresponded to those generated from the high spatial-resolution results from MONM. A 125 ms fixed time window positioned to maximize the SPL over the pulse duration was applied. The resulting SEL-to-SPL offsets were averaged in 0.02 km range bins along each modelled radial and depth, and the 90th percentile was selected at each range to generate a generalised range-dependent conversion function for each site. The range-dependent conversion function was applied to predicted per-pulse SEL results from MONM to model SPL values. Figures D-2 to D-6 show the conversion offsets for Sites 2, 3, 5, 8, and 10 with the 2820 in^3 array; the spatial variation is caused by changes in the received airgun pulse as it propagates from the source. The conversion to SPL from SEL was conducted considering the water depth and seabed geology at a given modelled site.

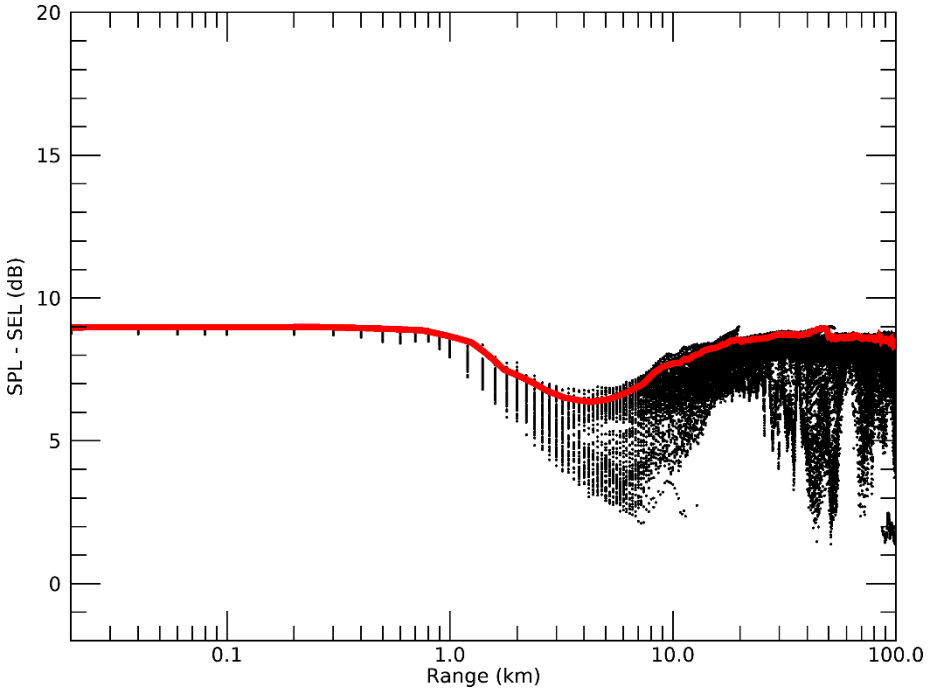

Figure D-2. *Site 2 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. Slices are shown for the 2820 in^3 seismic source. Black lines are the modelled differences between SEL and SPL across different radials and receiver depths; the solid red line is the 90th percentile of the modelled differences at each range.

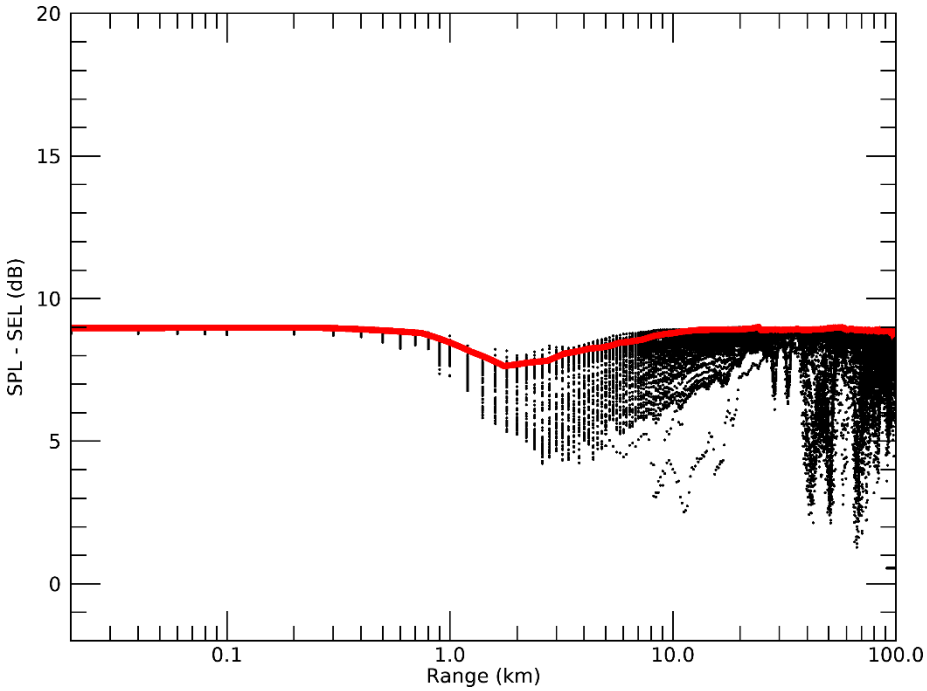

Figure D-3. *Site 3 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. Slices are shown for the 2820 in^3 seismic source. Black lines are the modelled differences between SEL and SPL across different radials and receiver depths; the solid red line is the 90th percentile of the modelled differences at each range.

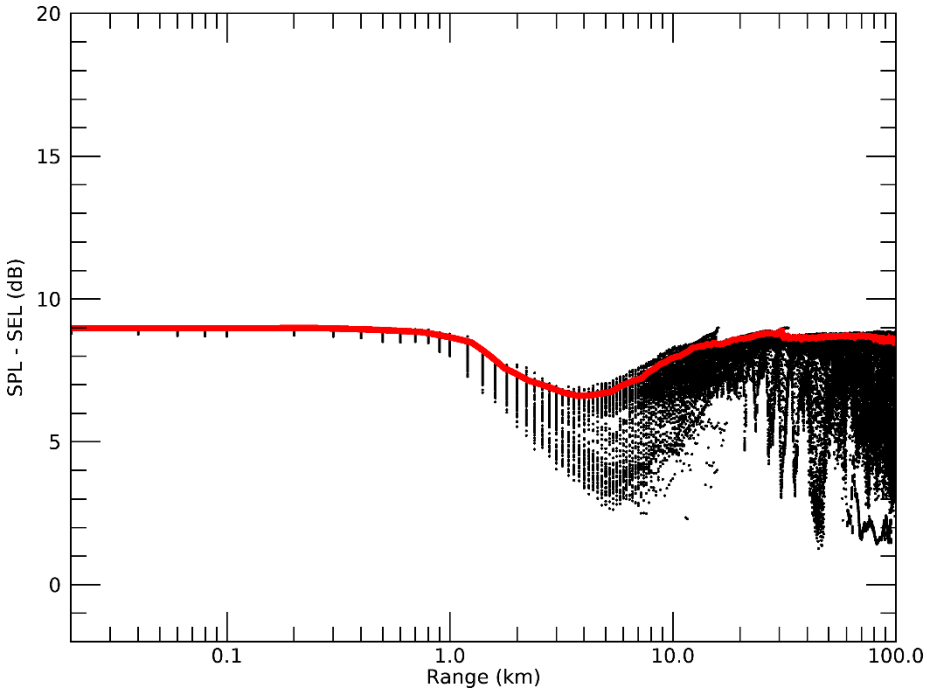

Figure D-4. *Site 5 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. Slices are shown for the 2820 in^3 seismic source. Black lines are the modelled differences between SEL and SPL across different radials and receiver depths; the solid red line is the 90th percentile of the modelled differences at each range.

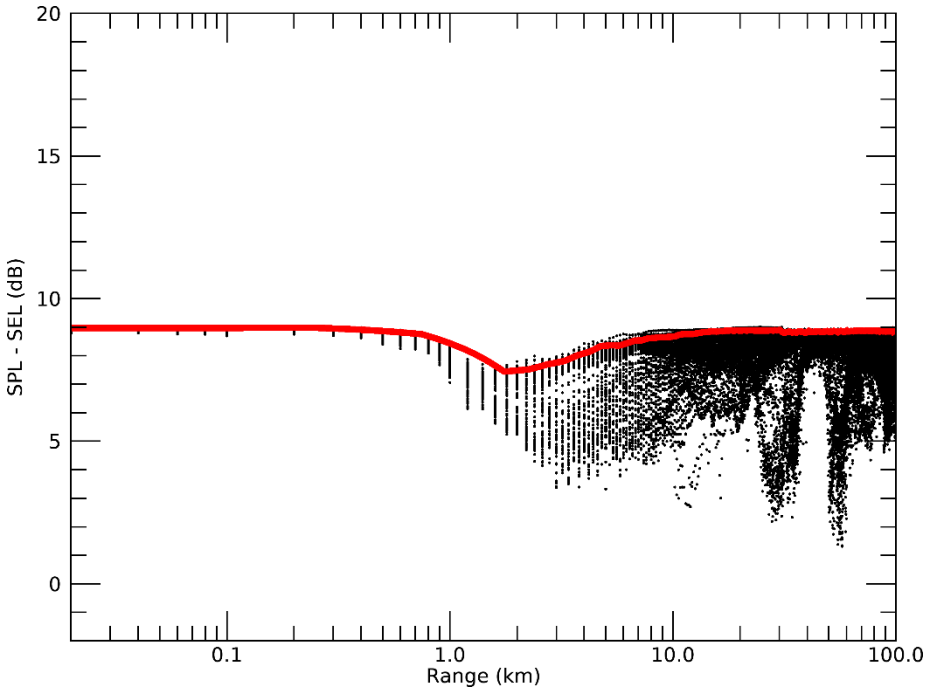

Figure D-5. *Site 8 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. Slices are shown for the 2820 in^3 seismic source. Black lines are the modelled differences between SEL and SPL across different radials and receiver depths; the solid red line is the 90th percentile of the modelled differences at each range.

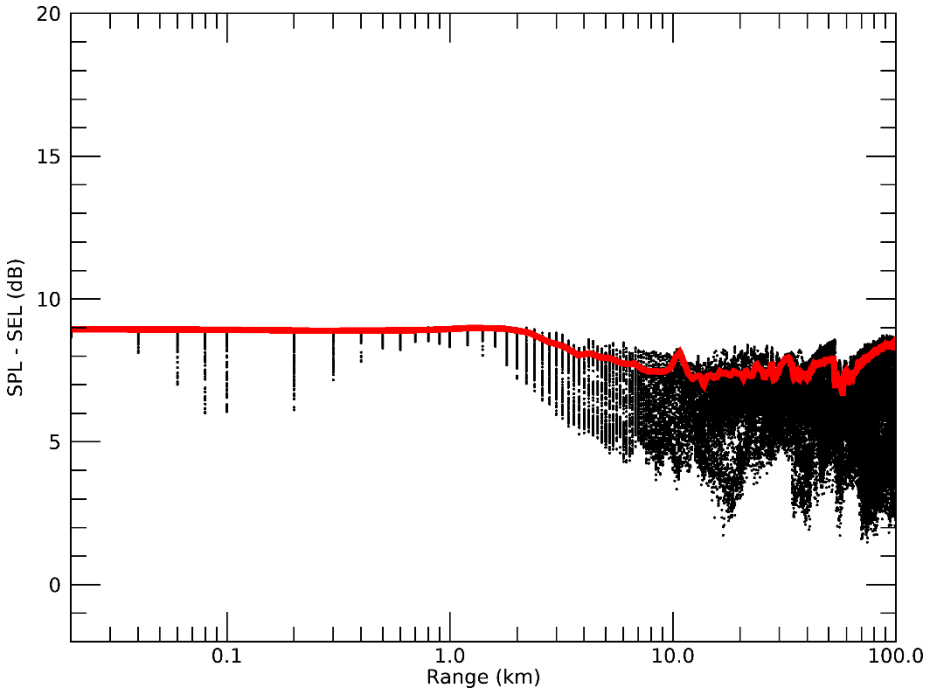

Figure D-6. *Site 10 tow direction 113°*: Range-and-depth-dependent conversion offsets for converting sound exposure level (SEL) to sound pressure level (SPL) for seismic pulses. Slices are shown for the 2820 in^3 seismic source. Black lines are the modelled differences between SEL and SPL across different radials and receiver depths; the solid red line is the 90th percentile of the modelled differences at each range.

D.3. Environmental Parameters

D.3.1. Bathymetry

Water depths throughout the modelled area were extracted from Australian Bathymetry and Topography Grid, a 9 arc-second grid rendered for Australian waters (Whiteway 2009). Bathymetry data was extracted and re-gridded onto a Map Grid of Australia (MGA) coordinate projection (Zone 54) with a regular grid spacing of 200 × 200 m to generate the bathymetry in Figure D-7.

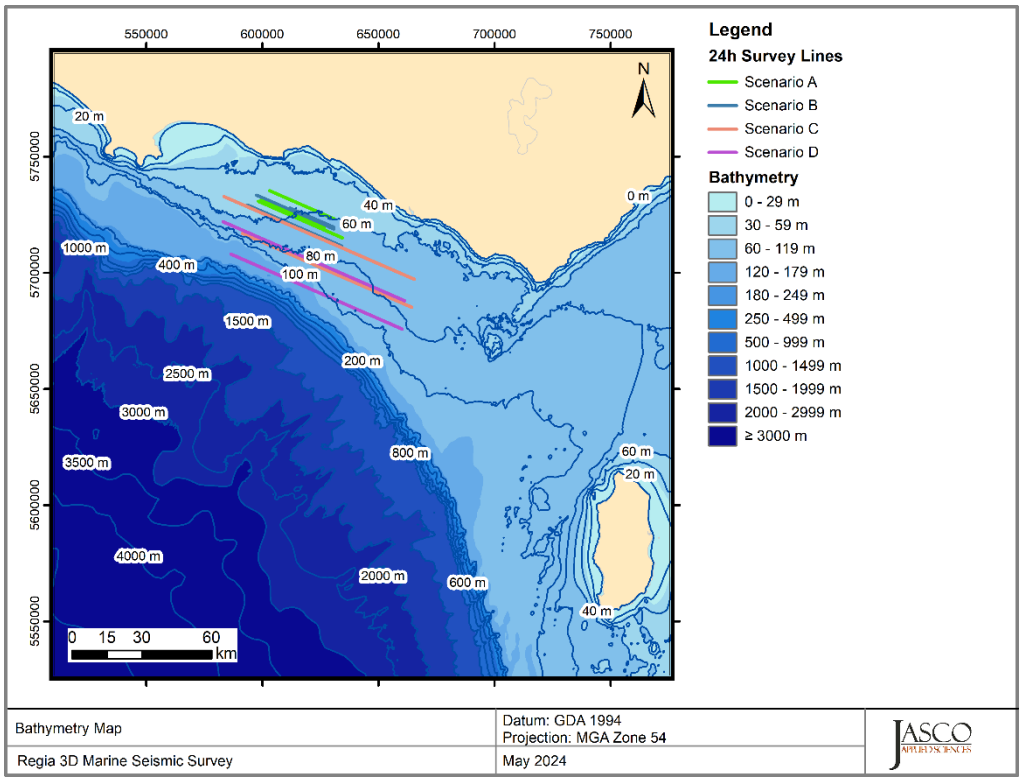

Figure D-7. Bathymetry map of the modelling area for the Regia Marine Seismic Survey.

D.3.2. Sound Speed Profile

The sound speed profiles for the modelled sites were derived from temperature and salinity profiles from the US Naval Oceanographic Office's Generalized Digital Environmental Model V 3.0 (GDEM; Teague et al. 1990, Carnes 2009). GDEM provides an ocean climatology of temperature and salinity for the world's oceans on a latitude-longitude grid with 0.25° resolution, with a temporal resolution of one month, based on global historical observations from the US Navy's Master Oceanographic Observational Data Set (MOODS). The climatology profiles include 78 fixed depth points to a maximum depth of 6800 m (where the ocean is that deep). The GDEM temperature-salinity profiles were converted to sound speed profiles according to Coppens (1981).

Mean monthly sound speed profiles were derived from the GDEM profiles within a 100 km box radius encompassing all modelled sites. The June sound speed profile is expected to be most favourable to longer-range sound propagation due its upward refracting profile. As such, June was selected for sound propagation modelling to ensure precautionary estimates of distances to received sound level thresholds. Figure D-8 shows the resulting profile used as input to the sound propagation modelling.

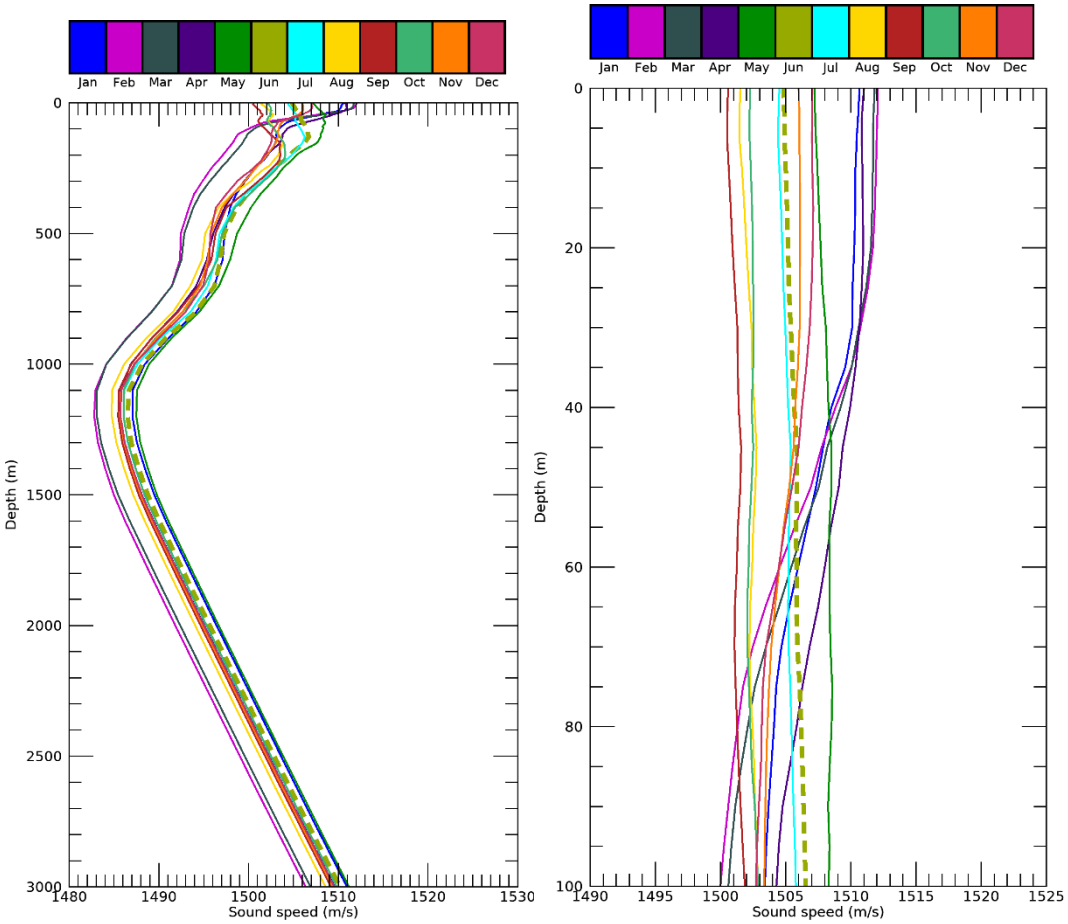

Figure D-8. The sound speed profile (June) used for all modelling, showing the entire water column (left) and the top 100 m within the profile (right). Profiles are calculated from temperature and salinity profiles from GDEM V 3.0 (GDEM; Teague et al. 1990, Carnes 2009).

D.3.3. Geoacoustics

The geoacoustic parameters used for modelling have been sourced from previous public reports completed by JASCO for modelling projects in the surrounding area. Similar to previous modelling studies in the region (Wood and McPherson 2018, Koessler et al. 2020, Matthews et al. 2020, McPherson et al. 2021), several seabed types were considered for modelling. These seabed profiles are indicative of a benthic environment located on the continental shelf and upper slope and are consistent with larger scale geological data and interpretations of the Australian continental shelf environment (James and Bone 2010) within the Otway region.

For the sites modelled in shallow water (less than 65 m depth) the seabed was modelled as a sand layer underlain by variably cemented calcarenite. Literature and public reports suggest that this layer likely begins to thin as water depths increase in an offshore direction (Koessler et al. 2020, Matthews et al. 2020, McPherson et al. 2021), and for water depths greater than 65 m it was considered absent with only the variably cemented calcarenite present at the seafloor interface. These two seabed profiles are consistent with profiles described in association with measurement data (McCauley et al. 2016), and other modelling studies in the region (AIMS 2018).

Sites located above the calcarenite seabed generally displayed higher rates of loss at distance away from the source as compared to sites where a layer of sand overlies calcarenite (Duncan et al. 2009) and as such precises modelled was conducted to account for the loss associated with exposed calcarenite (see Appendix C.3.2). For sites located in water along the shelf, geoacoustic parameters considered for modelling are provided in Tables D-1 and D-2

Table D-1. Geoacoustic profile used in the acoustic propagation models for sites in less than 65 m water depth. Within each depth range, each parameter varies linearly within the stated range.

Depth below seafloor (m)	Material	Density (g/cm^3)	Compressional wave		Shear wave	
			Speed (m/s)	Attenuation (dB/λ)	S-wave speed (m/s)	S-wave attenuation (dB/λ)
0-5	Fine Carbonate Sand	2.1	1634-1803	0.09-0.73	315	3.65
5-25	Increasingly cemented calcarenite	2.2	2000-2120	0.30-0.34		
25-45		2.3	2120-2240	0.34-0.38		
45-65		2.4	2240-2360	0.38-0.42		
65-85		2.5	2360-2480	0.42-0.46		
85-105		2.6	2480-2600	0.46-0.50		
>105	Well-cemented calcarenite	2.7	2600	0.50		

Table D-2. Geoacoustic profile used in the acoustic propagation models for between 65 m and 120 m water depth.Within each depth range, each parameter varies linearly within the stated range.

Depth below seafloor (m)	Material	Density (g/cm^3)	Compressional wave		Shear wave	
			Speed (m/s)	Attenuation (dB/λ)	S-wave speed (m/s)	S-wave attenuation (dB/λ)
0-1	Well-cemented carbonate caprock	2.7	2600	0.5	500	0.4
1-20	Increasingly cemented calcarenite	2.2	2000-2120	0.30-0.34		
20-40		2.3	2120-2240	0.34-0.38		
40-60		2.4	2240-2360	0.38-0.42		
60-80		2.5	2360-2480	0.42-0.46		
80-10		2.6	2480-2600	0.46-0.50		
>100	Well-cemented calcarenite	2.7	2600	0.50		

For sites located along the shelf break/upper continental slope, the geoacoustic parameters used for modelling was derived from sedimentary grain size measurements from the Australian Government's Marine Sediments (MARS) database (Heap 2009). On average, the surficial grain size indicates silty carbonate sand is present. Information on the deeper geological structure was sparse, as such the seabed was assumed to consist of a thick package of unconsolidated sediments. However, this is consistent with the "shaved shelf" model of the discussed in James and Bone 2010, where sediments are transported and deposited from the shelf onto the slope. Representative grain sizes and porosity were used in the grain-shearing model proposed by Buckingham (2005) to estimate the geoacoustic parameters required by the sound propagation models. Table D-3 lists the geoacoustic parameters used for modelling for sites in water depths greater than 120 m.

Table D-3. Geoacoustic profile used in the acoustic propagation models for all modelled sites greater than 120 m water depth. Within each depth range, each parameter varies linearly within the stated range.

Depth below seafloor (m)	Predicted lithology	Density (g/cm^3)	Compressional wave		Shear wave	
			Speed (m/s)	Attenuation (dB/λ)	Speed (m/s)	Attenuation (dB/λ)
0–10	Silty carbonate sand to semi-cemented carbonate	1.88	1605–1700	0.35–0.70	255	3.65
10–20		1.88–1.89	1700–1755	0.70–0.85		
20–50		1.89–1.90	1755–1850	0.85–1.15		
50–100		1.90–1.92	1850–1950	1.15–1.35		
100–200		1.92–1.96	1950–2100	1.35–1.60		
200–500		1.96–2.05	2100–2355	1.60–1.95		
>500		2.05	2355	1.95		

D.4. Animal Movement and Exposure Modelling

Animal movement and exposure modelling considers the movement of both sound sources and animals over time. Acoustic source and propagation modelling are used to generate 3-D sound fields that vary as a function of distance to source, depth, and azimuth. Sound sources are modelled at representative sites and the resulting sound fields are assigned to source locations using the minimum Euclidean distance. The sound received by an animal at any given time depends on its location relative to the source. Because the true locations of the animals within the sound fields are unknown, realistic animal movements are simulated using repeated random sampling of various behavioural parameters. The Monte Carlo method of simulating many animals within the operations area is used to estimate the sound exposure history of the population of simulated animals (animats).

Monte Carlo methods provide a heuristic approach for determining the probability distribution function (PDF) of complex situations, such as animals moving in a sound field. The probability of an events occurrence is determined by the frequency with which it occurs in the simulation. The greater the number of random samples, in this case the more simulated animats, the better the approximation of the PDF. Animats are randomly placed, or seeded, within the simulation boundary at a specified density (animats/km^2). Higher densities provide a finer PDF estimate resolution but require more computational resources. To ensure good representation of the PDF, the animat density is set as high as practical allowing for computation time. The animat density is typically much higher than the real-world density to ensure good representation of the PDF. The resulting PDF can be scaled using real-world animal density when this information is available.

Several models for marine mammal movement have been developed (Ellison et al. 1987, Frankel et al. 2002, Houser 2006). These models use an underlying Markov chain to transition from one state to another based on probabilities determined from measured swimming behaviour. The parameters may represent simple states, such as the speed or heading of the animal, or complex states, such as likelihood of participating in foraging, play, rest, or travel. Attractions and aversions to variables like anthropogenic sounds and different depth ranges can be included in the models.

The JASCO Animal Simulation Model Including Noise Exposure (JASMINE) was based on the open-source marine mammal movement and behaviour model (3MB, Houser 2006) and used to predict the exposure of animats to sound arising from the anthropogenic activities. Animats are programmed to behave like the species likely to be present in the survey area. The parameters used for forecasting realistic behaviours (e.g., diving, foraging, aversion, surface times, etc.) are determined and interpreted from marine species studies (e.g., tagging studies) where available, or reasonably extrapolated from related species. An individual animats modelled sound exposure levels are summed over the total simulation duration to determine its total received energy, and then compared to the assumed threshold criteria.

JASMINE uses the same animal movement algorithms as 3MB (Houser, 2006), but has been extended to be directly compatible with JASCO's Marine Operations Noise Model (MONM) and Full Waveform Range-dependent Acoustic Model (FRAWM) acoustic field predictions, for inclusion of source tracks, and importantly for animats to change behavioural states based on time and space dependent modelled variables such as received levels for aversion behaviour, although aversion was not considered in this study.

D.4.1. Animal Movement Parameters

JASMINE uses previously measured behaviour to forecast behaviour in new situations and locations. The parameters used for forecasting realistic behaviour are determined (and interpreted) from marine species studies (e.g., tagging studies). Each parameter in the model is described as a probability distribution. When limited or no information is available for a species parameter, a Gaussian or uniform distribution may be chosen for that parameter. For the Gaussian distribution, the user determines the mean and standard deviation of the distribution from which parameter values are drawn. For the uniform distribution, the user determines the maximum and minimum distribution from which parameter values are drawn. When detailed information about the movement and behaviour of a species are available, a user-created distribution vector, including cumulative transition probabilities, may be used (referred to here as a vector model; Houser 2006). Different sets of parameters can be defined for different behaviour states. The probability of an animat starting out in or transitioning into a given behaviour state can in turn be defined in terms of the animats current behavioural state, depth, and the time of day. In addition, each travel parameter and behavioural state has a termination function that governs how long the parameter value or overall behavioural state persists in simulation.

The parameters used in JASMINE describe animal movement in both the vertical and horizontal planes. The parameters relating to travel in these two planes are briefly described below.

Travel sub-models

- **Direction**– determines an animats choice of direction in the horizontal plane. Sub-models are available for determining the heading of animats, allowing for movement to range from strongly biased to undirected. A random walk model can be used for behaviours with no directional preference, such as feeding and playing. In a random walk, all bearings are equally likely at each parameter transition time step. A correlated random walk can be used to smooth the changes in bearing by using the current heading as the mean of the distribution from which to draw the next heading. An additional variant of the correlated random walk is available that includes a directional bias for use in situations where animals have a preferred absolute direction, such as migration. A user-defined vector of directional probabilities can also be input to control animat heading. For more detailed discussion of these parameters, see Houser (2006) and Houser and Cross (1999).
- **Travel rate**–defines an animats rate of travel in the horizontal plane. When combined with vertical speed and dive depth, the dive profile of the animat is produced.

Dive sub-models

- **Ascent rate**–defines an animats rate of travel in the vertical plane during the ascent portion of a dive.
- **Descent rate**–defines an animats rate of travel in the vertical plane during the descent portion of a dive.
- **Depth**–defines an animats maximum dive depth.
- **Reversals**–determines whether multiple vertical excursions occur once an animat reaches the maximum dive depth. This behaviour is used to emulate the foraging behaviour of some marine mammal species at depth. Reversal-specific ascent and descent rates may be specified.
- **Surface interval**–determines the duration an animat spends at, or near, the surface before diving again.

D.4.2. Exposure Integration Time

The interval over which acoustic exposure (L_E) should be integrated and maximal exposure (L_p) determined is not well defined. Both Southall et al. (2007) and the NMFS (2018) recommend a 24 h baseline accumulation period, but state that there may be situations where this is not appropriate (e.g., a high-level source and confined population). Resetting the integration after 24 h can lead to overestimating the number of individual animals exposed because individuals can be counted multiple times during an operation. The type of animal movement engine used in this study simulates realistic movement using swimming behaviour collected over relatively short periods (hours to days) and does not include large-scale movement such as migratory circulation patterns. For this study, a representative 24-hour period was simulated.

Ideally, a simulation area is large enough to encompass the entire range of a population so that any animal that could approach the source during an operation is included. However, there are limits to the simulation area, and computational overhead increases with area. For practical reasons, the simulation area is limited. In the simulation, every animat that reaches a border is replaced by another animat entering at the opposing border—e.g., an animat crossing the northern border of the simulation is replaced by one entering the southern border at the same longitude. When this action places the animat in an inappropriate water depth, the animat is randomly placed on the map at a depth suited to its species definition. The exposures of all animats (including those leaving the simulation and those entering) are kept for analysis. This approach maintains a consistent animat density and allows for longer integration periods with finite simulation areas.

D.4.3. Seeding Density and Scaling

Seeding density refers to the spatial sample rate, in units of animats/km^2, used in the simulation. It is not related to the real-world animal density, but rather is a model parameter that controls how samples are drawn from the model space. The minimum required seeding density for any given project depends on several factors such as bathymetry, source characteristics, and the behavioural profile of the animats, with the main constraint being computation time and resources. Seeding density is adjusted as needed based on model conditions specific to a project or project area.

In the present study, the exposure criteria for impulsive sounds were used to determine the number of animats exceeding exposure thresholds. To generate statistically reliable probability density functions, all simulations were seeded with an animat density of 4 animat/km^2 over the entire simulation area, except those in which southern right whale animats were restricted to their reproduction BIA, in which case the density was increased to 6 animats/km^2 to account for the relatively small area. The modelling results are not related to real-world animal densities as animal density in the area is unknown.

Appendix E. Model Validation Information

Predictions from JASCO's Airgun Array Source Model (AASM) and propagation models (MONM, FWRAM and VSTACK) have been validated against experimental data from a number of underwater acoustic measurement programs conducted by JASCO globally, including the United States and Canadian Artic, Canadian and southern United States waters, Greenland, Russia and Australia (Hannay and Racca 2005, Aerts et al. 2008, Funk et al. 2008, Ireland et al. 2009, O'Neill et al. 2010, Warner et al. 2010, Racca et al. 2012a, Racca et al. 2012b, Matthews and MacGillivray 2013, Martin et al. 2015, Racca et al. 2015, Martin et al. 2017a, Martin et al. 2017b, Warner et al. 2017, MacGillivray 2018, McPherson et al. 2018, McPherson and Martin 2018).

In addition, JASCO has conducted measurement programs associated with a significant number of anthropogenic activities which have included internal validation of the modelling (including McCrodan et al. 2011, Austin and Warner 2012, McPherson and Warner 2012, Austin and Bailey 2013, Austin et al. 2013, Zykov and MacDonnell 2013, Austin 2014, Austin et al. 2015, Austin and Li 2016, Martin and Popper 2016).

Appendix F. Supplemental Modelling Results

The SPL sound fields, and distances to relevant isopleths, can be visualised for the 293° tow direction on the contour maps presented below. Equivalent maps for the 113° tow direction are included in Section 4.2.2.1.

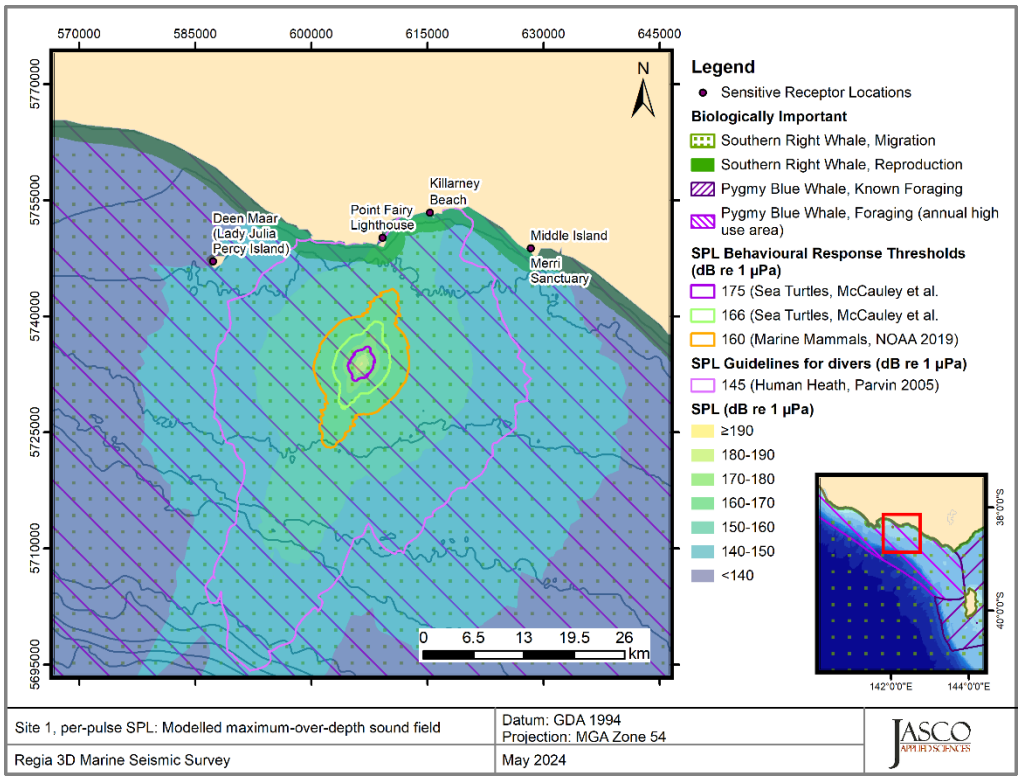

Figure F-1. *Site 1, SPL, 2820 in^3 source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

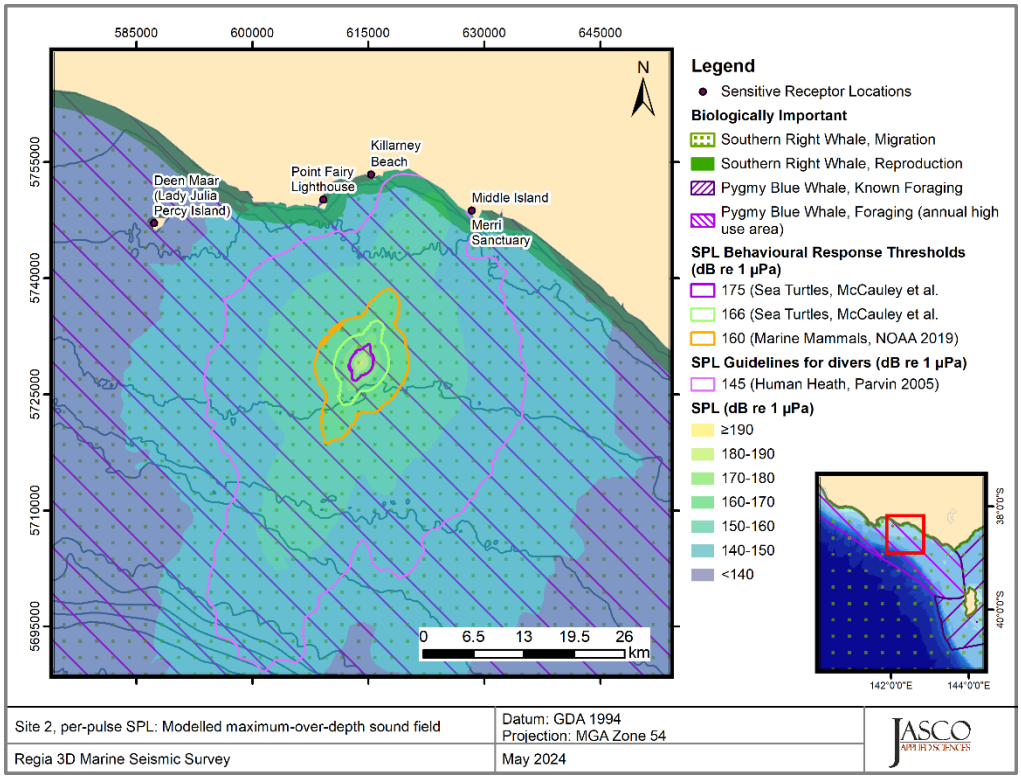

Figure F-2. *Site 2, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

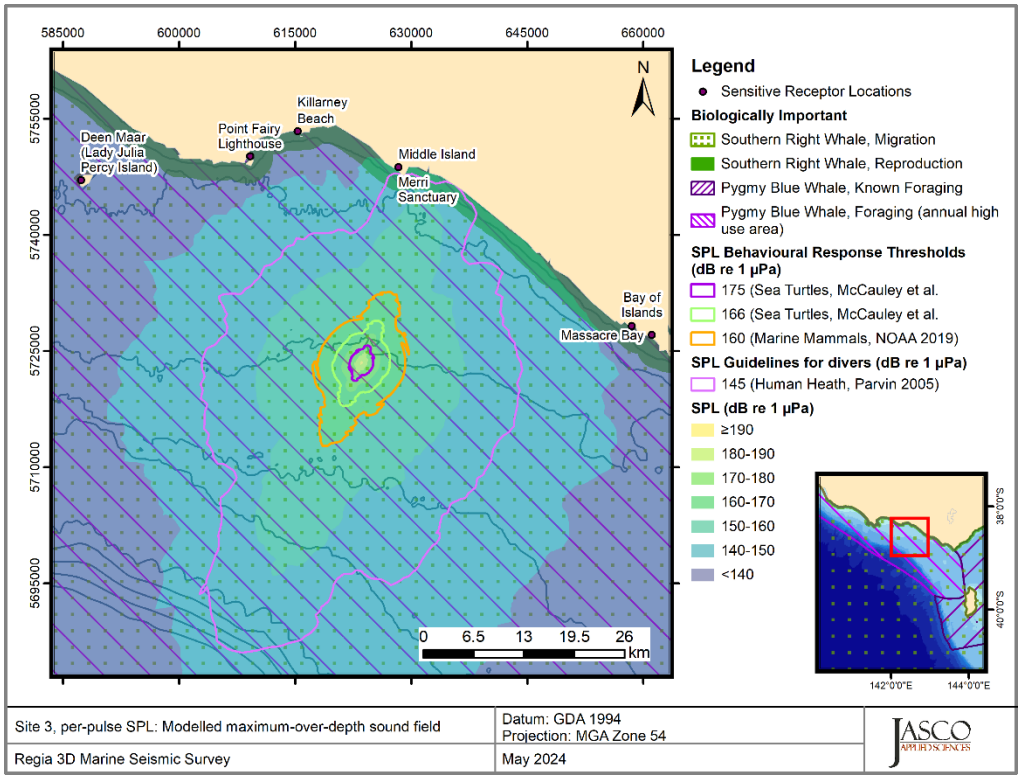

Figure F-3. *Site 3, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

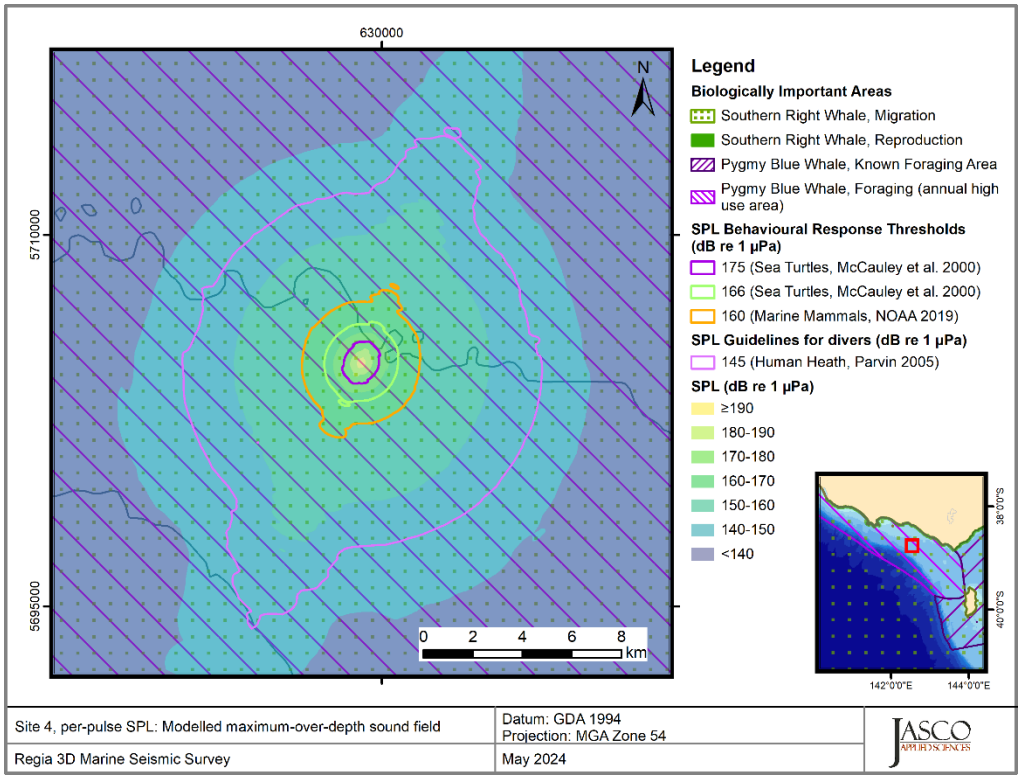

Figure F-4. *Site 4, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

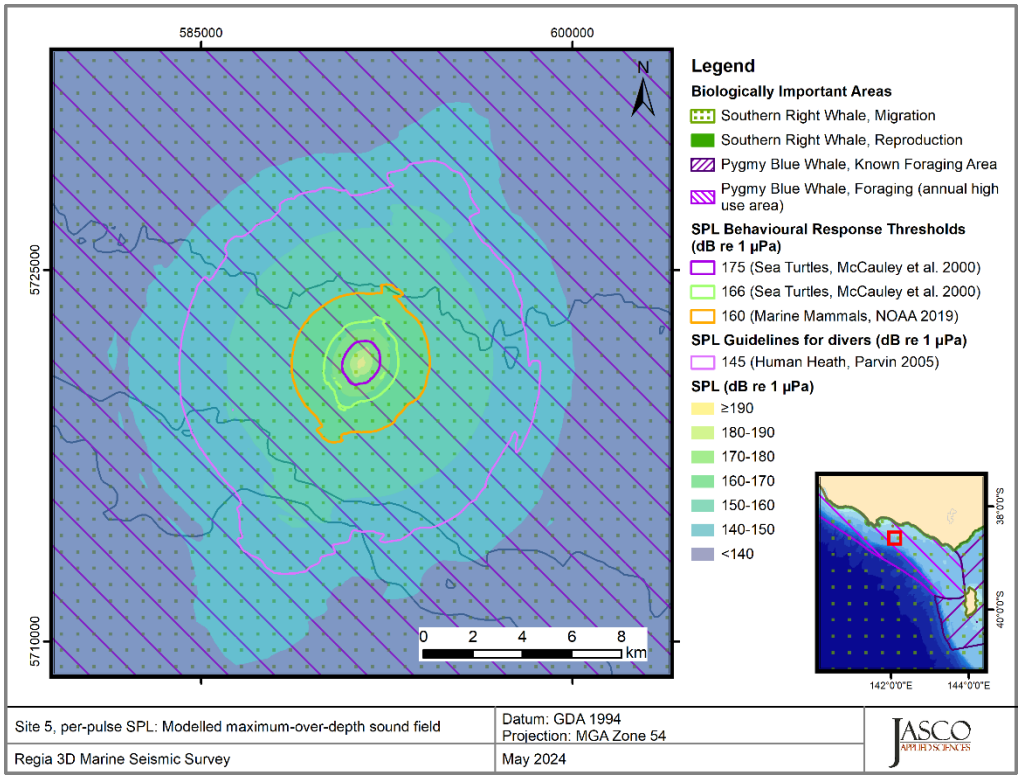

Figure F-5. *Site 5, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

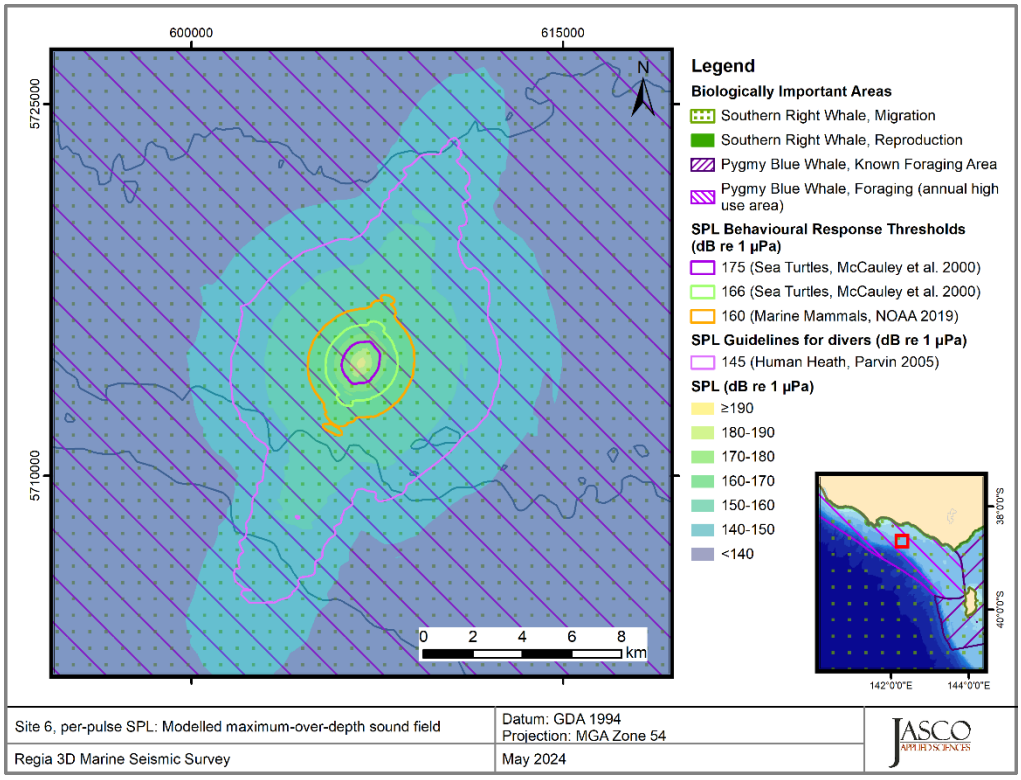

Figure F-6. *Site 6, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

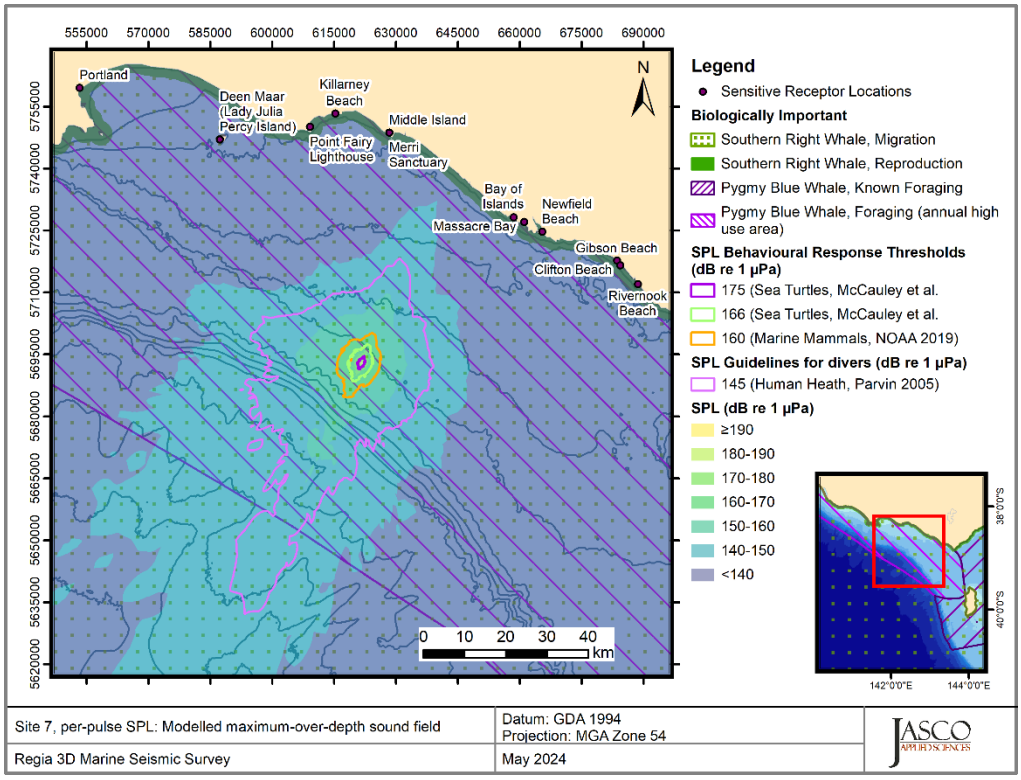

Figure F-7. *Site 7, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

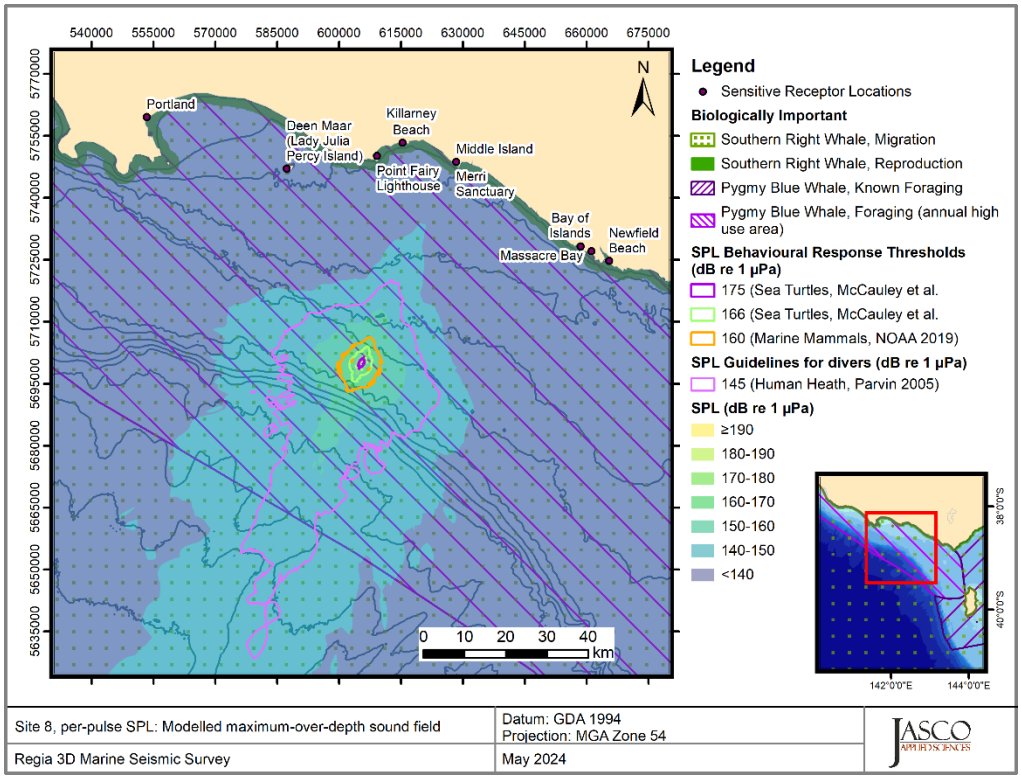

Figure F-8. *Site 8, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

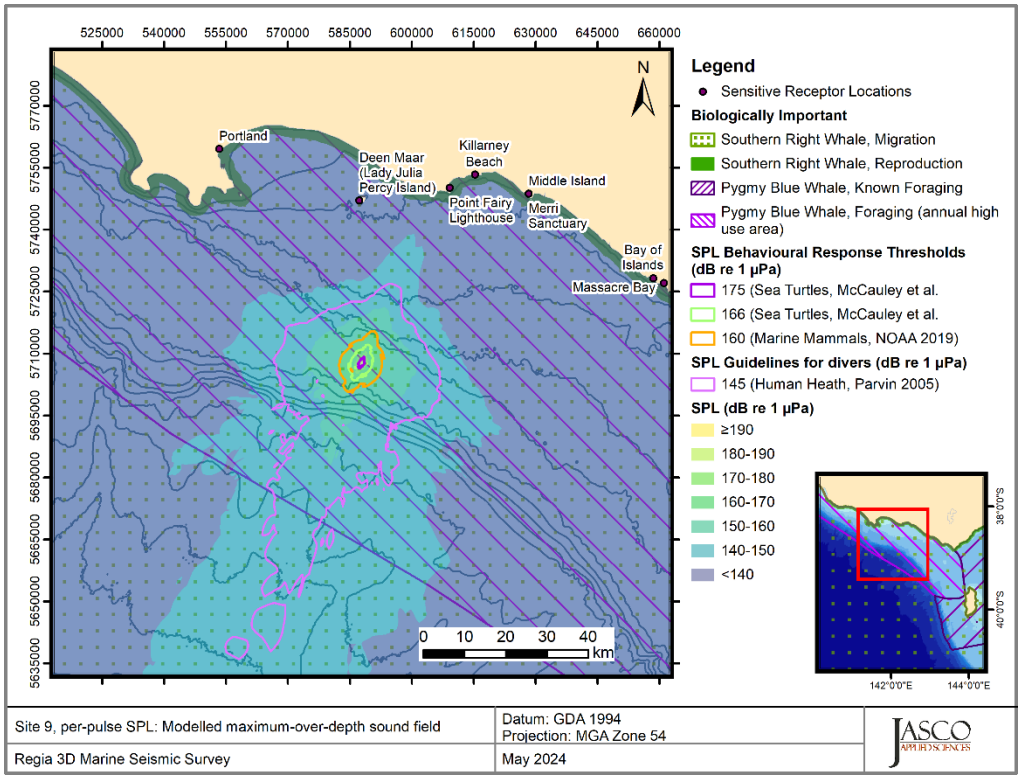

Figure F-9. *Site 9, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

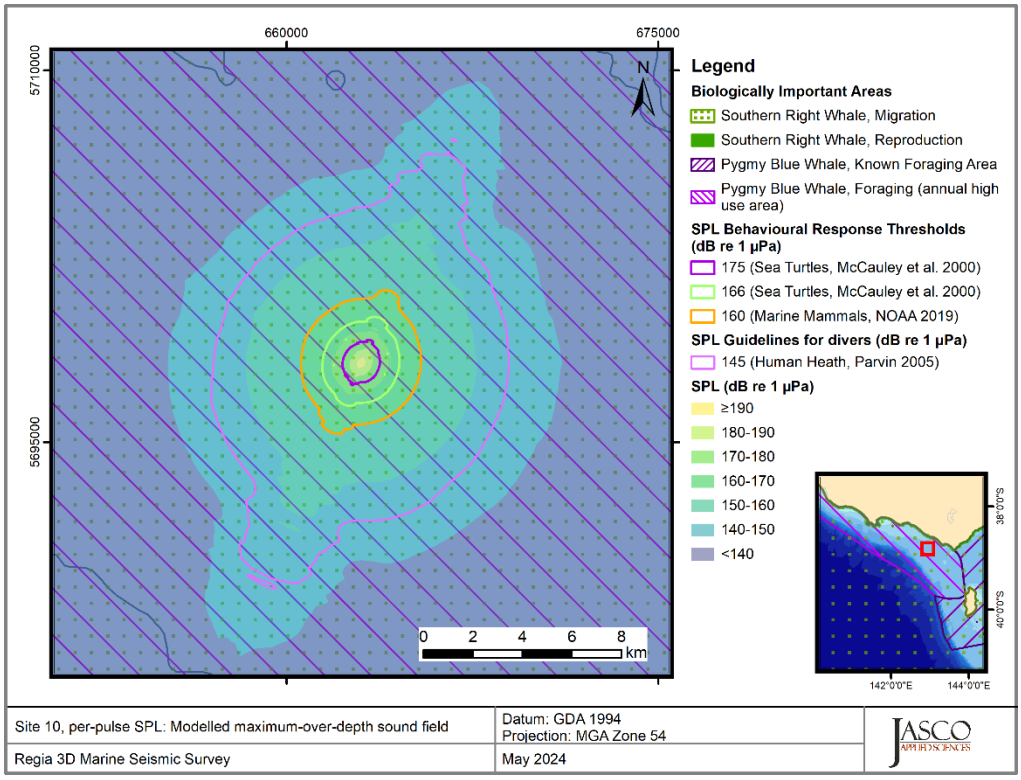

Figure F-10. *Site 10, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

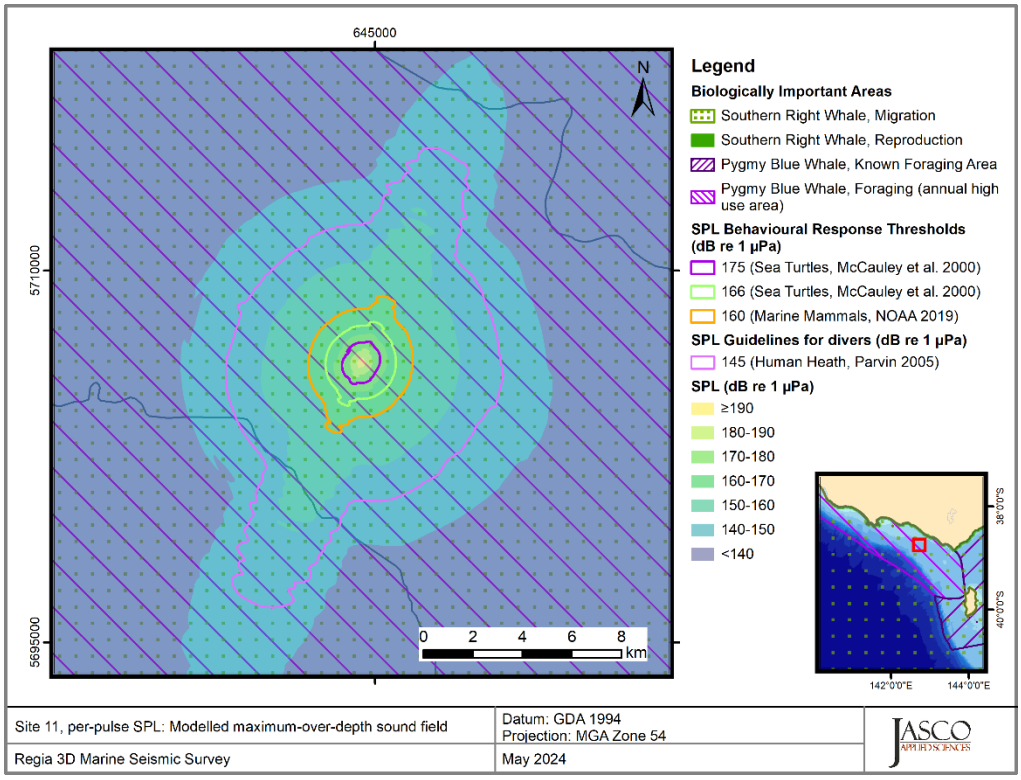

Figure F-11. *Site 11, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

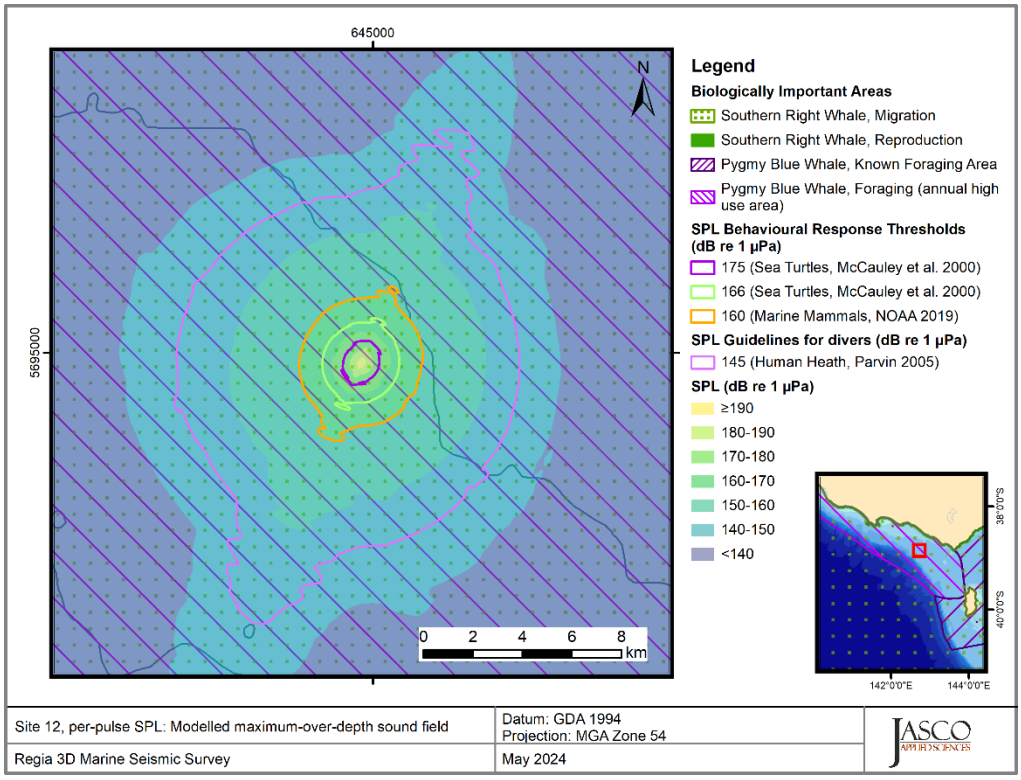

Figure F-12. *Site 12, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

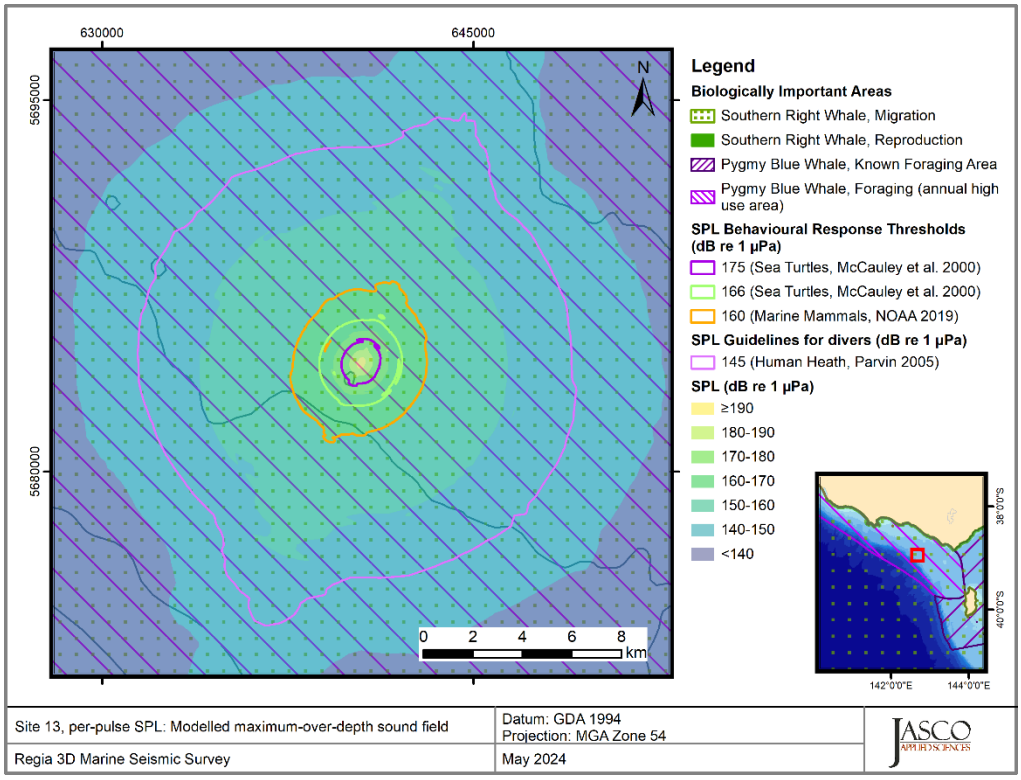

Figure F-13. *Site 13, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

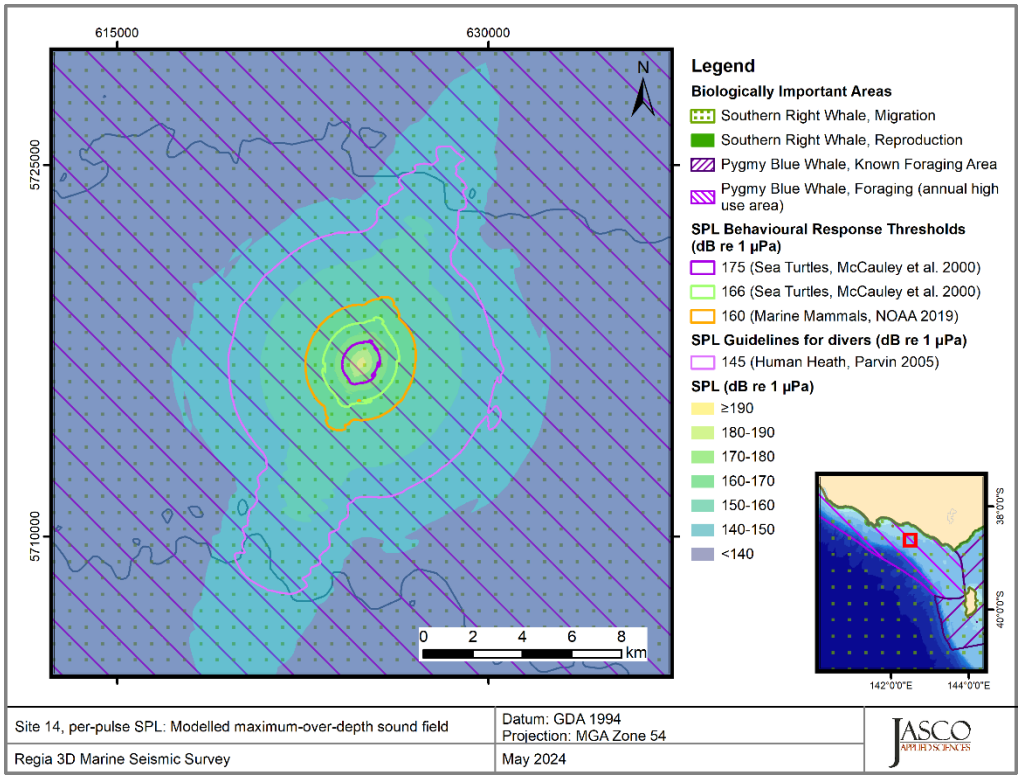

Figure F-14. *Site 14, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

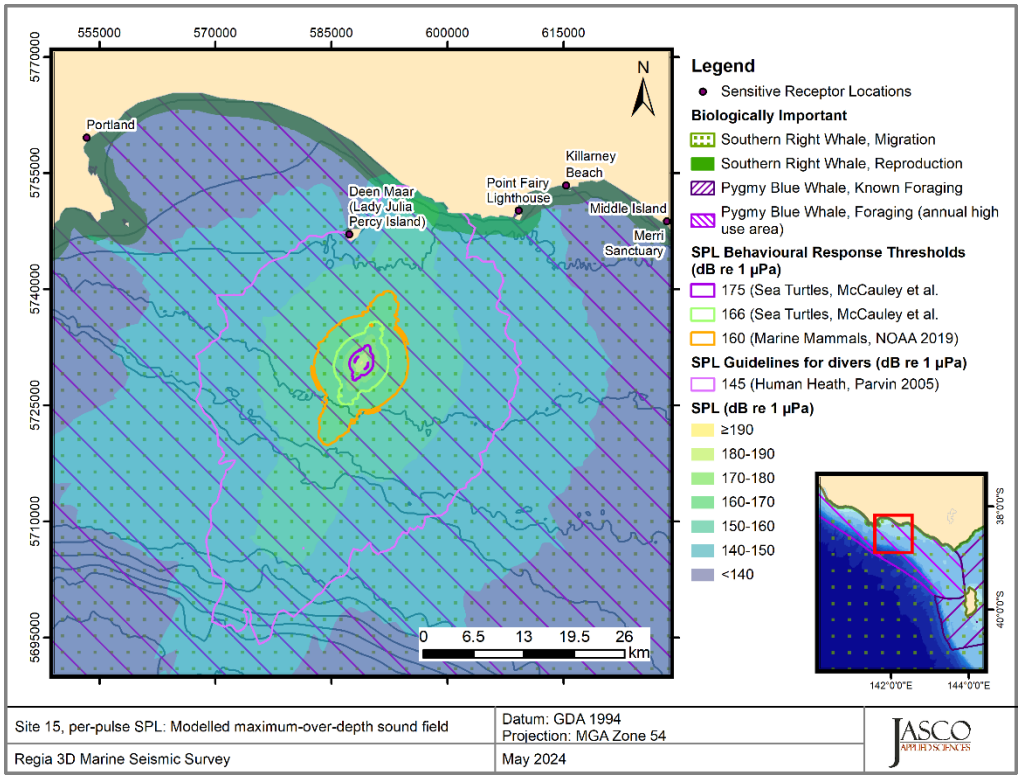

Figure F-15. *Site 15, SPL, 2820 in³ source, tow direction 293°*: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals, sea turtles and the human health assessment threshold.

Appendix G. Sensitive Receiver Maps

Maps showing which impulses result in levels above the human health assessment threshold. Each map shows which impulse if any result in an exceedance in the human health assessment threshold at the location listed in the figure caption.

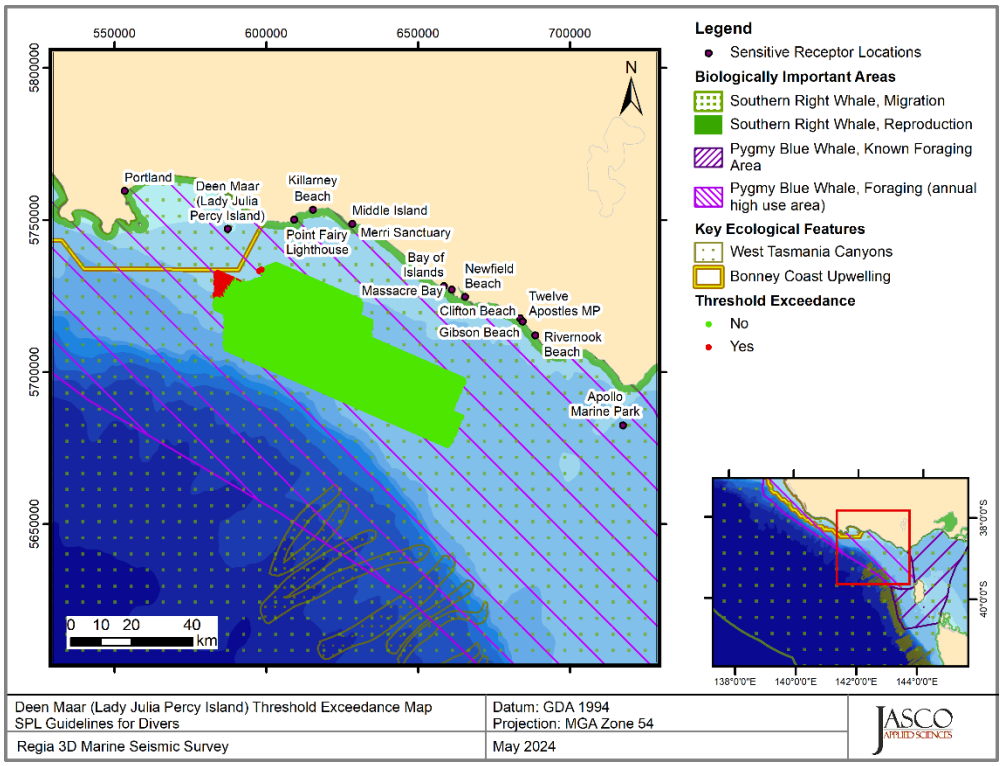

Figure G-1. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Deen Maar (Lady Julia Percy Island) is exceeded.

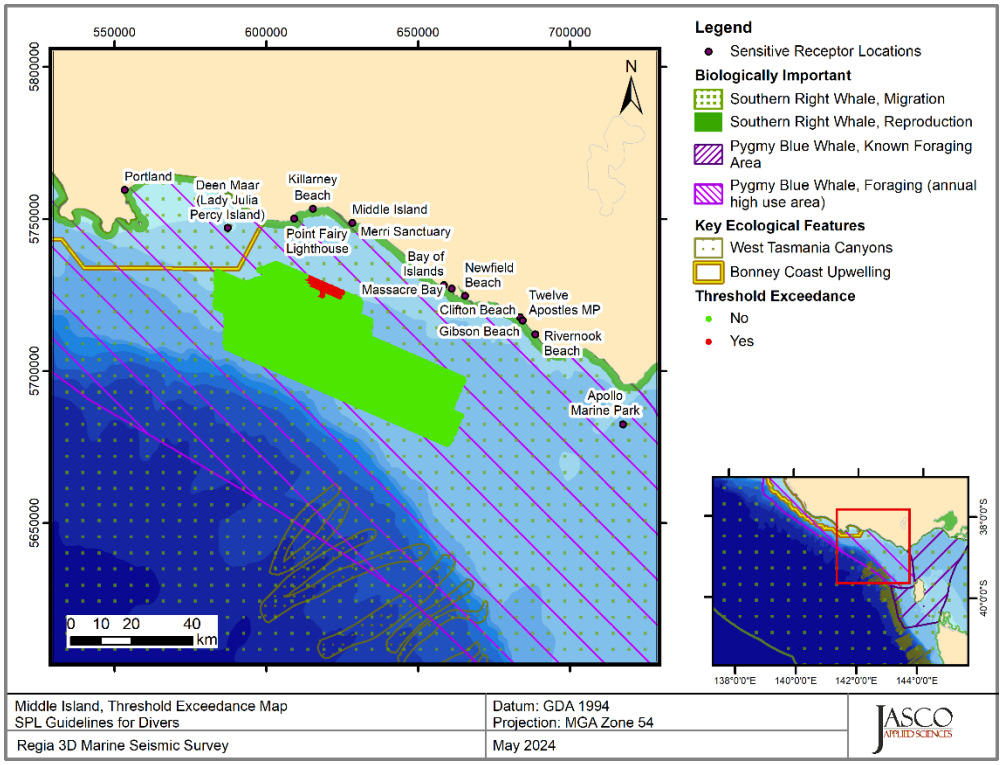

Figure G-2. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Middle Island is exceeded.

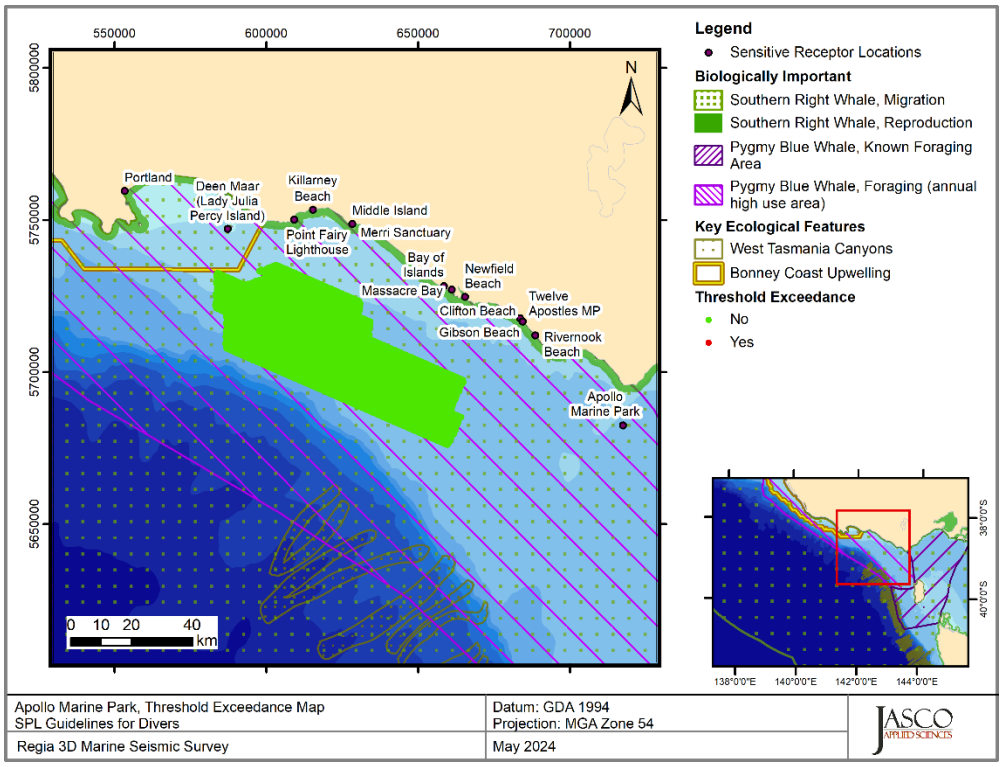

Figure G-3. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Apollo Marine Park is exceeded.

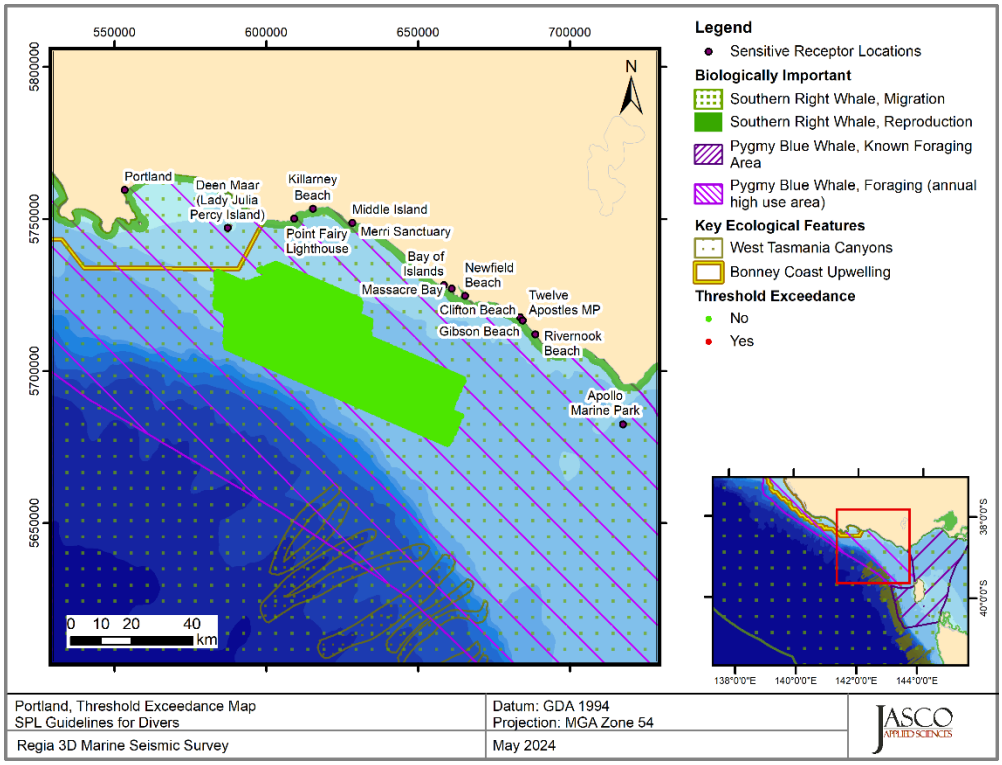

Figure G-4. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Portland is exceeded.

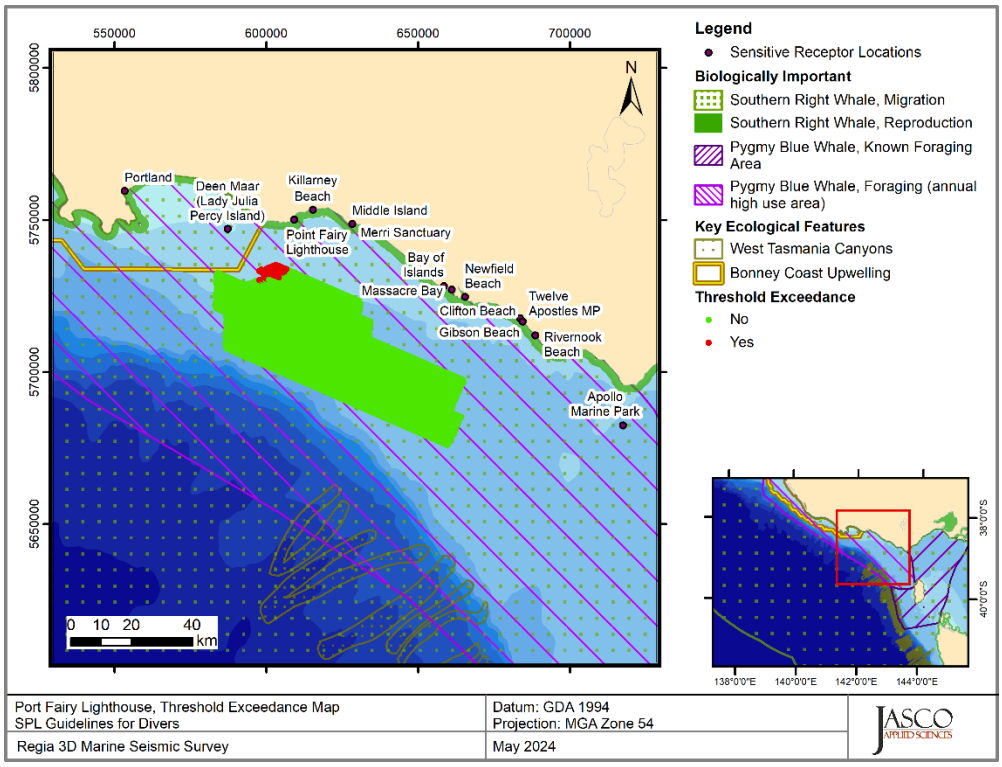

Figure G-5. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Port Fairy Lighthouse is exceeded.

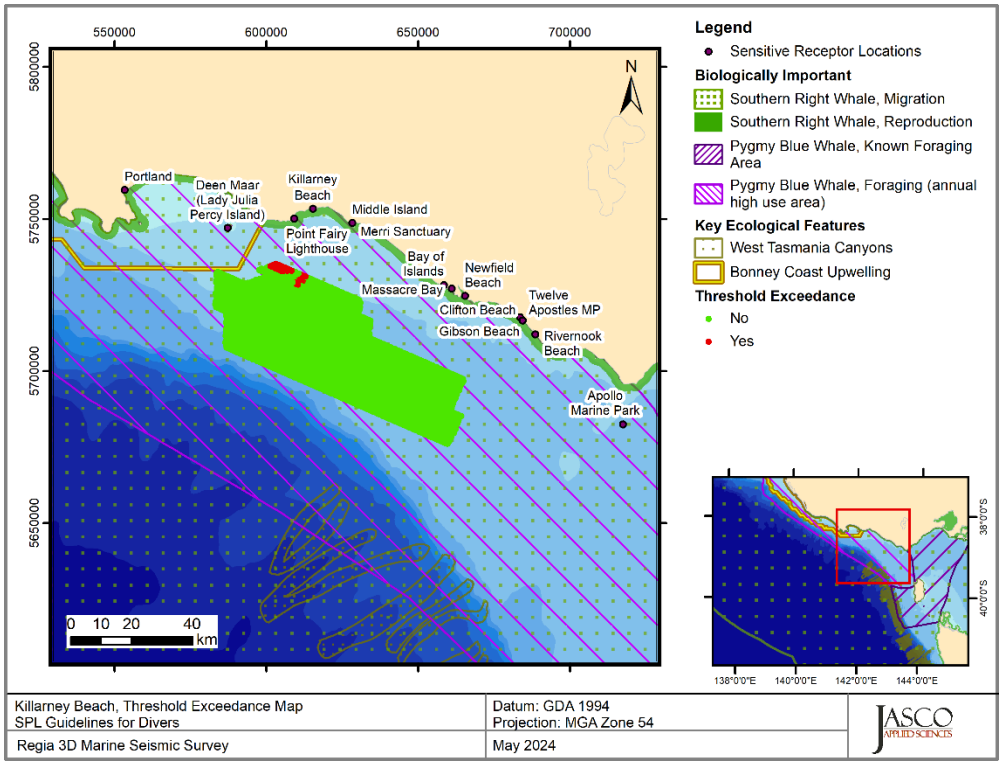

Figure G-6. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Killarney Beach is exceeded.

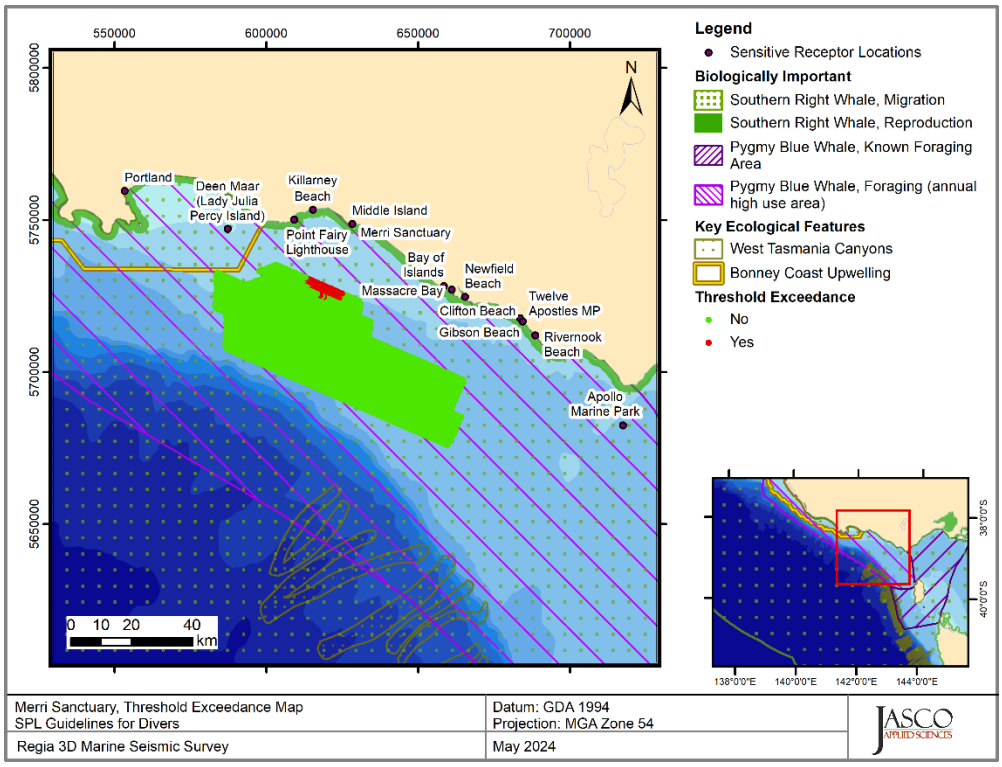

Figure G-7. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Merri Sanctuary is exceeded.

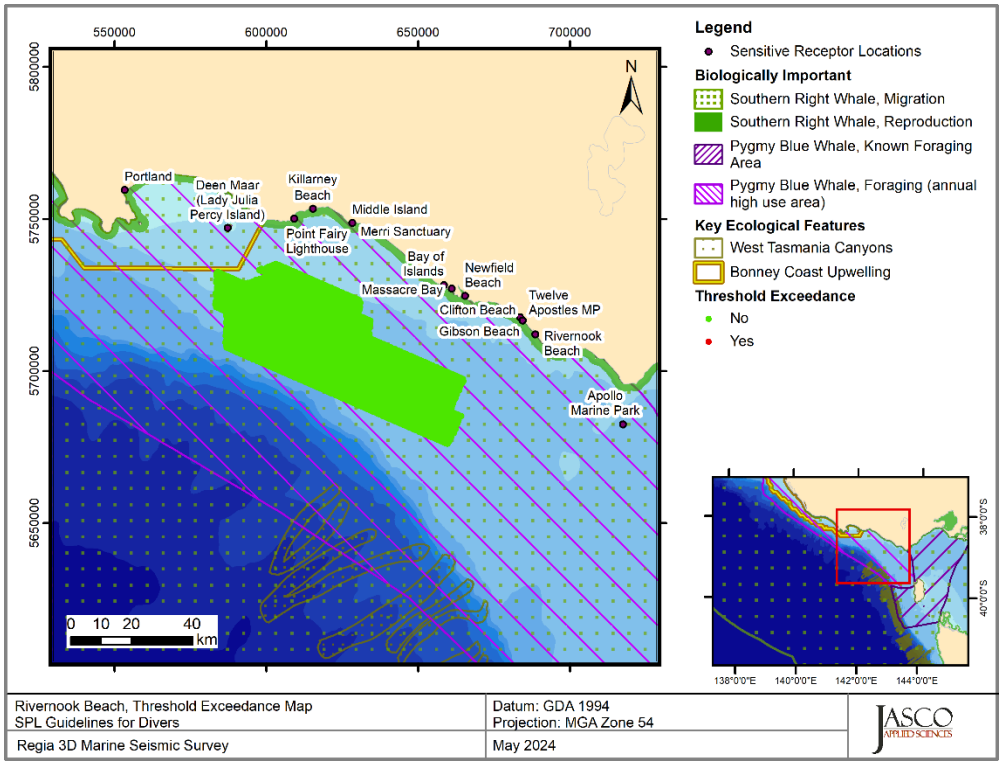

Figure G-8. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Rivernook Beach is exceeded.

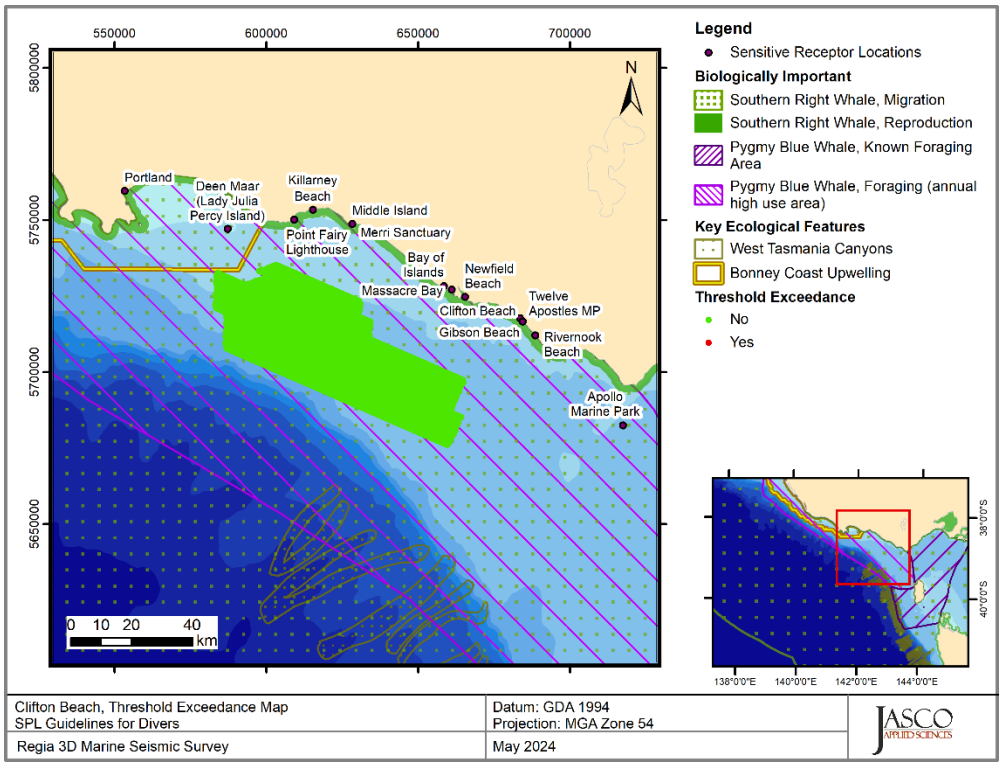

Figure G-9. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Clifton Beach is exceeded.

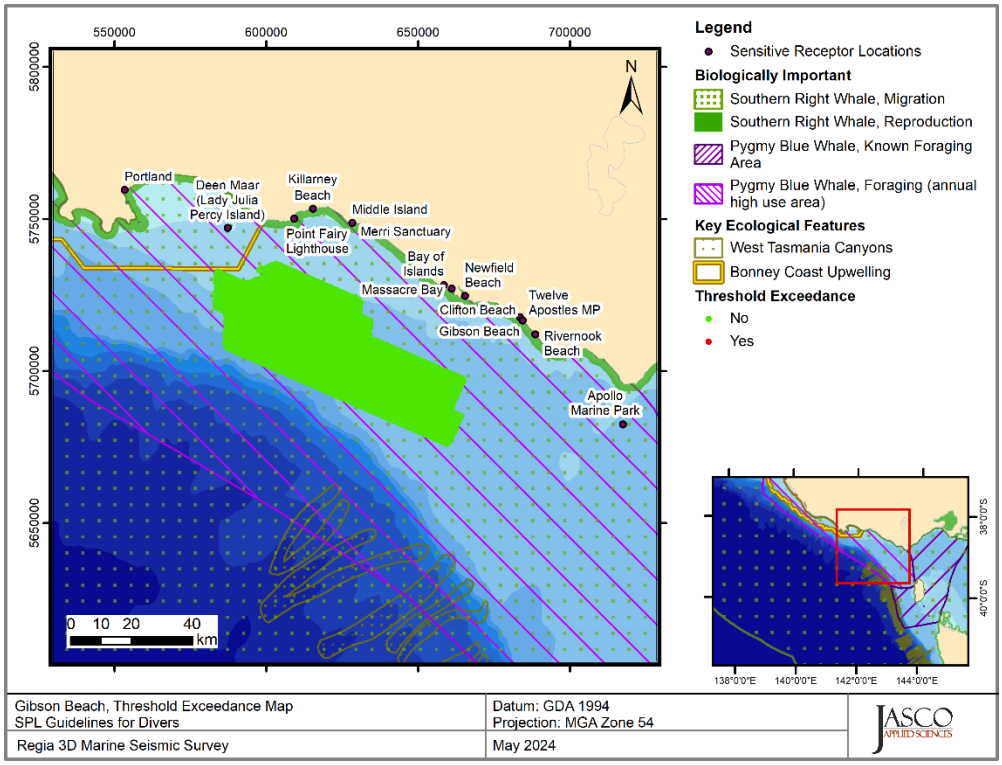

Figure G-10. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Gibson Beach is exceeded.

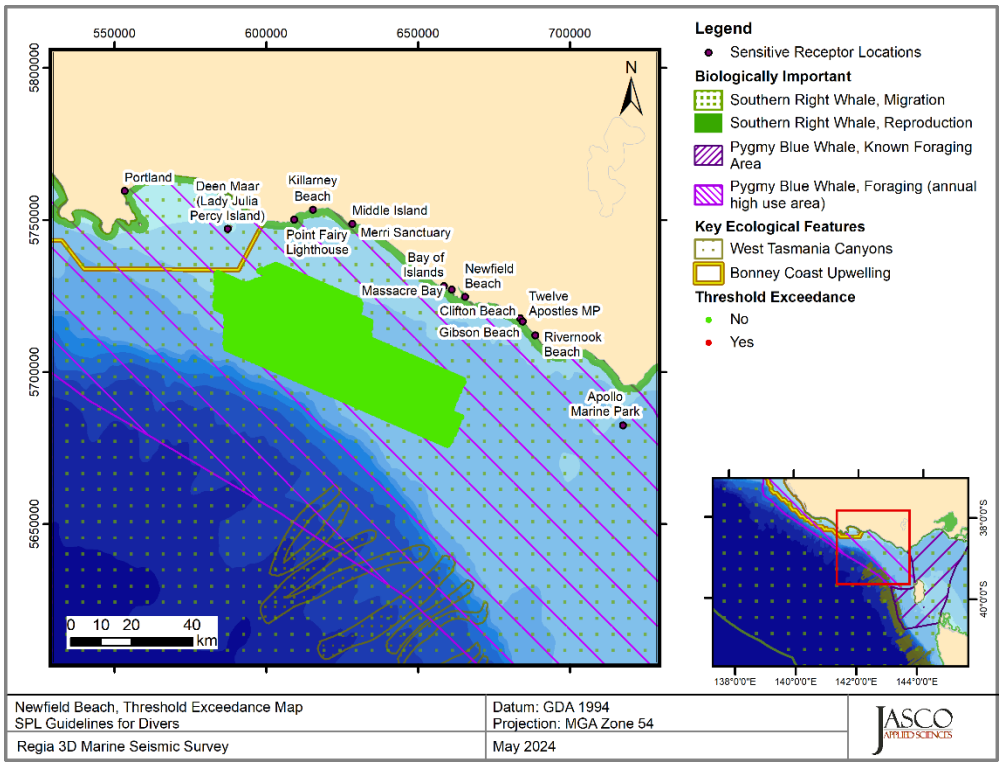

Figure G-11. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Newfield Beach is exceeded.

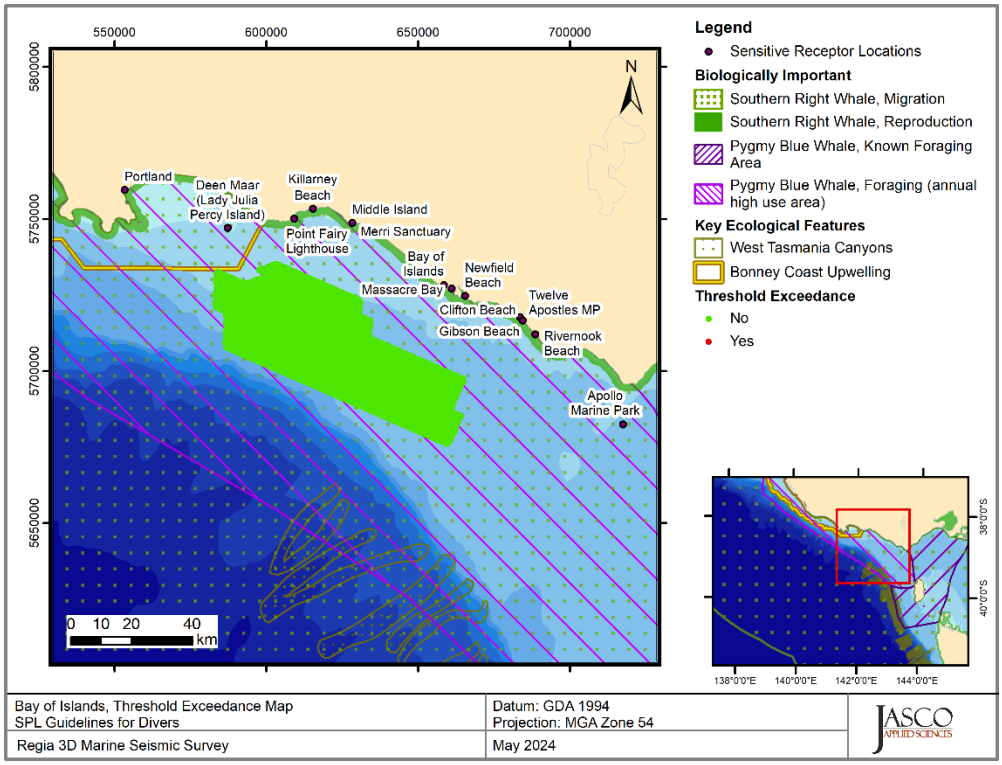

Figure G-12. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Bay of Islands is exceeded.

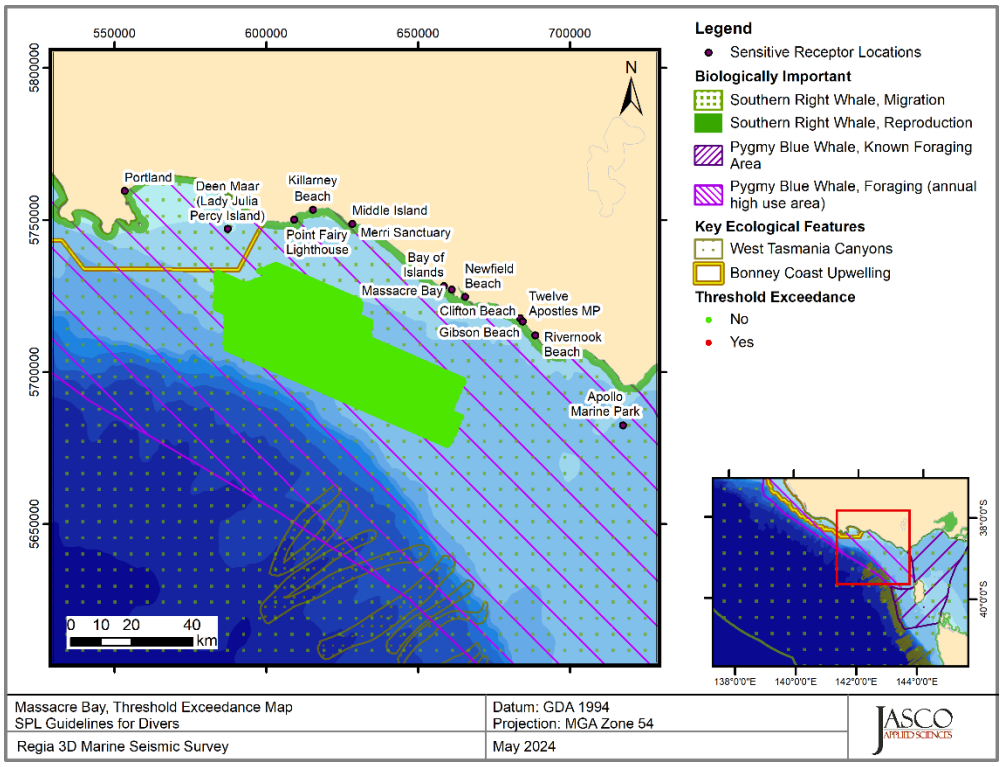

Figure G-13. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Massacre Bay is exceeded.

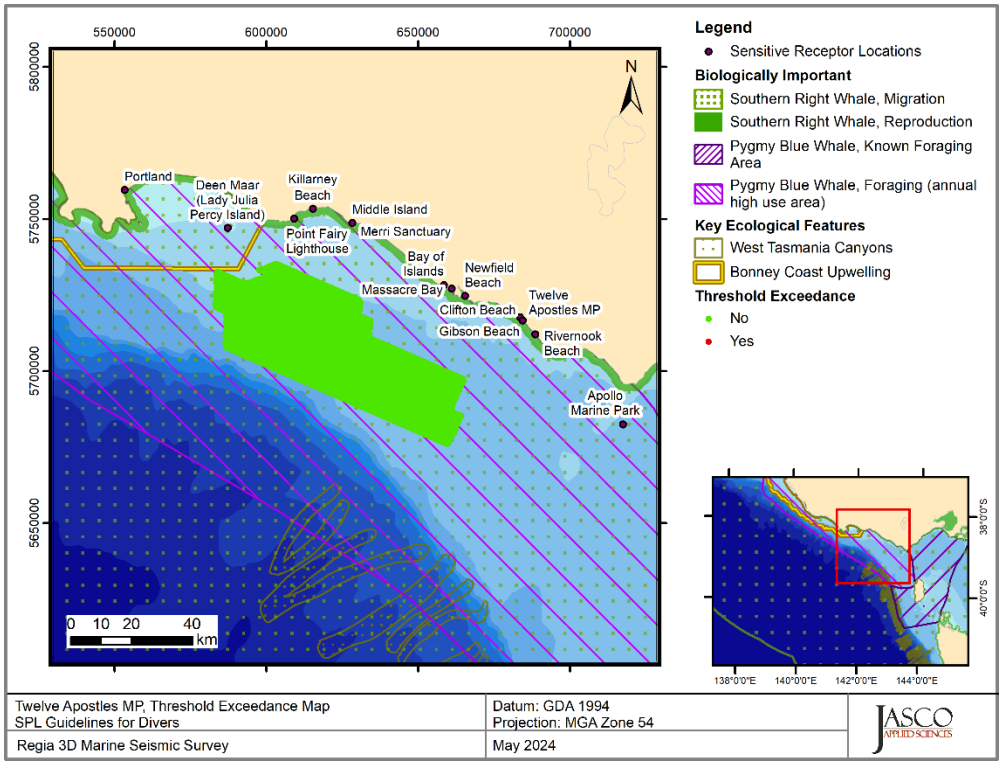

Figure G-14. *SPL, 2820 in³ source,* seismic impulse locations where the human health assessment threshold at Twelve Apostles MP is exceeded.

Appendix H. Supplemental Animal Movement Modelling Results

Histograms of CPA ranges to SEL_{24h} PTS, TTS, and the behavioural response threshold for Scenarios B, C and D are shown in Figures F-1 to F-30.

H.1. Scenario B

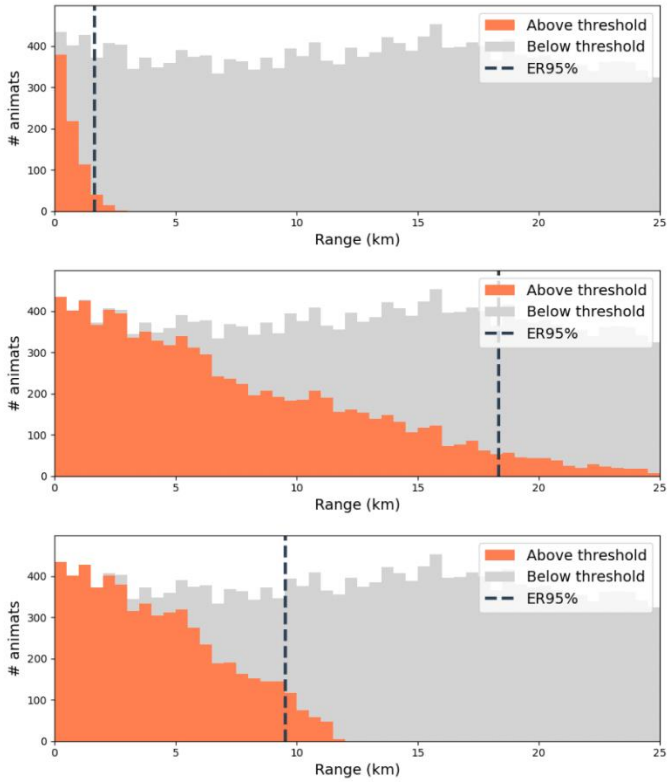

Figure H-1. *Scenario B, female pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

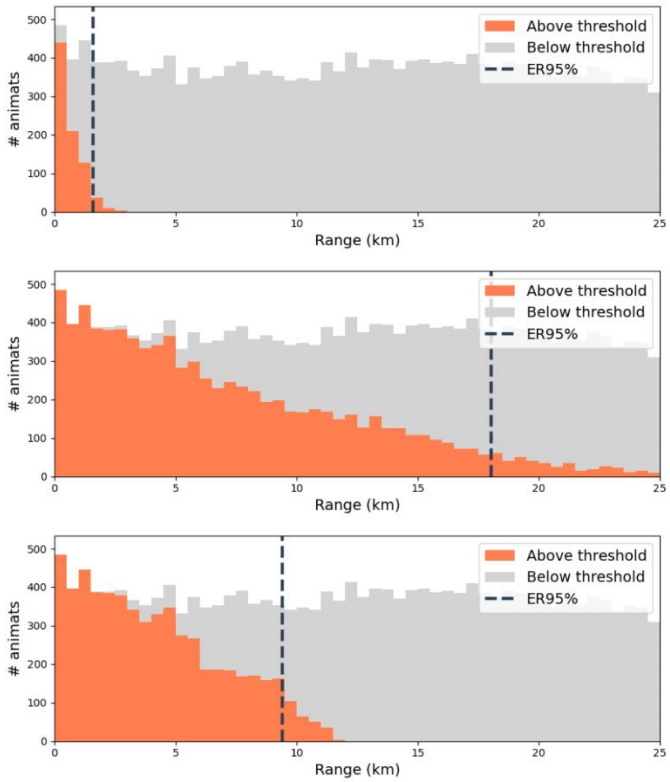

Figure H-2. *Scenario B, male pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

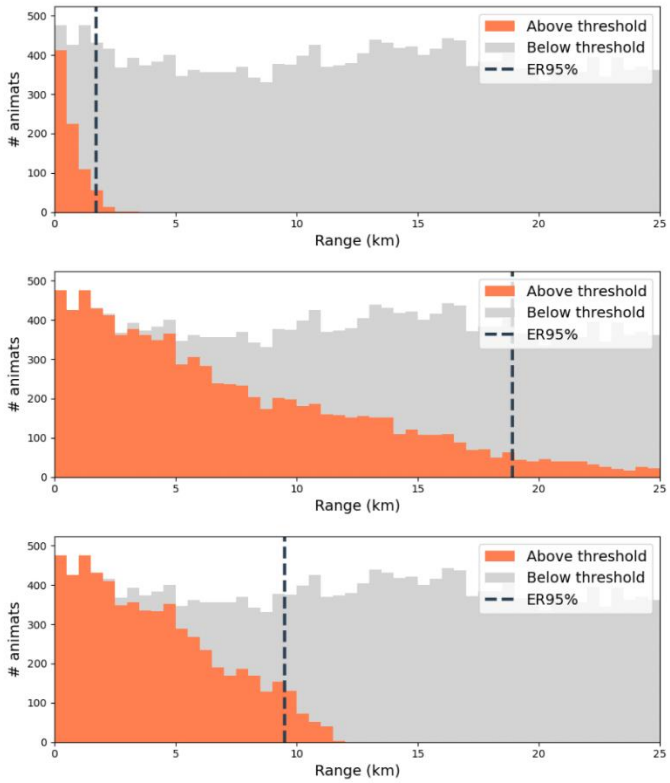

Figure H-3. *Scenario B, female pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

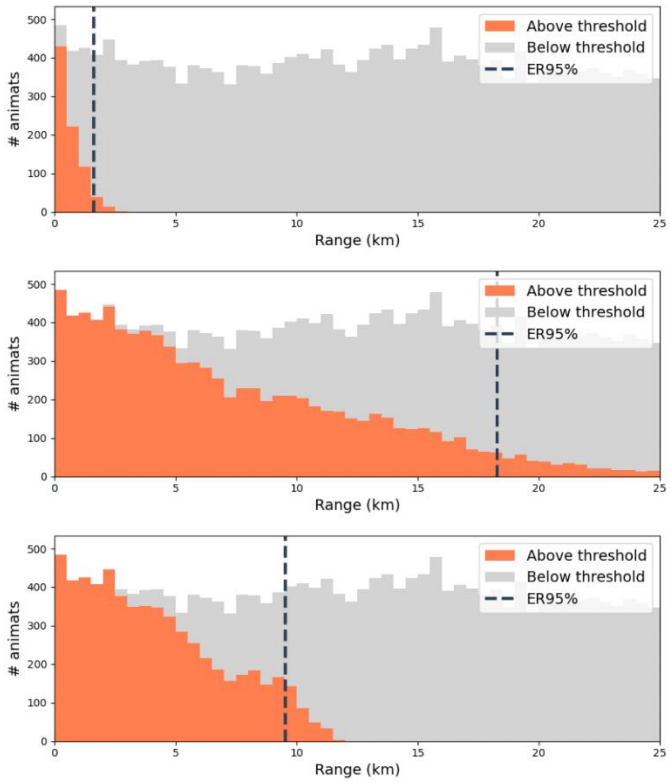

Figure H-4. *Scenario B, male pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

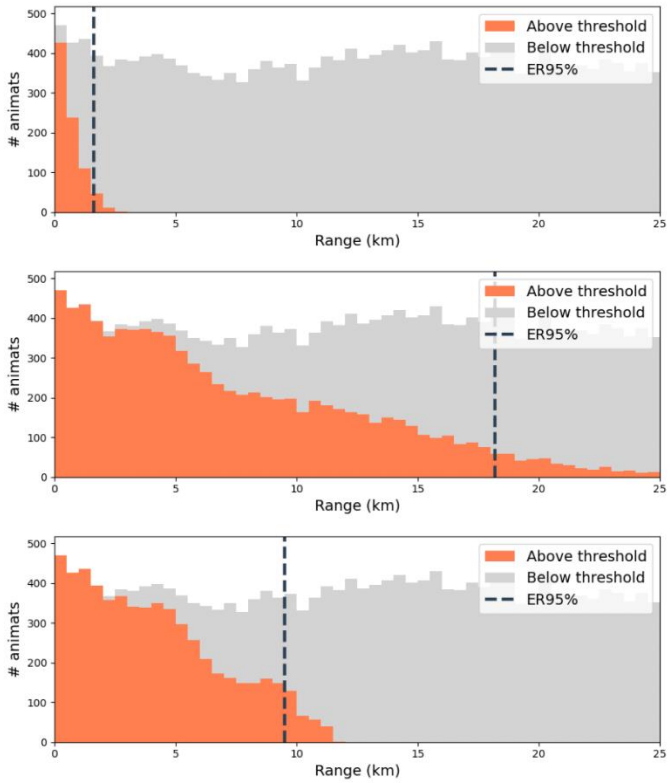

Figure H-5. *Scenario B, female pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

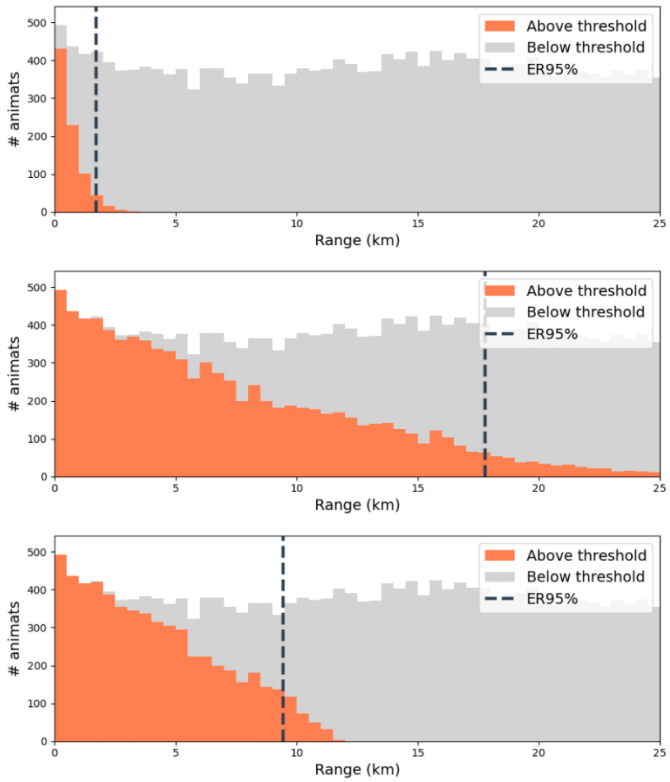

Figure H-6. *Scenario B, male pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

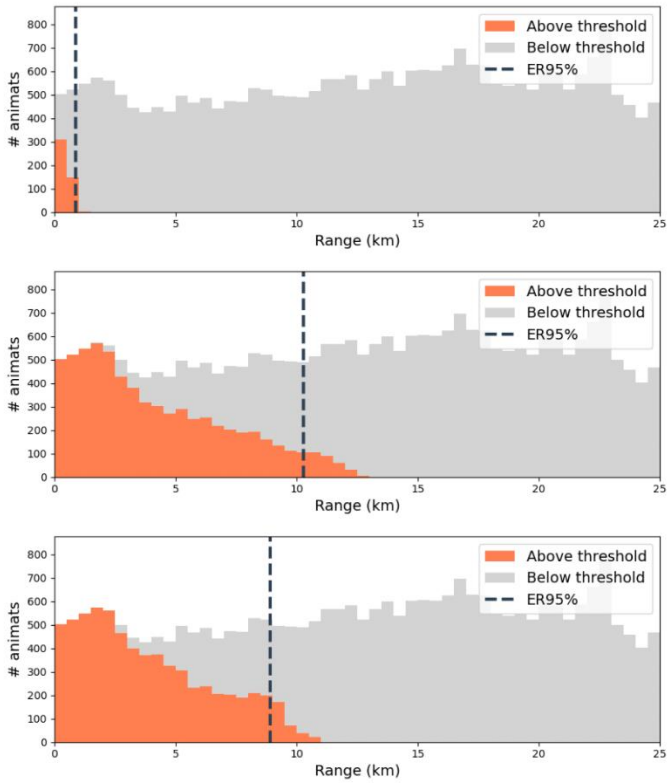

Figure H-7. *Scenario B, migrating southern right whale animats, no calf, unrestricted:* CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

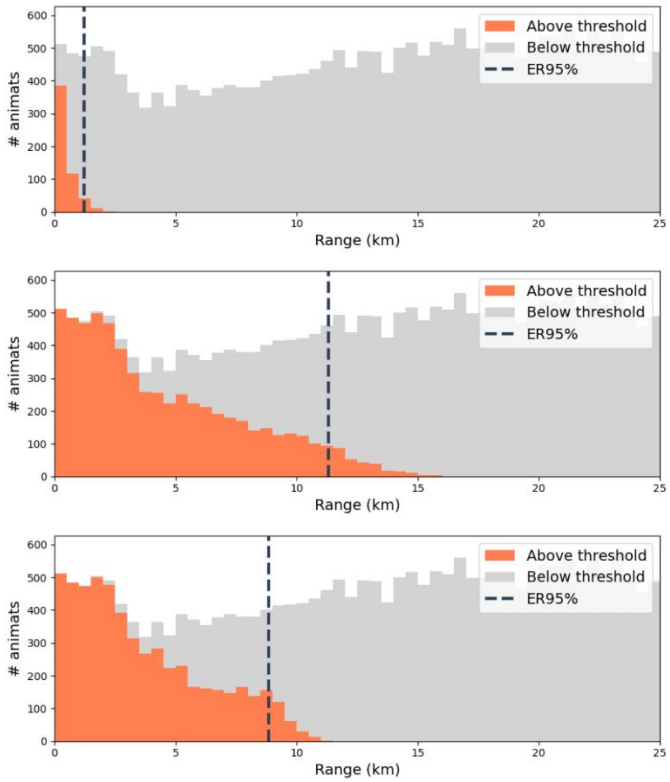

Figure H-8. *Scenario B, migrating southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

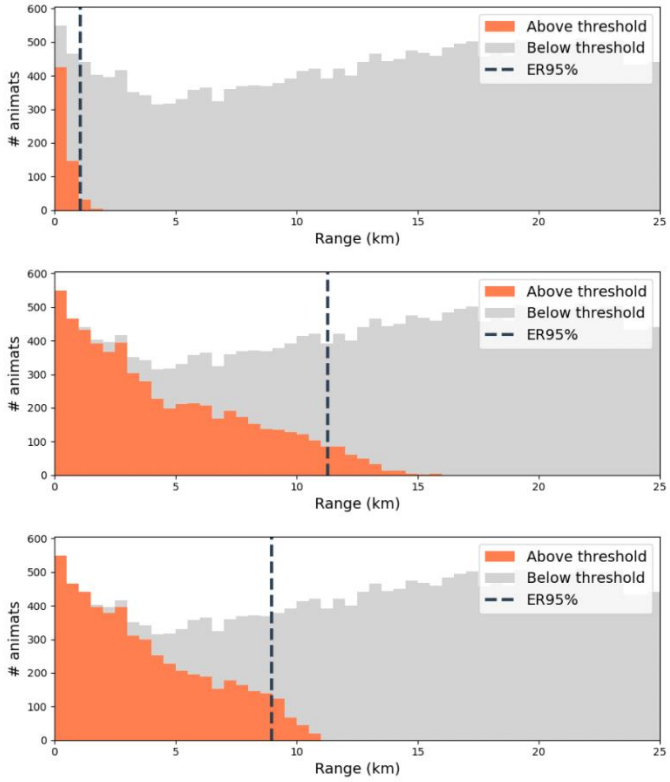

Figure H-9. *Scenario B, reproducing southern right whale animats, no calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

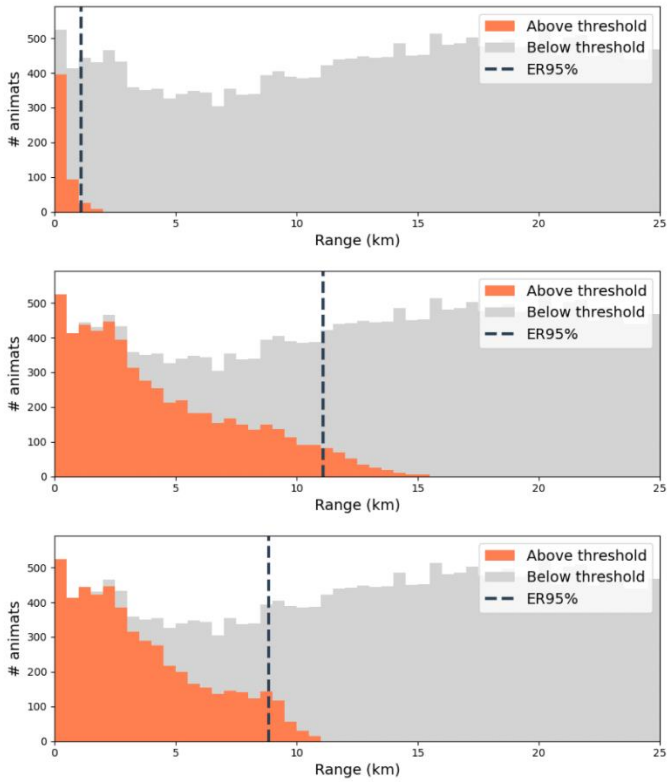

Figure H-10. *Scenario B, reproducing southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

H.2. Scenario C

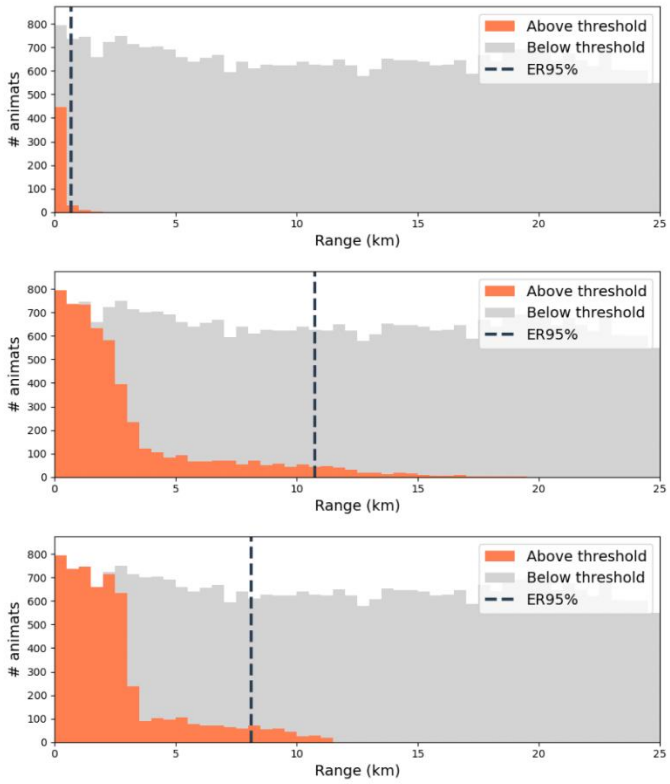

Figure H-11. *Scenario C, female pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

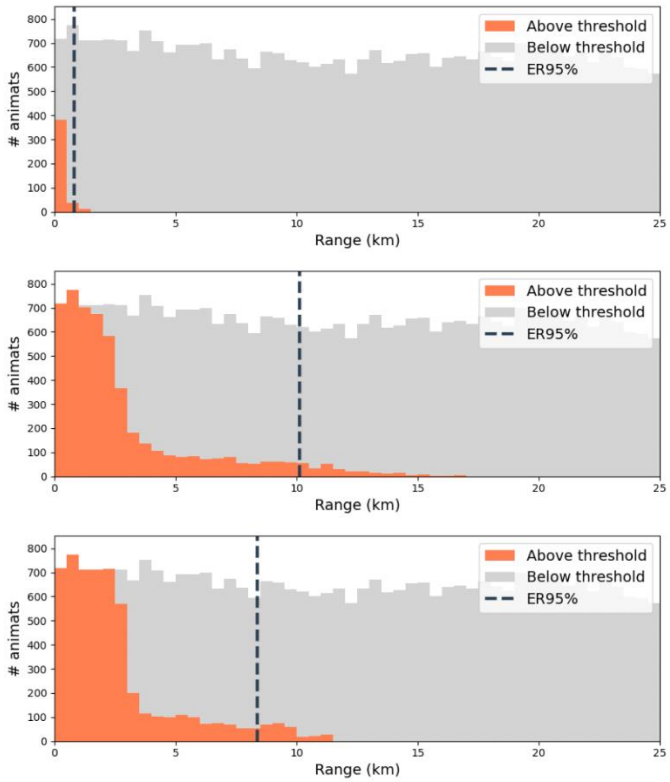

Figure H-12. *Scenario C, male pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

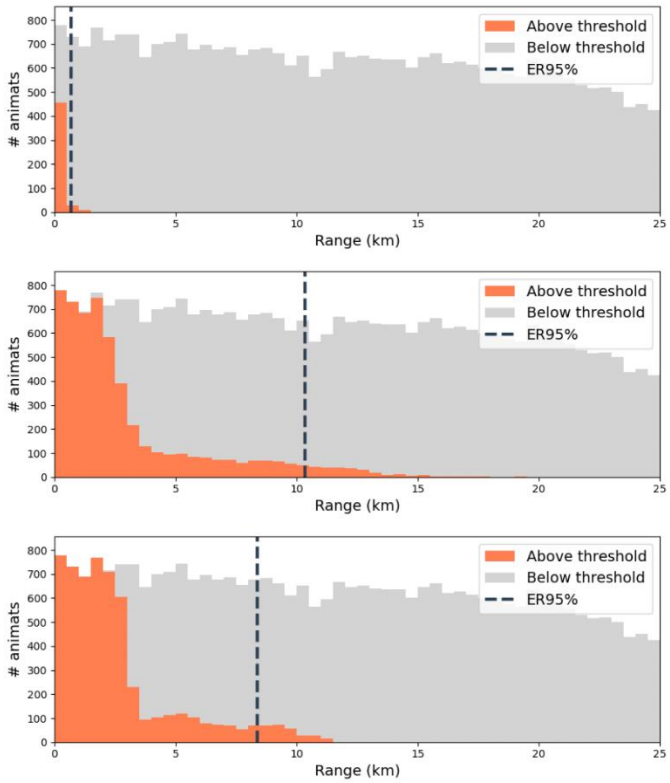

Figure H-13. *Scenario C, female pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

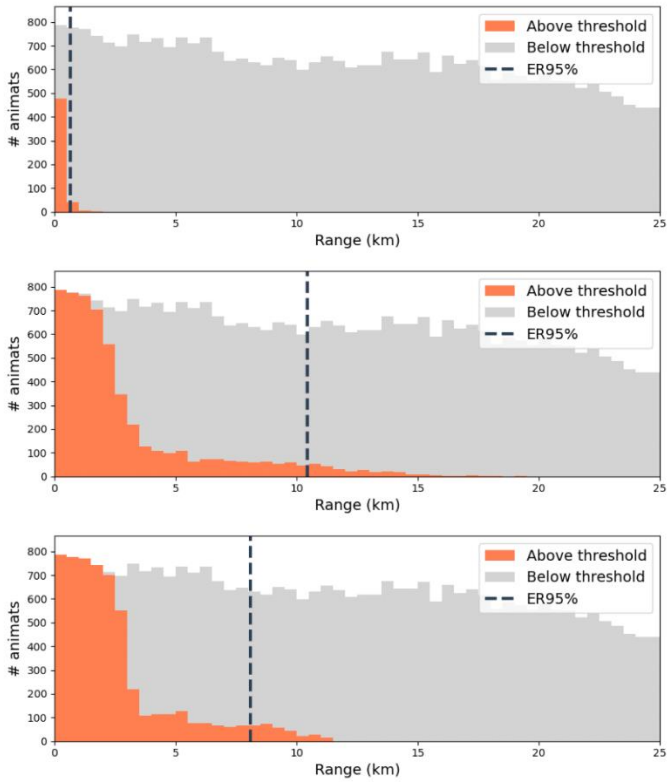

Figure H-14. *Scenario C, male pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

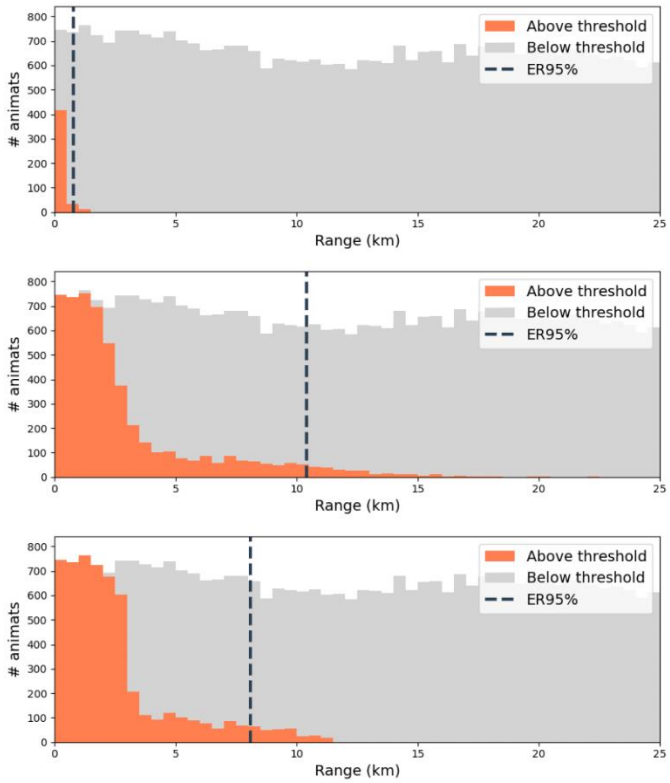

Figure H-15. *Scenario C, female pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

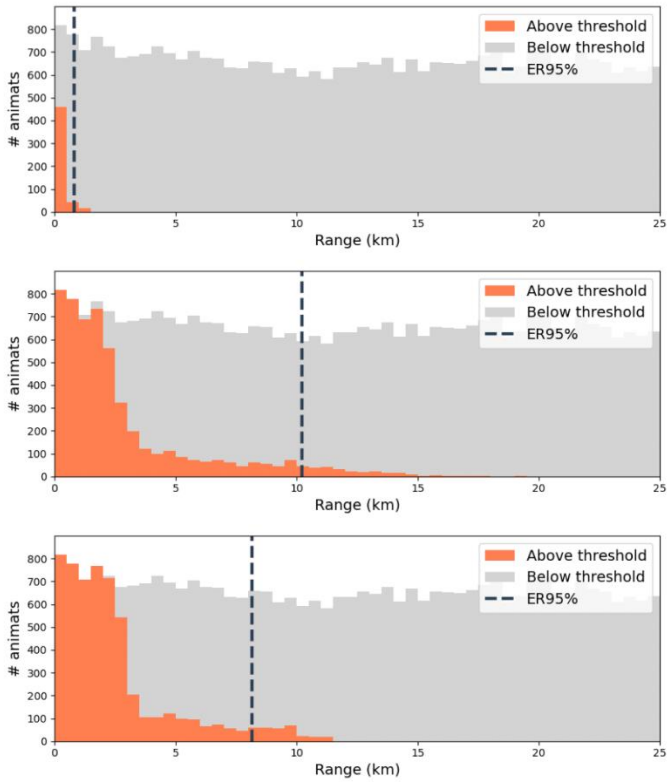

Figure H-16. *Scenario C, male pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

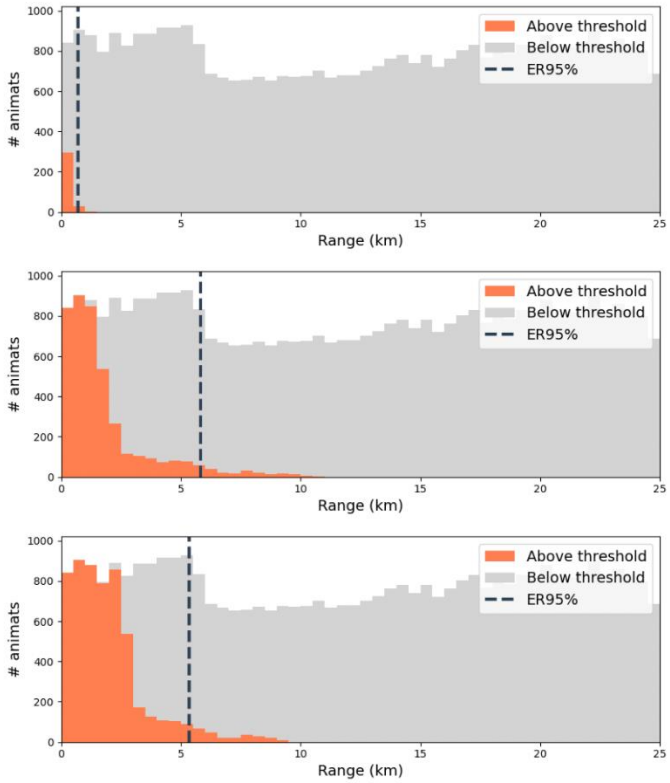

Figure H-17. *Scenario C, migrating southern right whale animats, no calf, unrestricted:* CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

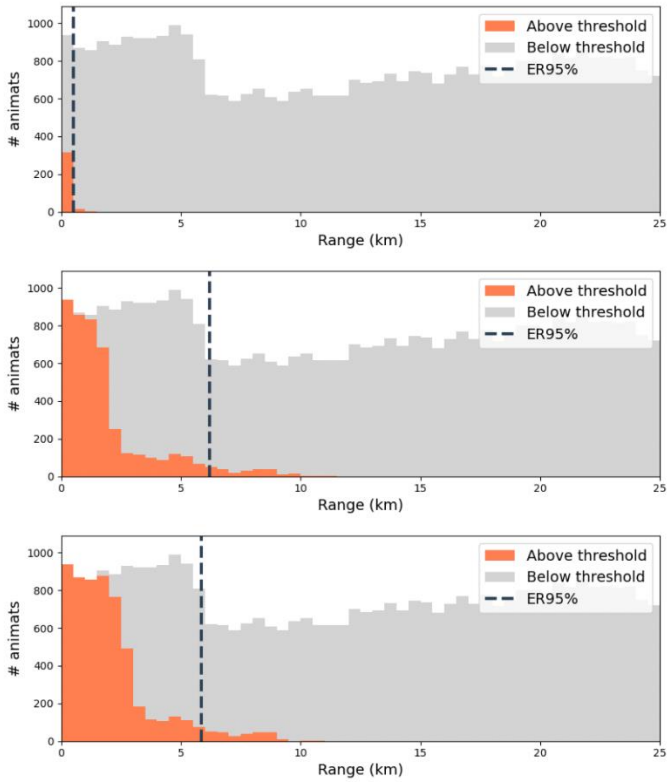

Figure H-18. *Scenario C, migrating southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

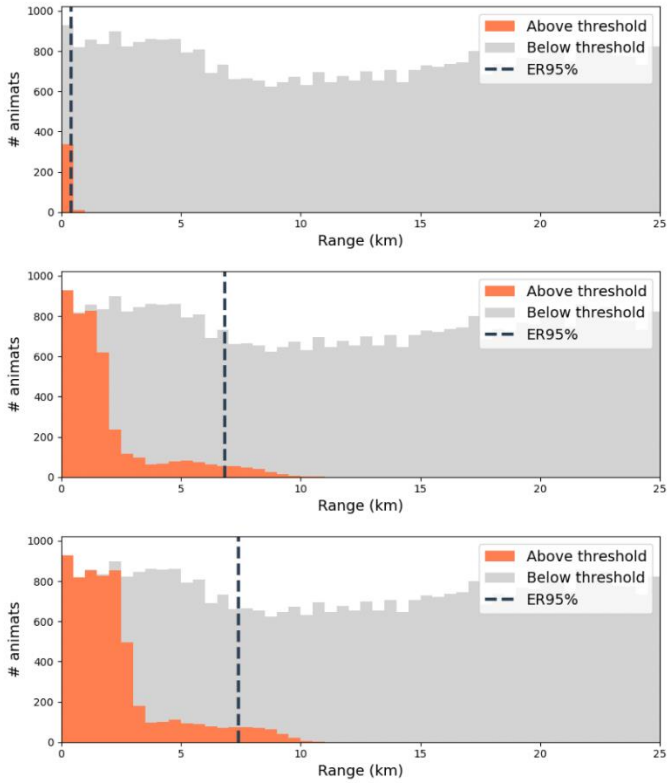

Figure H-19. *Scenario C, reproducing southern right whale animats, no calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

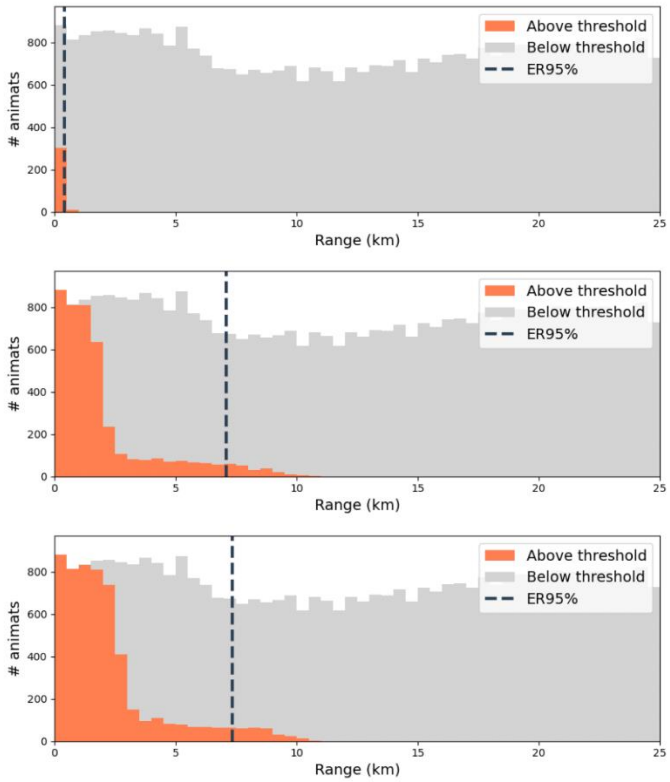

Figure H-20. *Scenario C, reproducing southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

H.3. Scenario D

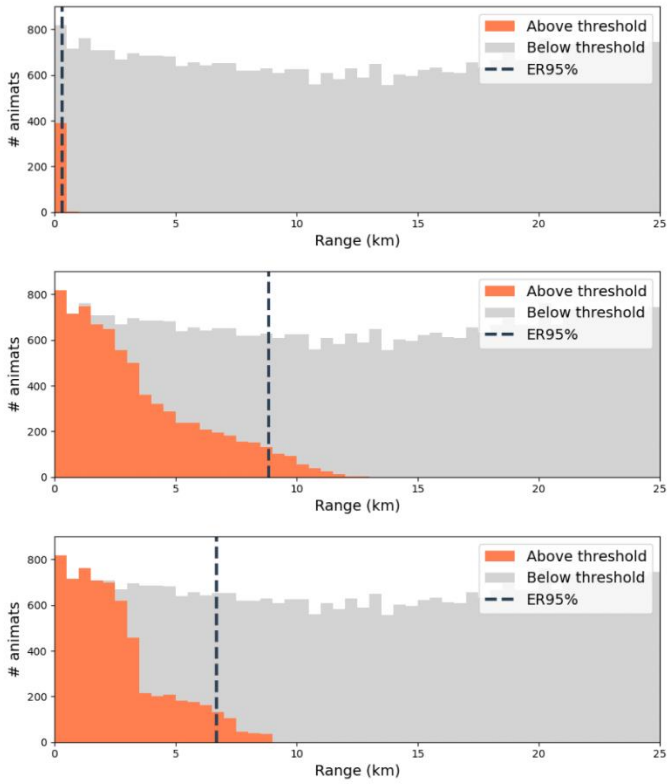

Figure H-21. *Scenario D, female pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

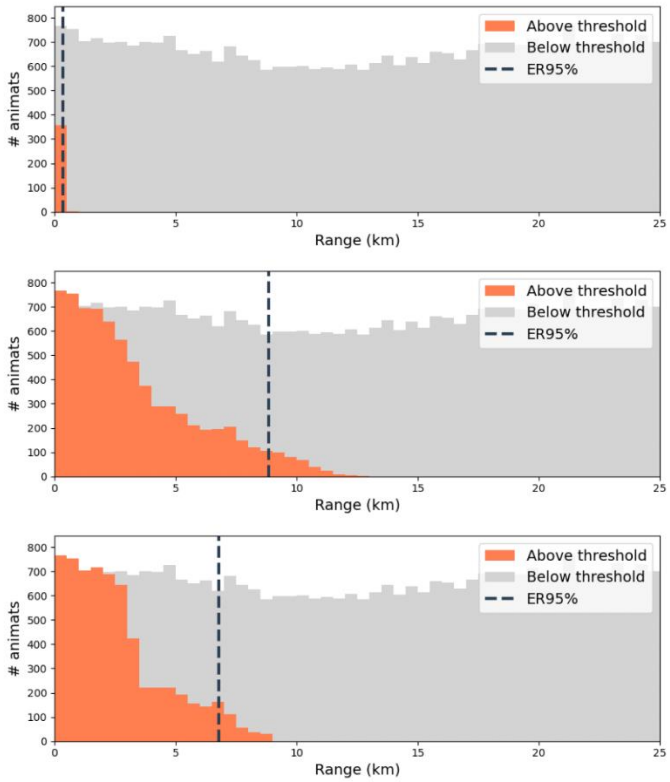

Figure H-22. *Scenario D, male pygmy blue whale animats, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

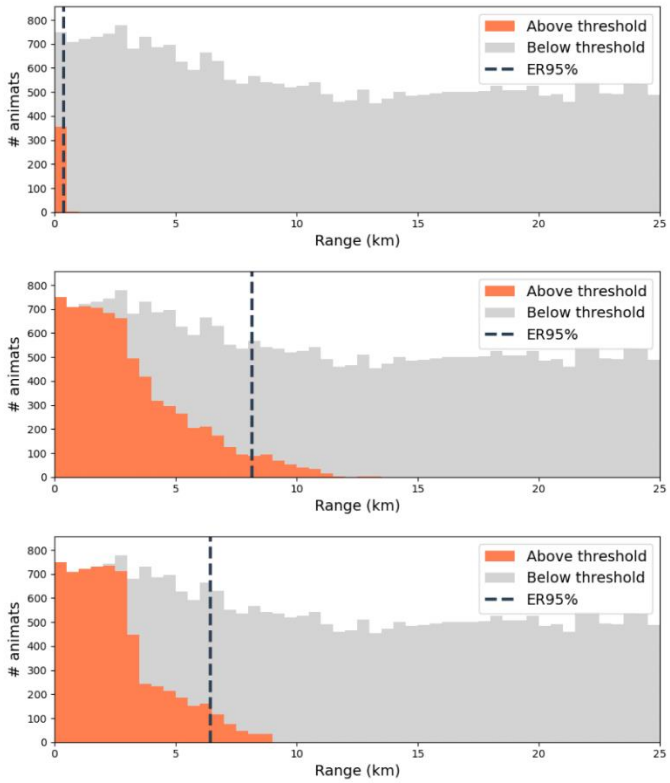

Figure H-23. *Scenario D, female pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

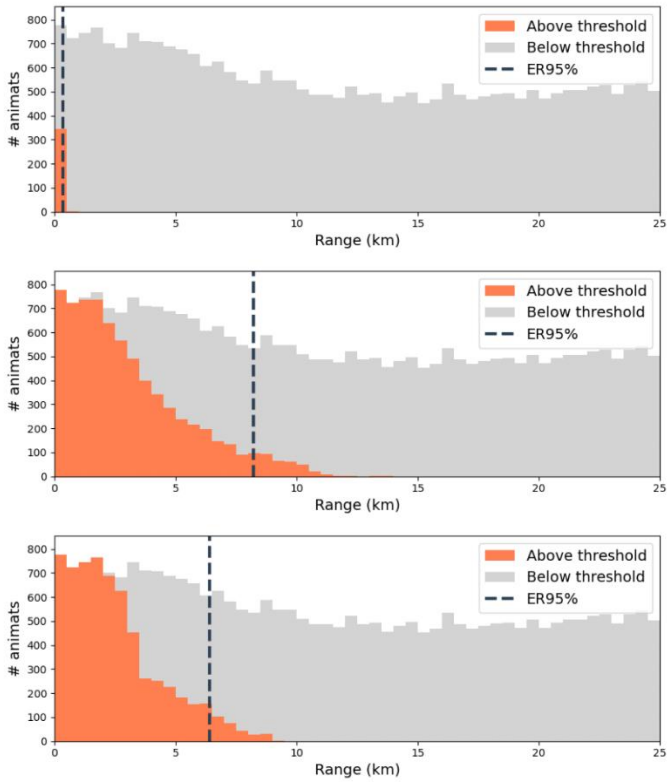

Figure H-24. *Scenario D, male pygmy blue whale animats, restricted to shelf*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

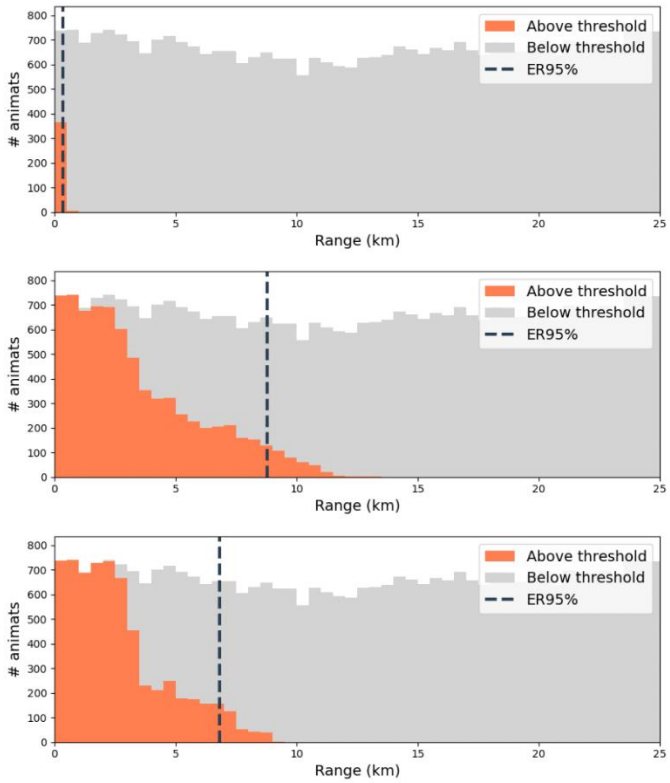

Figure H-25. *Scenario D, female pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

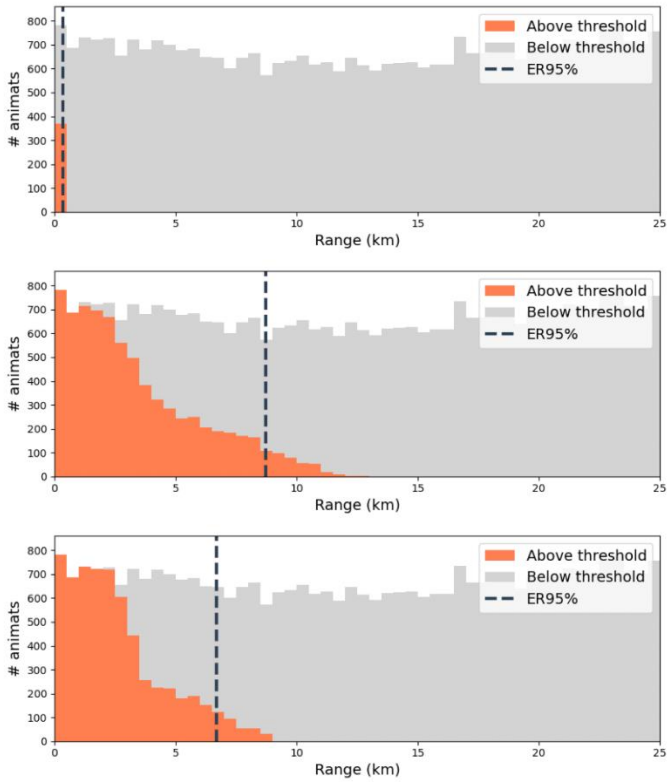

Figure H-26. *Scenario D, male pygmy blue whale animats, restricted to foraging BIA*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

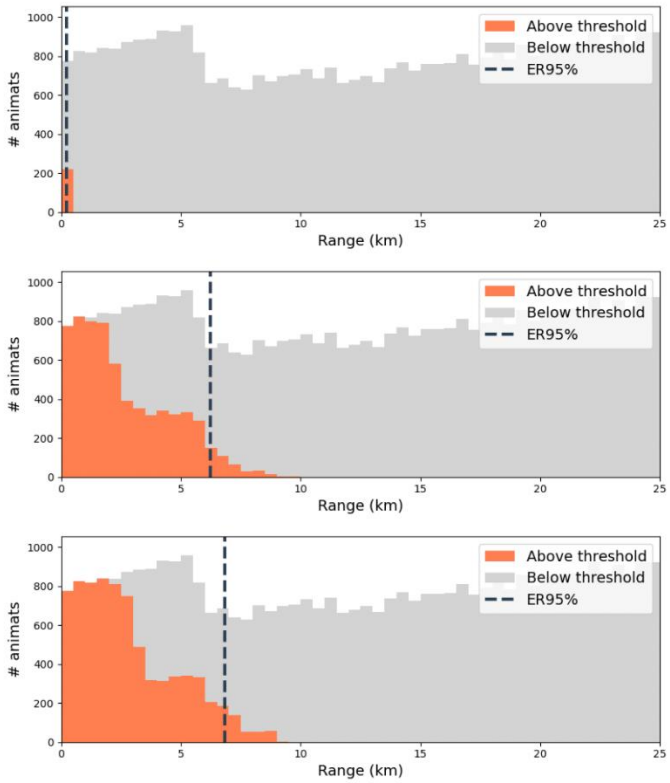

Figure H-27. *Scenario D, migrating southern right whale animats, no calf, unrestricted:* CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

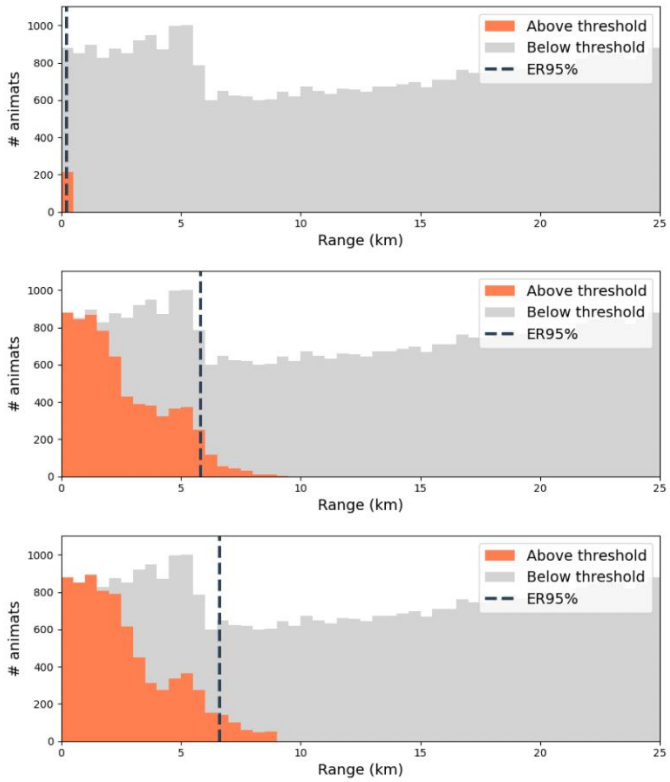

Figure H-28. *Scenario D, migrating southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

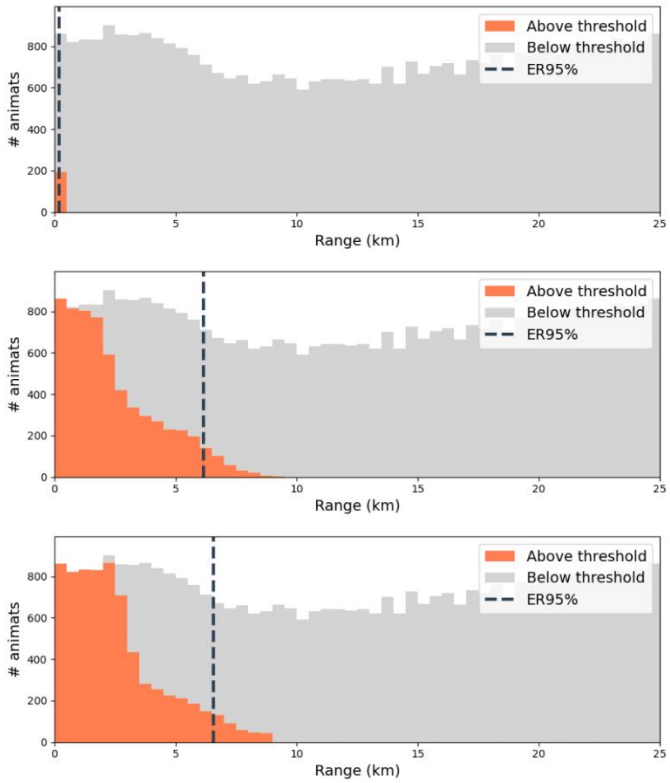

Figure H-29. *Scenario D, reproducing southern right whale animats, no calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

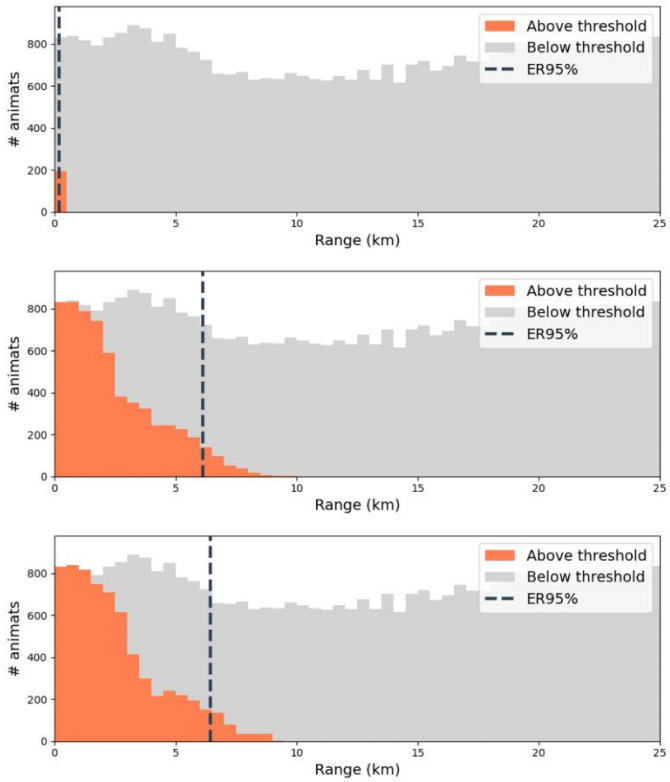

Figure H-30. *Scenario D, reproducing southern right whale animats, with calf, unrestricted*: CPA range histogram for animats, SEL_{24h} PTS threshold (top panel), SEL_{24h} TTS threshold (middle panel), SPL behavioural threshold (bottom panel). Bar colours indicate whether the animats exceeded the threshold.

Regia Marine Seismic Survey in the Otway Basin

Underwater Sound Transmission Loss Modelling Study

Klarite Pty Ltd

100 Herdsman Parade
Wembley WA 6014 Australia

Prepared by:

SLR Consulting (Canada) Ltd.

200 - 887 Great Northern Way, Vancouver, BC V5T 4T5

SLR Project No.: 675.073227.00001

December 1, 2025

Revision: 1

Revision Record

Revision	Date	Prepared By	Checked By	Authorized By
0	November 18, 2025	Jonathan Vallarta	Justin Eickmeier	Jonathan Vallarta
1	December 1, 2025	Jonathan Vallarta	Justin Eickmeier	Jonathan Vallarta

Statement of Limitations

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Executive Summary

The report provides a comprehensive underwater noise impact assessment for the proposed Regia Marine Seismic Survey in the Otway Basin, southwest of Victoria, Australia. The study evaluates acoustic emissions from two seismic source array technologies (Conventional G-Gun II and Bluepulse) using advanced Sound Transmission Loss Modelling (STLM) and Animat Modelling. The modelling incorporates updated NMFS 2024 noise exposure criteria, site-specific bathymetry, geoacoustic profiles, and seasonal sound speed profiles to predict zones of impact for marine fauna, including marine mammals, turtles, fish, diving seabirds, invertebrates, and human divers.

The modelling demonstrates that conventional arrays produce higher peak and root-mean-square sound pressure levels (SPL), while Bluepulse significantly reduces unnecessary high-frequency emissions (> 200 Hz), thereby lowering ecological risk. Immediate physiological impacts such as auditory injury (AUD INJ) and temporary threshold shift (TTS) are confined to tens of meters from the source, whereas behavioural disturbance can extend to tens or even hundreds of kilometres, particularly for low-frequency cetaceans. Cumulative exposure modelling under worst-case assumptions predicts larger impact zones, though these are precautionary and likely overestimate real-world exposure. Bluepulse consistently reduces impact ranges across all scenarios, with shallow-water sites showing greater near-field amplification compared to deep-water sites.

For low-frequency (LF) cetaceans, immediate exposure zones for AUD INJ range from approximately 73 m for conventional arrays to 62 m for Bluepulse, while behavioural disturbance may extend up to 160 km and 130 km respectively; cumulative exposure zones for TTS can reach 28 km for conventional arrays versus 10 km for Bluepulse.

Turtles exhibit immediate AUD INJ zones of 51 m versus 39 m and behavioural disturbance up to 1.6 km versus 1.3 km, while fish mortality zones range from 210 m to 104 m and behavioural disturbance up to 13.8 km versus 12.7 km.

Diving seabirds show AUD INJ zones of 55 m versus 44 m and behavioural disturbance up to 10.6 km versus 2.3 km, whereas invertebrates such as lobsters and squid may experience behavioural disturbance at distances of 397 m versus 220 m and 2.7 km versus 2.4 km respectively.

Human divers could experience slight aversion at distances of 24 km versus 23.5 km, with cumulative tolerance limits extending beyond 160 km.

Additionally, Appendix F include the Animat modelling of pygmy blue whales and southern right whales using the modelled sound fields conducted by Marine Acoustics, Inc. (MAI) to assess potential acoustic exposure of pygmy blue whales and southern right whales during a proposed seismic survey in the Otway Basin, off southern Australia. Using the Acoustic Integration Model (AIM), simulations integrated realistic animal movement patterns with predicted sound fields from two seismic source types—conventional airguns and the Bluepulse system—across two representative track lines. The analysis evaluated exposure against regulatory thresholds for AUD INJ, TTS, and behavioural SPLs (120, 140, 160 dB). Species-specific behaviour profiles, including foraging and migrating states and mother-calf dynamics, were incorporated to ensure ecological relevance.

Results show that conventional sources produce significantly larger exposure ranges for physiological thresholds compared to Bluepulse. Transect scenario C (Site 15) consistently yielded greater exposure ranges than transect scenario D (Site 7), reflecting spatial variability in

acoustic propagation. Animat predictions for behavioural disturbance also show lower ranges when comparing to Bluepulse.

Overall, findings highlight the effectiveness of Bluepulse in reducing high-level acoustic impacts and underscore the importance of site-specific planning and alternative technologies to mitigate risks to vulnerable cetacean populations during seismic operations. While seismic surveys inherently generate high-intensity impulsive noise, the integration of updated criteria, advanced modelling, and alternative source technologies provides a robust framework for impact prediction and mitigation.

These findings support environmentally responsible planning and regulatory compliance for seismic activities in the Otway Basin and underscore the importance of adopting Bluepulse technology, prioritizing deep-water survey lines, implementing exclusion zones based on updated NMFS criteria, scheduling operations outside critical migration and calving periods, and deploying real-time acoustic monitoring and marine fauna observers.

Table of Contents

Statement of Limitations ..... **ii**
Executive Summary ..... **iii**
Table of Contents ..... **v**
Acronyms and Abbreviations ..... **ix**
1.0 Introduction **1**
1.1 Project Background 1
1.2 Content and Structure of the Report 3
2.0 Underwater Noise Environment **4**
2.1 Introduction to Underwater Noise Concepts 4
2.2 Underwater Noise Metrics 4
2.3 Ocean Ambient Noise 5
2.3.1 Otway Basin Ambient Noise 8
2.3.2 Shipping Traffic in the Project Area 9
3.0 Underwater Noise Impact Assessment Criteria **10**
3.1 Marine Fauna Hearing Sensitivity 10
3.2 Possible Noise Impacts on Marine Fauna 11
3.2.1 Masking 11
3.2.2 Behavioural Response and Disturbance 12
3.2.3 Hearing Impairment 12
3.2.4 Physical Injury 12
3.3 Criteria for Determining Adverse Noise Effects 13
3.3.1 Marine Mammals 14
3.3.2 Turtles 15
3.3.3 Fish Groups 16
3.3.4 Diving Seabirds 17
3.3.5 Invertebrates 18
3.3.6 Human Divers 19
3.3.7 Hearing sensitivity of human divers 19
3.3.8 Maximum exposure thresholds 19
3.4 Impacts Zones on Marine Fauna 21

4.0 Sound Transmission Loss Modelling 22
4.1 Modelling Input Parameters 22
4.1.1 Bathymetry 22
4.1.2 Sound Speed Profiles 23
4.1.3 Seafloor Geo-acoustic Model 24
4.2 Modelling Source Scenarios 26
4.2.1 Source Array Configuration 26
4.2.2 Source Locations 27
4.2.3 Survey Lines 28
4.3 Methodology and Procedure 30
4.3.1 Notional signature 30
4.3.2 Conversion Factors 31
4.3.3 Short Range Modelling 33
4.3.4 Long Range Modelling 34
4.3.5 Cumulative SEL Modelling 34
4.3.6 Model Validation 35
4.4 Impact Zones on Marine Fauna 36
5.0 Modelling Results 37
5.1 Seismic Source 37
5.1.1 Notional Signature 38
5.1.2 Far-field Signatures 38
5.1.3 Beam Patterns 40
5.2 Short Range Modelling 42
5.3 Long Range Modelling 42
5.4 Cumulative SEL Modelling 43
6.0 Impact Zones 43
6.1 Immediate Exposure from Single Pulses 44
6.1.1 Marine Mammals and Turtles 44
6.1.2 Fish 45
6.1.3 Diving Seabirds 45
6.1.4 Invertebrates 45
6.1.5 Human Divers 46

6.2 Cumulative Exposure from Multiple Pulses....46
6.2.1 Marine Mammals and Turtles....46
6.2.2 Fish....47
6.2.3 Diving Seabirds....47
6.2.4 Invertebrates....47
6.2.5 Human Divers....47
7.0 Discussion....48
8.0 Closure....50
9.0 References....51

Tables in Text

Table 1: Hearing Capabilities of Marina Fauna Groups Based on Composite Audiograms....11
Table 2: Noise criteria for marine mammals exposed to impulsive noise sources....15
Table 3: Noise criteria for turtles exposed to impulsive noise....16
Table 4: Noise criteria for fish hearing groups exposed to impulsive noise....17
Table 5: Noise criteria for diving seabirds exposed to impulsive noise....18
Table 6: Noise criteria for invertebrates exposed to impulsive noise....19
Table 7: Noise criteria for human divers exposed to a single seismic pulse....20
Table 8: Noise criteria for human divers exposed to multiple seismic pulses....21
Table 9: Geo-acoustic parameters for the proposed seabed model of sites 10 and 15....25
Table 10: Geo-acoustic parameters for the proposed seabed model of site 7....25
Table 11: Source array configuration (Conventional and Bluepulse 2630 CUI)....27
Table 12: Details of the three selected source locations for the long-range modelling....27
Table 13: Details of the selected transect survey lines for the cumulative SEL modelling for scenario C....29
Table 14: Details of the selected transect survey lines for the cumulative SEL modelling for scenario D....29
Table 15: Noise source levels (Conventional and Bluepulse 2630 CUI)....37
Table 16: Summary of maximum impact zones modelled by the STLM study....49

Figures in Text

Figure 1: Location of the active survey and operational areas within the Otway Basin, located off the southwest coast of Victoria, Australia....2
Figure 2: Levels and Frequencies of Sound Sources in the Marine Environment....6

Figure 3: Spectra and Frequency Distribution of Ocean Sound Sources 8
Figure 4: Shipping traffic density at Otway Basin, around the seismic and operational area (green)..... 9
Figure 5: Composite Audiograms of Marine Fauna Based on Various Studies 10
Figure 6: Potential zones of noise impact on marine fauna.....13
Figure 7: Human audiograms in air and water (Parvin and Nedwell 1995).....20
Figure 8: Bathymetric imagery within and around the seismic operational area (black).....23
Figure 9: Typical sound speed profile within the survey area during the winter season.....24
Figure 10: Schematic of seismic source array configuration (Conventional and Bluepulse 2630 CUI).....26
Figure 11: Representation of the selected source locations (orange) over the survey area 28
Figure 12: Representation of cumulative SEL 24-hour survey lines (green and blue) over the survey area.....30
Figure 13: SEL to SPL conversion factor as a function of horizontal range from the conventional and Bluepulse source array 2630 CUI.....33
Figure 14: One-third-octave band spectral SL (Conventional and Bluepulse 2630 CUI) 37
Figure 15: Notional source signatures for the source elements in the source array 2630 CUI - Conventional (left) and Bluepulse (right).....38
Figure 16: Waveform of the far-field signature in the vertically downward direction for the Conventional and Bluepulse (BP200) source array 2630 CUI.....39
Figure 17: Power spectral density of the far-field signature for the Conventional and Bluepulse (BP200) source array 2630 CUI 39
Figure 18: Array far-field beam patterns for Conventional (left) and Bluepulse (right) array 2630 CUI as a function of orientation and frequency.....41
Figure 19: Modelled maximum SELs across the water column for all azimuths as a function of range (0 – 4 km) from the source locations for the Conventional (left) and Bluepulse (right) array 2630 CUI.....42

Appendices

Appendix A Acoustic Terminology
Appendix B Auditory Weighting Functions
Appendix C Marine Fauna Classification
Appendix D Noise Modelling Table Results
Appendix E Noise Modelling Results and Exclusion Zone Maps
Appendix F MAI Otway Basin Animat Modelling Report

Acronyms and Abbreviations

µPa	micro-Pascal
ANSI	American National Standards Institute
AUD INJ	Auditory Injury
CF	Cumulative Factor
CT	Conventional tanker
CUI	cubic Inch
dB	decibel
DoN	Department of the U.S. Navy
ESIA	Environmental and Social Impact Assessment
FHWG	Fisheries Hydroacoustic Working Group
GEBCO	General Bathymetric Chart of the Oceans
HF	High-Frequency cetacean group
Hz	Hertz
ISO	International Organization for Standardization
kHz	Kilohertz
km	kilometre
km^2	square kilometre
LE	Source exposure level metric
LF	Low-Frequency cetacean group
Lp	Sound pressure level metric
LS	Source level metric
m	metre
MMS	Marine Seismic Survey
MMscfd	million standard cubic foot per day
NATO	North Atlantic Treaty Organization
NMFS	National Marine Fisheries Services
NOAA	National Oceanic and Atmospheric Administration
OW	Otariid pinnipeds in Water group
PE	Parabolic Equation
PK	Peak
PSD	Power Spectral Density
PSI	Pound per square inch
PTS	Permanent hearing Threshold Shift

PW	Phocid pinnipeds in Water group
rms	Root-mean-square
rpm	revolution rate
s	Seconds
SEL	Sound Exposure Level
SEL_W	Weighted Sound Exposure Level
SI	Sirenians group
SL	Source Level
SLR Canada	SLR Consulting (Canada) Ltd.
SPL	Sound Pressure Level
STLM	Sound Transmission Loss Modelling
TTS	Temporary hearing Threshold Shift
TU	Turtle group
VHF	Very High-Frequency cetacean group
WG	Working Group

A glossary of acoustic terminology is provided in Appendix A.

1.0 Introduction

1.1 Project Background

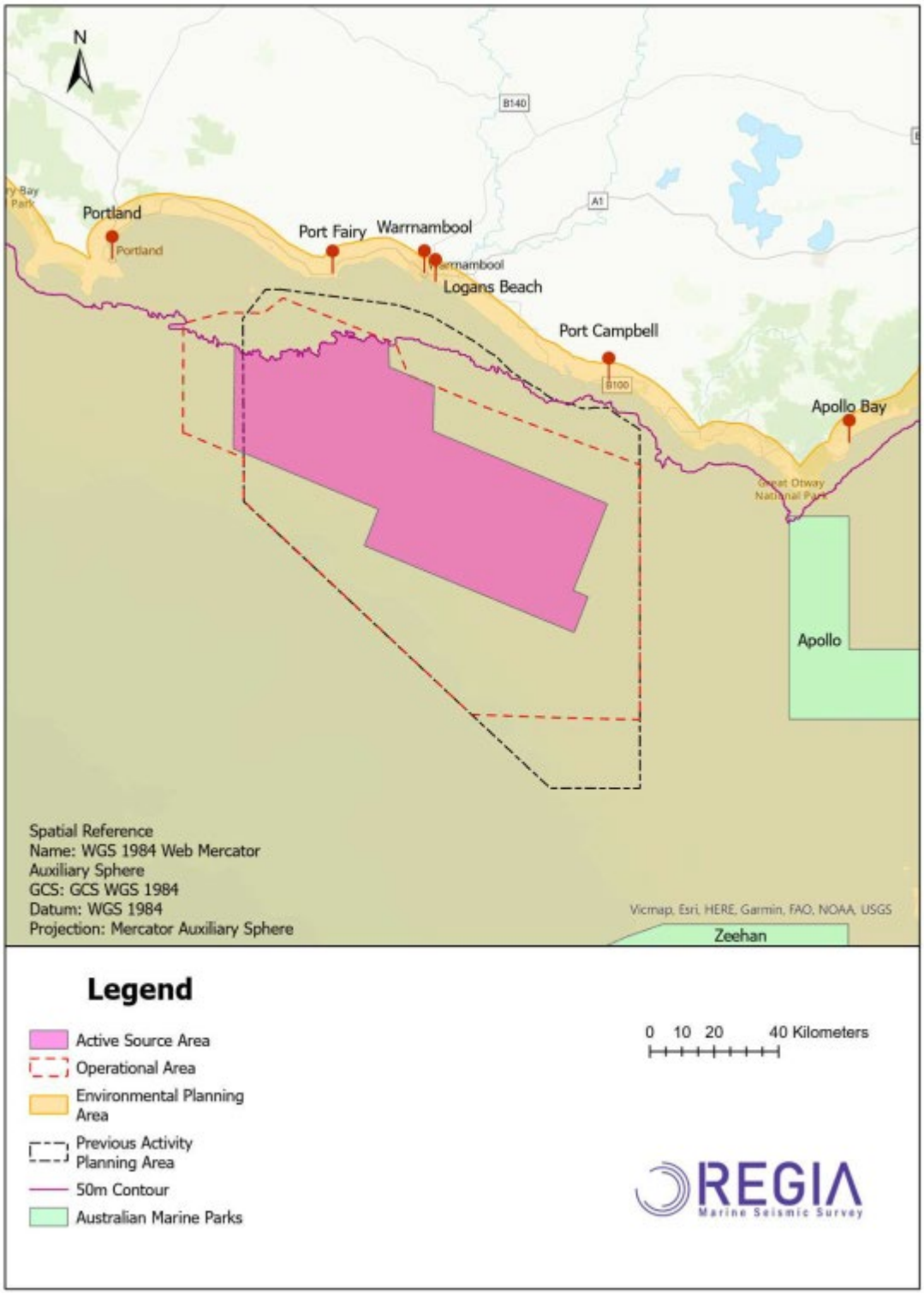
CGG Services Australia Pty Ltd is proposing a Regia Marine Seismic Survey (Regia MSS), a large-scale offshore geophysical exploration initiative in the Otway Basin, located off the southwest coast of Victoria. The project aims to collect high-resolution seismic data to better understand subsurface geological formations and assess potential oil and gas resources. Spanning approximately 2,750 square kilometres in Commonwealth waters, the survey will involve advanced acoustic technologies deployed from a single vessel, operating over a period of up to 90 days (Figure 1).

An initial modelling study requested by CGG provided detailed predictions of the expected sound emissions from the Regia MSS. It included modelling results, sound level contour maps, and comprehensive assessments of potential exposure to marine wildlife, including behavioural and physiological impacts. A subsequent modelling study accounted for increased depth and additional areas of geophysical interest, as well as sound exposure at popular recreational and commercial dive sites. It also accounted for changes in activity design up to the point of its commission. Both reports were based on the marine mammal noise exposure criteria published by the National Oceanic and Atmospheric Administration (NOAA) in 2019.

In October 2024, the United States National Marine Fisheries Service (NMFS) published a peer-reviewed update to its Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing. The updates include new information and changes to sound impact threshold, which are likely to alter the ranges for predicted effects on marine mammals detailed in previous studies. In April 2025, SLR Consulting (SLR) carried out a high-level assessment of the latest acoustic modelling study using the latest NMFS technical guidance (2024), and the results were summarized in a technical letter. This new modelling study considers several other elements not taken into account in previous acoustic modelling studies carried out on the proposed activity, namely updated noise criteria for marine mammals published recently (NMFS 2024), the application of a slightly different airgun source array (lower volume) and application of a new source array from Sercel technology (i.e., Bluepulse) to limit emissions of higher frequencies from the source.

In order to assess the potential noise impacts on marine fauna when considering the other elements as described above, SLR Consulting (Canada) Limited (SLR Canada) has been commissioned by Klarite Proprietary Limited (Klarite) to undertake a standalone Sound Transmission Loss Modelling (STLM) and Animat Modelling study to determine the zones of impact for different marine faunal groups of concern for the major noise sources associated with the proposed offshore seismic survey activities on the Otway Basin area.

Figure 1: Location of the active survey and operational areas within the Otway Basin, located off the southwest coast of Victoria, Australia



1.2 Content and Structure of the Report

This modelling study includes the following components:

- Source modelling, i.e., modelling of sound energy emissions from the source arrays proposed to be used in the seismic surveys, including the far-field signature and its power spectral density (PSD), as well as the beam pattern of the source array.
- Short-range modelling, i.e., prediction of the received noise levels over a range of up to four kilometres from the selected array source location of various depths, in order to investigate sound field variations due to the water depth changes, as well as to assess the potential high-risk immediate noise impact to marine fauna species of interest.
- Long-range modelling, i.e., prediction of the received noise levels over a range of up to two hundred kilometres from the selected array source locations, in order to assess the potential noise impact from the surveys on relevant far-field marine sensitive areas.
- Cumulative noise exposure modelling, i.e., prediction of the cumulative sound exposure levels over a 24-hour period for selected representative survey scenarios adjacent to sensitive marine areas, to assess the potential cumulative noise impact on marine fauna species of interest.
- Zones of impact, i.e., prediction for immediate exposure from single pulses and cumulative exposure from multiple pulses in order to assess noise impact on local marine receptor groups.
- Comparative analysis between the two source arrays modelled results.

The report content is summarised below:

- Section 2.0 of the report provides a summary of underwater noise concepts and noise metrics used in this study, including shipping traffic in the project area.
- Section 3.0 details relevant noise impact assessment for marine animals, including the noise criteria for different marine fauna groups and human divers.
- Section 4.0 outlines the methodologies and procedures for the seismic survey acoustic modelling components, including the input parameters and modelling scenarios.
- Section 5.0 presents the STLM modelling results for the source array, the short-range, long-range, and cumulative modelling.
- Section 6.0 includes the estimated impact zones for different marine faunal groups and human divers.
- Section 7.0 provides a discussion of the key findings of the STLM and Animat study.
- Section 9.0 provides references cited in the report.

Additional technical information is provided in Appendices:

- Appendix A – Acoustic Terminology
- Appendix B – Auditory Weighting Functions
- Appendix C – Marine Fauna Classification
- Appendix D – Noise Modelling Table Results
- Appendix E – Noise Modelling Figure Results and Exclusion Zone Maps
- Appendix F – MAI Otway Basin Animat Modelling Report

2.0 Underwater Noise Environment

2.1 Introduction to Underwater Noise Concepts

Sound is a form of energy made by vibrations. When an object vibrates, it causes the fluid particles around it to move. These particles collide with nearby particles, and this continues until they run out of energy.

In underwater acoustics, the word sound is used to describe all the pressure waves that are generated in an underwater medium. Sound waves propagate as alternate phases of compression and rarefaction. Compression occurs when molecules are pressed together. Rarefaction is just the opposite; molecules are allowed to expand.

There are two types of sound waves: transversal and longitudinal. In physics, a transverse wave is a wave that oscillates perpendicularly to the direction of the wave's advance. In contrast, a longitudinal wave travels in the direction of its oscillations. Sound propagates from a source as a longitudinal wave. Wavelength is the spatial distance between two successive peaks in a propagation wave; sound frequency is the number of waves passing through a fixed point per second.

Sound levels are typically reported in units of decibels (dB[1]). The decibel is defined as a ratio of measured acoustic intensity and a reference intensity level and is expressed in a logarithmic scale. However, the sound in air and underwater is often measured as pressure rather than directly as intensity.

2.2 Underwater Noise Metrics

Where possible, recent updates to the ANSI and ISO standards for acoustic terminology and metrics (ANSI S1.13-2013; ISO 18405:2017; ISO 80000-3:2019) have been incorporated into this modelling study.

The Sound Pressure Level (SPL) indicates the amplitude level of sound at a specific location in space and is a scalar quantity. The level is dependent on the location and distance at which the sound is observed relative to a sound source. Sound pressure is measured in Pascals but can be computed in decibels. A standard reference pressure is used to compare sound levels given in decibels to one another. In underwater acoustics, the traditional standard reference pressure (p_o) is 1 micro-Pascal (µPa), leading to the use of the unit dB re 1 µPa, which represents a decibel referenced to a pressure of 1 µPa.

The most common types of acoustic metrics that refer to how pressure was measured are:

- source level, SL (L_S, dB re 1 µPa^{2}m^2) is the acoustic source level referenced to a distance of 1 m from a point source.
- zero-to-peak sound pressure level, PK ($L_{p,pk}$, dB re 1 µPa) simply measures the maximum instantaneous signal's amplitude without considering time in a stated frequency band. It is used to assess a potential permanent and temporary injury in the hearing of marine mammals and mortality and injury in fish and sea turtles exposed to impulsive sound.
- root-mean-square sound pressure level, SPL ($L_{p,rms}$, dB re 1 µPa), is essentially an average intensity over a given amount of time and, therefore, not an instantaneous

[1] dB differs from the common reference dB(A) used for airborne acoustics.

pressure. This type of metric can be used to assess potential behavioural disturbance in marine mammals from impulsive and non-impulsive sound exposure. It is also used to assess the mortality or injury in fish and sea turtles exposed to non-impulsive sound.

- sound exposure level, SEL (L_E, dB re 1 µPa^2·s), is related to the acoustic energy contained in one or more acoustic events over a given period (i.e., 24 hours) and is often used to assess cumulative exposure to noise.
    - For a single event, it is the integration of sound energy produced from a source, over the full event duration. For impulsive or non-impulsive intermittent sounds, this is the SEL for a single hammer strike for pile driving, a single air gun shot for a seismic survey or a single ping for sonar.
    - For multiple acoustic events, the cumulative SEL is commonly referred to as a 24-hour event or alternatively can be calculated by summing the SEL of a single event plus the logarithm of the N individual events multiplied by 10 and will be indicated by an appropriate subscript (i.e., $L_{E,N}$). If a period is used, the integration time shall be specified (e.g., $L_{E,24h}$). This type of acoustic metric is used to assess potential permanent and temporary injury in the hearing of marine mammals and turtles when exposed to impulsive or non-impulsive sounds and the mortality or injury of fish exposed to impulsive sounds.
- weighted sound exposure level, SEL_W ($L_{E,w}$, dB re 1 µPa^2·s), is the cumulative SEL weighted with a specific frequency range of sound pressure levels. If a period is used, the integration time shall be specified. If a specific frequency weighting is applied, appropriate subscripts should also indicate this. For example, auditory weighting functions that have been proposed for specific auditory groups of marine mammals over a 24-hour period can be expressed using the weighted SEL metric plus an abbreviation for the respective auditory group (e.g., $L_{E,LF,24h}$ see Section 3.3.1).
- Spectrum or spectra is the visual display of the frequency content of a sound signal. It shows how sound level varies when the frequency is given. The spectra are presented in third-octave bands (1/3-octave), which measure the sound level in frequency bands that widen exponentially with increasing frequency and are evenly spaced on a logarithmic frequency axis. In underwater acoustics, this is used to approximate the bandwidths of the marine mammals' fish' and turtles' auditory systems.

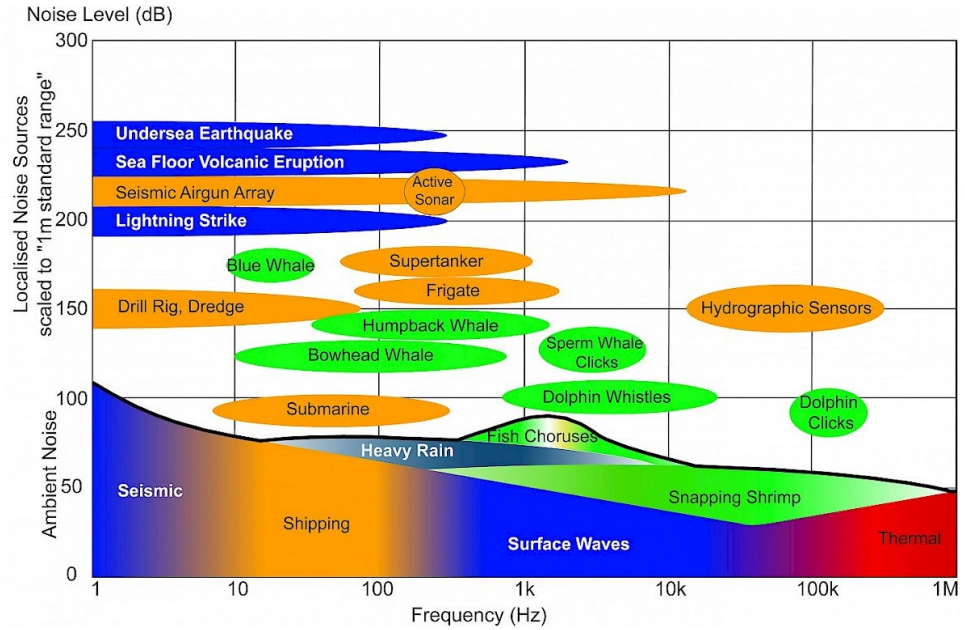
2.3 Ocean Ambient Noise

Acoustic cues are thought to be important to marine fauna in the perception of their environment as well as for navigation purposes, predator avoidance, and in mediating social and reproductive behaviour. Noise is generally an unwanted sound, a sound that clutters and masks other sounds of interest, such as those generated by marine fauna. Ocean ambient noise poses a baseline limitation on the use of sound by marine animals, as signals of interest must be detected against background noise. The level and frequency characteristics of the ambient noise environment are the two major factors that control how far away a given sound signal can be detected (Richardson et al. 2013).

Ocean ambient noise is comprised of a variety of sounds of different origins at different frequency ranges, with temporal and spatial variations. It primarily consists of noise from natural physical events, marine biological species, and anthropogenic sources.

An overview of the indicative noise spectral levels produced by various natural and anthropogenic sources relative to typical background or ambient noise levels in the ocean is shown in Figure 2.

Figure 2: Levels and Frequencies of Sound Sources in the Marine Environment



Source: from https://www.ospar.org/work-areas/eiha/noise. Notes: Natural physical noise sources are represented in blue; marine fauna noise sources are shown in green; human noise sources are shown in orange.

Background noise at higher frequencies tends to be dominated by natural physical or bioacoustics sources such as rainfall, surface waves and spray, as well as fish choruses and snapping shrimp for coastal waters. Human contributions to ambient noise are often significant at low frequencies, between about 20 Hz and 500 Hz, predominantly from distant shipping (Hildebrand 2009).

- **Geophony:** the major natural physical events contributing to ocean ambient noise include, but are not limited to, wave/turbulence interactions, wind, precipitation (rain and hail), breaking waves and seismic events (e.g., earthquakes/tremors):
  - The interactions between waves/turbulence can cause very low-frequency noise in the infrasonic range (below 20 hertz [Hz]). Seismic events such as earthquakes/tremors and underwater volcanos also generate noise predominantly at low frequencies from a few Hz to a few hundred Hz;
  - Wind and breaking waves, as the prevailing noise sources in much of the world's oceans, generate noise across a very wide frequency range, typically dominating the ambient environment from 100 Hz to 20 kilohertz [kHz] in the absence of biological noise sources. The wind-dependent noise spectral levels also strongly depend on sea states, which are essentially correlated with wind force; and
  - Precipitation, particularly heavy rainfall, can produce much higher noise levels over a wider frequency range of approximately 500 Hz to 20 kHz.
- **Biophony:** some marine animals produce various sounds (e.g., whistles, clicks) for different purposes (e.g., communication, navigation, reproductive displays, territorial defence, or detection and feeding):

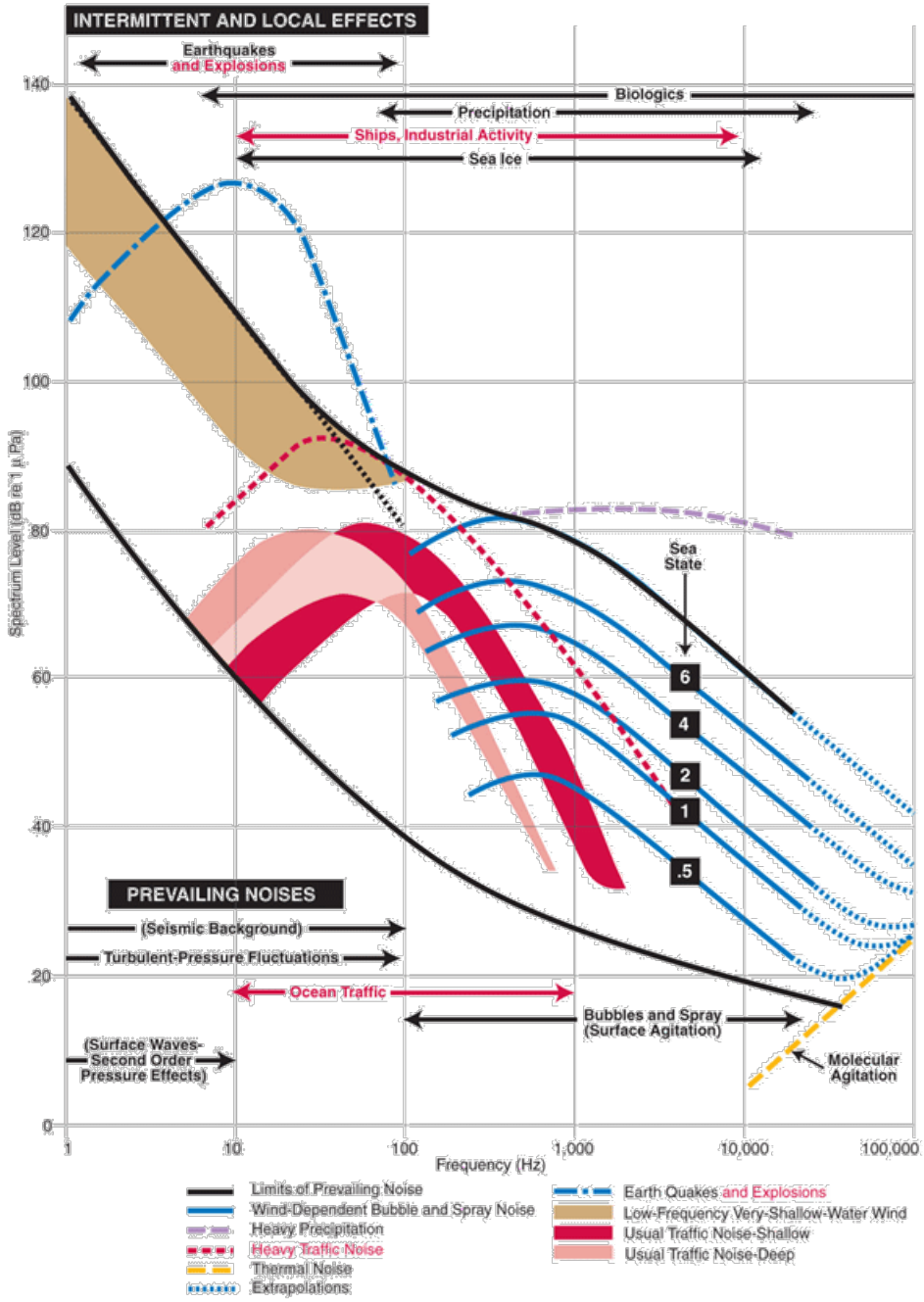
  - Baleen whales (e.g., great whales like humpback whales) regularly produce intense low-frequency sounds (whale songs) that can be detected at long ranges in open water. Odontocete whales, including dolphins, can produce rapid bursts of high-frequency clicks (up to 150 kHz) that are primarily for echolocation purposes;
  - Some fish species produce sounds individually, and some species also make noise in choruses. Typically, fish chorusing sounds depend on species, time of day and time of the season; and

- **Anthrophony:** anthropogenic noise primarily consists of noise from shipping activities, offshore seismic and drilling explorations, marine industrial developments, and operations, as well as equipment such as sonar and echo sounders:
  - Shipping traffic from various sizes of ships is the prevailing man-made noise source around nearshore port areas. Shipping noise is typically due to cavitation from propellers and thrusters (operating using dynamic positioning systems or DPS), with energy predominantly below 1 kHz;
  - Pile driving and offshore seismic exploration generate repetitive pulse signals with intense energy at relatively low frequencies (hundreds of Hz) that can potentially cause physical injuries to marine species close to the noise source. The full frequency range for these impulsive signals could be up to 10 kHz; and
  - Dredging activities and other marine industry operations are additional man-made sources which generate broadband noise over relatively long durations.

A summary of the spectra of various ambient noise sources, based on a review study undertaken by Wenz (1962), is shown in Figure 3. Although the spectral curves in the figure are based on average levels from reviewed references primarily for the North Atlantic Ocean, they are regarded as representative (in general) of the ocean ambient noise spectral components in the project region. Ambient noise levels typically range:

- From as low as 80 dB re 1 µPa for the 10-10 kHz frequency range for areas with few shipping movements and calm sea surface conditions to; and
- Up to 120 dB re 1 µPa for the 10-10 kHz frequency range for areas with moderate to heavy remote shipping traffic and medium to high wind conditions.

Figure 3: Spectra and Frequency Distribution of Ocean Sound Sources



Source: Miksis-Olds et al. 2013, adapted from Wenz (1962)

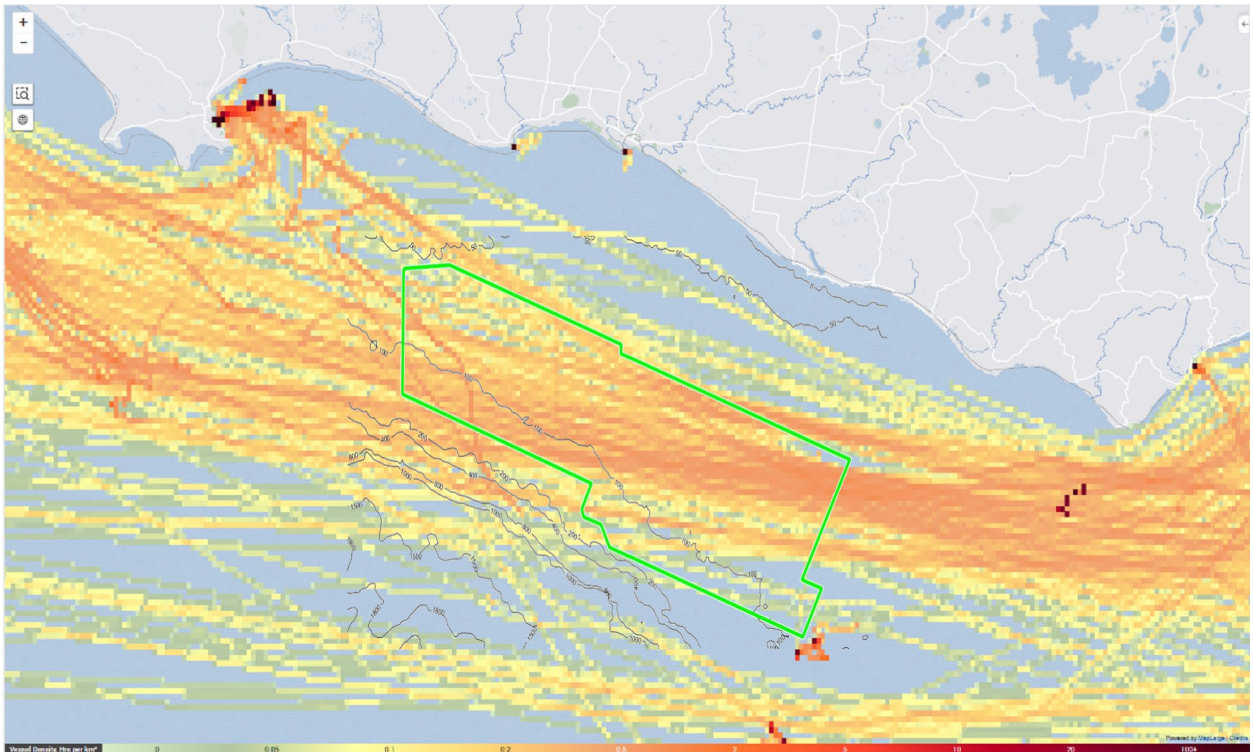
2.3.1 Otway Basin Ambient Noise

A recent assessment of ambient noise in the Otway Basin (RMSS, 2025) reported median broadband ambient noise levels of 104.5 dB re 1 µPa, with a mean of 118.3 dB re 1 µPa. Noise levels ranged between 86.6 to 153.6 dB re 1 µPa.

2.3.2 Shipping Traffic in the Project Area

Shipping traffic is an important component of ocean ambient noise in the project area. As can be seen in Figure 4, shipping traffic density overpasses the seismic and operational areas. Thus, the shipping noise component of the ambient noise environment is expected to be present throughout deeper zones.

Figure 4: Shipping traffic density at Otway Basin, around the seismic and operational area (green)



Source: https://globalmaritimetraffic.org, accessed 1 September 2025

3.0 Underwater Noise Impact Assessment Criteria

3.1 Marine Fauna Hearing Sensitivity

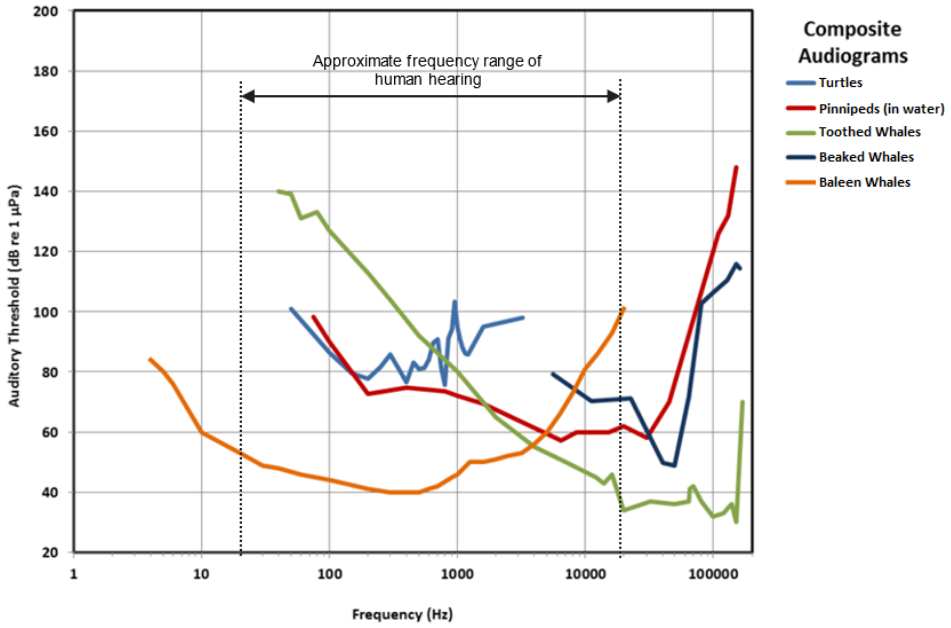
A sound is audible when the receiver is able to perceive it over background noise. The audibility is also determined by the individual's threshold of hearing, which varies with frequency. Hearing ability is typically described using audiograms, which display hearing threshold (the sound level at which sound is just detectable) as a function of sound wave frequency. A low sound pressure level on an audiogram indicates a low hearing threshold at a given frequency, which means that even a very weak sound is still audible and indicates a higher auditory sensitivity.

Hearing capabilities differ between different groups of species, with some being more sensitive to low-frequency sounds while others hear better in the high-frequency range. Hipsey and Booth (2012) considered several marine mammals (and turtle) species and compiled composite audiograms for different groups (see Figure 5). Table 1 summarises the information on which the composite audiograms are based.

Marine mammals and fish species usually have U-shaped audiograms, meaning that within their respective hearing ranges, they are more sensitive to the sound energy component in the mid-frequency range and less sensitive to the energy components in the lower and upper-frequency ranges (Finneran 2016, Southall et al. 2019; Popper et al. 2019).

For sirenians (manatees and dugongs), Southall et al. (2019) suggested that species would be sensitive to sounds less than 20 kHz, with peak sensitivity around 8 kHz. The hearing capability in sirenians ranges from 20 Hz to 60 kHz.

Figure 5: Composite Audiograms of Marine Fauna Based on Various Studies



Source: adapted from Hipsey & Booth 2012

Table 1: Hearing Capabilities of Marina Fauna Groups Based on Composite Audiograms

Marine Species Group	Hearing Capability (Hz)		Peak Hearing Sensitivity (Hz)	
	Minimum	Maximum	Minimum	Maximum
Toothed whales (odontocetes)[1]	150	160,000	20,000	120,000
Beaked whales (ziphiids)[2]	5,600	160,000	40,000	50,000
Baleen whales (mysticetes)[3]	7	35,000	100	200
Pinnipeds (seals; under water)	70	> 100,000	7,000	30,000
Sirenians (manatees, dugongs)	20	60,000	8,000	<20,000
Fish	10	4,000	100	800
Turtles	50	3,000	100	800

[1]Some odontocete species can hear well below this range.
[2]Based on two studies in which single individuals were tested.
[3]Based on theoretical evidence only (no empirical data).
Sources: Hipsey & Booth 2012, DoN 2017, Popper and Hawkins 2019, Southall et al. 2019

For fish species, sound detection is based on the response of the auditory portion of their ears (i.e., the otolithic organs) to the particle motion of the surrounding fluid (Popper and Hawkins 2018). Some fish species also detect sound pressure via gas-filled structures near the ear and/or extensions of the swim bladder that functionally affect the ear, in addition to purely the fluid particle motion, resulting in higher hearing sensitivity and broader hearing bandwidth (Nedelec et al. 2016; Popper and Hawkins 2018). Fishes that can detect sound pressure hear sounds from <50 Hz (even as low as 10–30 Hz) to perhaps 1000 Hz, and a much smaller number of species can detect sounds of 3–4000 Hz (Popper and Hawkins 2019).

For turtles, the Department of the U.S. Navy (DoN 2017) agreed that these animals have low sensitivity to impulsive noise, with audiograms more similar to those of fish but without specialized high-frequency hearing adaptations poor auditory sensitivity.

3.2 Possible Noise Impacts on Marine Fauna

The potential impacts of noise on marine fauna species include masking of communication and other biologically important sounds, behavioural responses, and physiological impacts (including discomfort, hearing impairment, and physical injury or mortality in extreme cases) (Richardson et al. 2013; Hawkins and Popper 2017; Erbe et al. 2018; Popper and Hawkins 2019).

The type and distance of noise impacts on marine fauna depend on the acoustic characteristics of the noise (e.g., source level, spectral content, temporal characteristics, directionality, etc.), the sound propagation environment, as well as the hearing ability and physical reaction of an individual to detect sound. The individual types of impacts are discussed below.

3.2.1 Masking

Masking occurs when the introduced noise is loud enough to impair the detection of biologically relevant sound signals, such as communication signals, echolocation clicks and passive detection cues that are used for navigation and finding prey (Clark et al. 2009). The extent of the masking area depends on the differences in the animal's hearing frequency range, received sound levels, and the introduced anthropogenic and background ambient noise (Richardson et al. 2013). The masking effect can be partly compensated by an animal’s frequency and temporal discrimination ability, directional hearing, co-modulation masking

release (if noise is amplitude modulated over several frequency bands) and multiple looks (if the noise has gaps or the signal is repetitive), as well as anti-masking strategies (increasing call level, shifting frequency, repetition, etc.) (Erbe et al. 2016).

3.2.2 Behavioural Response and Disturbance

Sound that is significantly above ambient noise levels and the animal's audiogram range can trigger behavioural responses that can include changes in vocalisation, resting, diving, and breathing patterns, and in most cases, avoidance of the noise source (Wartzok et al. 2003). Behavioural response effects can be challenging to measure and depend on a wide variety of factors such as the physical characteristics of the signal, the behavioural and motivational state of the receiver, its age, sex and social status and many other aspects. In summary, behaviour response refers to any observable change in behaviour of an animal due to a sound stimulus. Importantly, a behavioural response does not necessarily imply harm or disruption to the animal's normal functioning. In contrast, behaviour disturbance is a subset of behavioural responses that are considered disruptive to normal biological functions such as feeding, mating and migration. The type and magnitude of behavioural disturbance for any given signal can vary both within a population and for the same individual over time and can vary significantly, from very subtle changes in behaviour to strong avoidance reactions (Ellison et al. 2012; Richardson et al. 2013).

3.2.3 Hearing Impairment

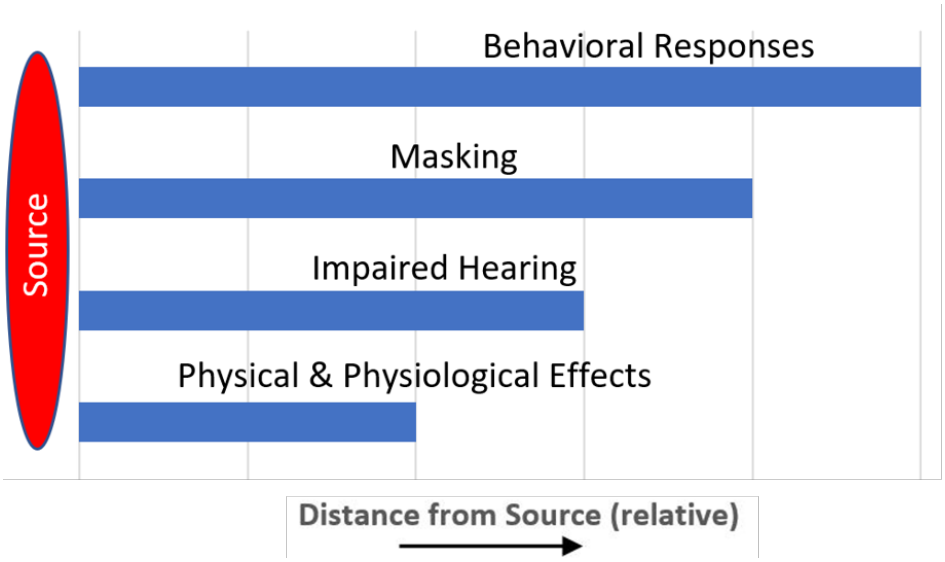
The physiological effects of underwater noise are primarily associated with the auditory system, which is likely to be most sensitive to noise. Exposure to noise sources can cause a loss of sensitivity to sound. If noise exposure is below a critical level of sound energy or for a certain duration, hearing loss is usually temporary, and the animal recovers; this effect is called Temporary Threshold Shift (TTS). If damage occurs to the inner ear that can lead to tissue destruction, the effect is called auditory injury (AUD INJ) and may or may not result in permanent hearing loss or permanent threshold shift (PTS) (NMFS 2024). Noise exposure can cause a reduction in the animal's hearing sensitivity or increase the hearing threshold (i.e., the sound level that is just audible to the animal) (Finneran 2016; Popper and Hawkins 2019; Southall et al. 2019).

3.2.4 Physical Injury

Noise at very high sound pressure levels may cause concussive effects and physical damage to tissues, organs, and cavitation or result in the rapid formation of bubbles in the blood system due to massive pressure oscillations (Groton 1998). The physiological systems of marine animals that are potentially affected include the vestibular system, reproductive system, nervous system, liver, or organs with high concentrations of dissolved gas and gas-filled spaces (swim-bladders).

The severity of these impacts decreases with increasing distance from the noise source, as illustrated by the potential zones of noise impact shown in Figure 6.

Figure 6: Potential zones of noise impact on marine fauna



Source: Adapted from Hawkins and Popper 2017.

3.3 Criteria for Determining Adverse Noise Effects

This section outlines the impact assessment criteria for noise impacts on marine mammals, fish, and sea turtles, diving seabirds and some invertebrate species, as well as human divers.

Extensive scientific studies and research have been conducted to determine quantitative links between marine noise and its impacts on marine fauna. For example, Southall et al. (2019) have proposed noise exposure criteria associated with various sound types, including impulsive and non-impulsive noise for marine mammal species, based on a review of expanding literature on marine mammal hearing and physiological and behavioural responses to anthropogenic sounds.

Popper and Hawkins (2019) reviewed sound exposure guidelines for fish, considering the diversity of fish, the different ways they detect sound, various sound sources, and their acoustic characteristics. The Department of the U.S. Navy (DoN 2017) presented a revision of the thresholds for sea turtle injury and hearing impairment (TTS and PTS).

The noise exposure levels presented in the following sections, are based on the most recent available data and published literature (i.e., the state of current knowledge, also see Appendix B and Appendix C).

This research is considered applicable to the marine fauna of the study area and appropriate as a basis of assessment since the species present there share the same physiological characteristics as the species that were subject to the cited research.

3.3.1 Marine Mammals

The newly updated scientific recommendations in marine mammal noise exposure criteria (NMFS 2024) propose auditory injury (AUD INJ[2]) onset and temporary threshold shift (TTS) onset criteria for both impulsive noise and non-impulsive noise events.

As different mammals hear at different frequencies (see Section 3.1), they are grouped into different hearing groups and, hence, different threshold levels:

- Low-frequency cetaceans (LF) include baleen whales;
- High-frequency cetaceans (HF) are dolphins, toothed whales, beaked whales, bottlenose whales;
- Very-high-frequency cetaceans (VHF) include true porpoises and river dolphins,
- Phocid pinnipeds in water (PW) include true seals;
- Otariid pinnipeds in water (OW), such as sea lions and fur seals; and
- Sirenians (SI), e.g., manatees and dugongs;

A summary of marine species classified by auditory group is presented in Appendix C. Not all animals listed are expected to be found in the vicinity of the project area; however, is known that reproduction, foraging, and migration areas overlap the operational area for the following marine fauna species:

- LF – Pygmy Blue Whale (PBW)
- LF – Southern Right Whale (SRW)

Therefore, while these hearing groups are considered relevant in this STLM reporting study, the "other" hearing groups (HF, VHF, PW, OW and SI) are still assessed and reported here.

The AUD INJ-onset and TTS-onset criteria for impulsive noise are outlined in Table 2, which incorporates a dual-criteria approach based on both $L_{p,pk}$ (immediate exposure) and $L_{E,w}$ (cumulative weighted exposure over a 24-hour period).

The widely used threshold level for the onset of possible behavioural disturbance in all marine mammals is the SPL of 160 dB re 1 µPa from a single pulse. However, thresholds of 140/120 dB re 1 µPa are also considered in this study as shown in Table 2 and explained below.

While progress has been made in many areas, it is important to recognize that hearing measurements are lacking in most marine mammal species, especially in LF cetaceans. For example, hearing studies for SRW and PBW are scarce and must almost certainly rely on comparative anatomical models of other LF cetacean species, given the difficulties in obtaining direct hearing measurements.

Although a compilation of different studies is presented by Southall et. al (2021); most of these studies refer to stimulus to other impulsive sources (i.e., pile driving and intermittent sonar). Only four studies refer to a stimulus with seismic airguns and its response in LF cetaceans (particularly Humpback and Gray Whale). From those, only one study (Malme et al., 1986) refers to experimental seismic airgun noise to migrating Gray Whales with an associated response of SPL values ranged 149 and 174 dB re 1µPa.

[2] AUD INJ refers to damage to the inner ear that can result in tissue destruction, such as loss of cochlear neuron synapses or auditory neuropathy (NMFS 2024). AUD INJ may or may not result in permanent damage.

Table 2: Noise criteria for marine mammals exposed to impulsive noise sources

Marine mammal hearing group	AUD INJ onset		TTS onset		Behavioural response
	Single pulse	Multiple pulses	Single pulse	Multiple pulses	Single pulse
	$L_{p,pk}$ dB re 1µPa	$L_{E,w,24h}$ dB re 1µPa^2·S	$L_{p,pk}$ dB re 1µPa	$L_{E,w,24h}$ dB re 1µPa^2·S	$L_{p,rms}$ dB re 1µPa
LF	222	183	216	168	160/140/120
HF	230	193	224	178	
VHF	202	159	196	144	
PW	223	183	217	168	
OW	230	185	224	170	
SI	226[1]	190[1]	220	175	

$L_{p,pk}$ = zero to peak sound pressure level; $L_{E,w,24h}$ = weighted sound exposure level over a 24h period; $L_{p,rms}$ = root-mean-square sound pressure level; AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift. [1]The sirenian group uses the noise criteria for PTS = permanent hearing threshold shift. Green shaded areas highlight the groups likely to be present within the operational area.

Sources: NMFS 2024, NMFS 2024a, Southall et al. 2019

While according to Southall 2024 the concepts of all-or-nothing response thresholds are clearly and unequivocally incompatible with the best available information; Southall (2024) also recommends the need to develop novel approaches and evaluate and apply existing and new experimental and observational findings on the behavioural disturbance of marine mammals to understand and mitigate the effects of anthropogenic noise on protected species.

A scientific understanding of the effects of noise on behavioural disturbances must also be combined with the (sometimes extensive) variability among individuals, species, sources, situational contexts, and temporal and spatial scales of exposure for long-term, broad-scale, and population-level impact assessments.

Therefore, for this modelling study, three different noise thresholds (160/140/120 dB re 1µPa) are applied for the behavioural disturbance to impulsive sound sources, such as seismic air guns.

3.3.2 Turtles

Popper et al. (2014) suggested threshold levels for potential PTS of turtles, extrapolated from other animal groups, such as fish, on the basis that the hearing range of turtles is relatively close to that of certain fish. More recently, the Department of the U.S. Navy (DoN 2017) revised thresholds based on a review of references from at least five different species of turtles to construct their composite audiograms and provide thresholds for the onset of PTS and TTS (see Appendix C). They agreed that turtles' audiograms have low sensitivity, which is more similar to those of fish without specialized hearing adaptations for high frequencies.

Data on the behavioural responses of sea turtles to sound sources is limited. Currently, there is not enough data to derive separate thresholds for different source types. However, behavioural disturbance (immediate exposure) from impulsive and non-impulsive noise generally occurs around 175 dB re 1 µPa SPL (O'Hara and Wilcox 1990; Moein et al. 1994; Lenhardt 2002; McCauley et al. 2000),), which has also been adopted by NMFS (NMFS 2024b).

The revised thresholds for turtles (impulsive noise) are presented in Table 3.

Table 3: Noise criteria for turtles exposed to impulsive noise

Type of animal	PTS onset		TTS onset		Behaviour disturbance
	Single pulse	Multiple pulses	Single pulse	Multiple pulses	Single pulse
	$L_{p,pk}$ dB re 1µPa	$L_{E,TU,24h}$ dB re 1µPa^2·S	$L_{p,pk}$ dB re 1µPa	$L_{E,TU,24h}$ dB re 1µPa^2·S	$L_{p,rms}$ dB re 1µPa
Turtles	232	204	226	189	175

$L_{p,pk}$ = zero to peak sound pressure level; $L_{E,TU,24h}$ = weighted sound exposure level for turtles over a 24h period; $L_{p,rms}$ = root-mean-square sound pressure level; PTS = permanent hearing threshold shift; TTS = temporary hearing threshold shift.

Sources: NMFS 2024b, DoN 2017, O'Hara and Wilcox 1990; Moein et al. 1994; Lenhardt 2002; McCauley et al. 2000

3.3.3 Fish Groups

In general, limited scientific data is available regarding the effects of sound on fish. As such, Federal agencies from some countries often follow assessment procedures and best practices implemented by other anthropogenic activities in offshore waters. The U.S. National Oceanic and Atmospheric Administration (NOAA) convened an international panel of experts in 2004 to develop noise exposure criteria for fish and turtles, primarily based on published scientific data in the peer-reviewed literature. The panel was organized as a Working Group (WG) under the ANSI-Accredited Standards Committee S3/SC 1, Animal Bioacoustics, which the Acoustical Society of America sponsors.

The outcomes of the WG are broadly applicable to sound exposure guidelines for fish, fish eggs and larvae (Popper et al. 2014, Popper and Hawkins 2019), considering the diversity of fish and the different ways they detect sound, as well as various sound sources and their acoustic characteristics. Acoustic thresholds, which represent the minimal sound level at which the onset of a particular effect may occur, are also available for fish grouped either by size (less than 2 grams and greater than or equal to 2 grams) as recommended by the Fisheries Hydroacoustic Working Group (FHWG 2008) or by physiology (with/without swim bladder involved/not involved in hearing) as recommended by Popper et al. (2014).

The derivation and origin of the informal 150 dB threshold is not as well-defined as other thresholds. However, recent publications do not refute that behavioural disturbance for fish can occur around this level (Hawkins et al. 2014).

The exposure criteria for sound sources relevant to the Project, notably impulsive noise from seismic sources, are presented in Table 4 noting the following:

- When data exist to infer thresholds such as PK (single pulse), SEL (multiple pulses over 24 hours) and, SPL (single pulse or second) threshold levels are reported; and
- When insufficient data exists to be able to infer thresholds, a dash is highlighted.

Table 4: Noise criteria for fish hearing groups exposed to impulsive noise

Fish Group	Mortality and Non-Recoverable Injury		Recoverable Injury		TTS	Behaviour disturbance
	Single pulse	Multiple pulses	Single pulse	Multiple pulses	Multiple pulses	Single pulse
	$L_{p,pk}$ dB re 1µPa	$L_{E,24h}$ dB re 1µPa^2·S	$L_{p,pk}$ dB re 1µPa	$L_{E,24h}$ dB re 1µPa^2·S	$L_{E,24h}$ dB re 1µPa^2·S	$L_{p,rms}$ dB re 1µPa
[a] Fish without swim bladder	>213	>219	>213	>216	>>186	150
[a] Fish: with swim bladder not involved in hearing	>207	210	>207	203	>186	150
[a] Fish: with swim bladder involved in hearing	>207	207	>207	203	186	150
[a] Eggs and larvae	>207	>210	-	-	-	150
[b] Fish ≥ 2g	-	-	206	187	-	150
[b] Fish < 2g			206	183		

$L_{p,pk}$ = zero to peak sound pressure level; $L_{E,24h}$ = unweighted sound exposure level over a 24h period; $L_{p,rms}$ = root-mean-square sound pressure level; TTS = temporary hearing threshold shift; a dash indicates the threshold is not available for the fish category.
Sources: [a] Popper et al. 2014; [b] NMFS 2024b, FHWG 2008, Hawkins et al. 2014

3.3.4 Diving Seabirds

Currently, there is no data to derive thresholds for TTS and PTS caused during diving seabird activities. However, to assess the noise-induced impact risk of airgun impulse signals on diving seabirds, the least sensitive group of marine mammals Otariid pinnipeds in water (OW), is recommended as a proxy indicator (Southall et al., 2019). This group has been selected due to the similar hearing sensitivity in the underwater frequency band of diving seabirds, thus providing a conservative approach.

For the case of behaviour response on penguins, underwater playback exercises (non-impulsive noise) conducted in a pool in the penguin enclosure at Odense Zoo, Denmark, suggested that gentoo penguins (*Pygoscelis papua*) respond to exposure to noise levels starting at 100 dB re 1 µPa SPL RMS (Sørensen et al. 2020). However, clear behaviour responses (45-90˚ change of swim direction and change of speed) were captured at playback intensities between 110 and 120 dB re 1 µPa, with the majority of responses (>75%) recorded at the 120 dB re 1 µPa threshold (see Table 5). The stimulus contained frequencies between 0.2 and 6 kHz with noise bursts of 500 milliseconds.

Revised and approximate thresholds for diving seabirds, including penguins, are presented in Table 5. To maintain consistency with the approach to assessing AUD INJ and TTS, the behavioural disturbance threshold weighted by OW was applied on diving seabirds.

Table 5: Noise criteria for diving seabirds exposed to impulsive noise

Type of animal	AUD INJ onset		TTS onset		Behaviour disturbance
	Single pulse	Multiple pulses	Single pulse	Multiple pulses	One-second exposure
	$L_{p,pk}$ dB re 1µPa	$L_{E,TU,24h}$ dB re 1µPa²·S	$L_{p,pk}$ dB re 1µPa	$L_{E,TU,24h}$ dB re 1µPa²·S	$L_{p,rms}$ dB re 1µPa
Diving Seabirds (e.g. penguins)	230[1]	185[1]	224[1]	170[1]	120[2]

$L_{p,pk}$ = zero to peak sound pressure level; $L_{E,TU,24h}$ = weighted sound exposure level for turtles over a 24h period; $L_{p,rms}$ = root-mean-square sound pressure level; AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift.

[1]Proxy threshold (similar to otariid pinnipeds in water, OW). [2]Threshold weighted as OW

Sources: Southall et al. 2019, Sørensen et al. 2020

3.3.5 Invertebrates

The acoustic signals emitted by crustaceans span a broad range of frequencies. Low-frequency rumblings (20–60 Hz) are produced by stomatopod mantis shrimp (*Hemisquilla californiensis*) and American lobsters (*Homarus americanus*), while ultrasonic signals (20–55 kHz) are emitted by European spiny lobsters (*Palinurus elephas*) (Edmonds, et al. 2016). In a report by Christian et al. (2003), no significant difference was found between the acute effects of seismic airgun exposure upon adult snow crabs (*Chionoecetes opilio*) in comparison with control crabs (broadband received levels 197–220 dB re 1 µPa).

No comprehensive analyses have yet been carried out for anthropogenic sound. One of the few studies to explore the issue found no statistically significant correlation between seismic surveys and changes in commercial rock lobster (*Panulirus cygnus*) catch rates (Parry and Gason, 2006). Therefore, in the absence of specific sound pressure levels received, reliable conclusions cannot be drawn.

However, a monitoring study conducted in aquariums by Payne et al. (2007) found no effect of airgun exposure (202–227 dB re 1 µPa at 1 m) on delayed mortality in American lobsters (*H. americanus*). Therefore, for crustaceans, a PK threshold of 202 dB re 1 µPa, respectively, is considered conservative and consequently applied in the assessment. Additionally for context related to different levels of potential impairment, the PK sound levels determined for scallops in Day et al. (2017), 212 dB re 1 µPa are also included.

Fewtrell and McCauley (2012) used a captive squid species (*Sepioteuthis australis*) and exposed it to the noise of an air gun. Six trials were conducted off the coast of Western Australia, each with a different noise exposure regime. The noise levels perceived by the animals ranged from 120 to 184 dB re 1 µPa²·s. When the air gun signal intensity exceeded 162 dB re 1 µPa²·s, ink ejection was observed, and the squid retreated and moved away from the gun. While this result is preliminary, the behavioural observations in this study indicate that air gun noise does alter squid behaviour

A sound level of 226 dB re 1 µPa has also been considered for comparison to Heyward et al. (2018) for sponges and corals. Revised and approximate thresholds for invertebrates are presented in Table 6.

Table 6: Noise criteria for invertebrates exposed to impulsive noise

Type of animal	Behaviour disturbance	
	Single pulse	
	$L_{p,pk}$ dB re 1µPa	L_E dB re 1µPa²·s
Crustaceans (e.g. Lobsters)	202[1]	-
Scallops	212[2]	-
Sponges and corals	226[3]	-
Squid	-	162[4]

$L_{p,pk}$ = zero to peak sound pressure level; L_E = sound exposure level (not weighted); a dash means a threshold has not been reported or there is limited data.

Sources: 2006; [1]Payne et al. 2007; [2]Day et al. (2017); [3]Heyward et al. 2018; [4]Fewtrell and McCauley 2012

3.3.6 Human Divers

3.3.7 Hearing sensitivity of human divers

Although sound intensity in water is much lower than in air (because of the higher impedance of water), loud underwater noise in human divers is believed to still produce hearing damage to bare-headed human divers with ‘wet’ ears. The mechanism for hearing damage is that the external ear canal is filled with water, and water is in direct contact with the tympanic membrane (Anthony et al., 2009).

In air, the human auditory system can perceive pressure changes at levels as low as 20 µPa, but in water, hearing ability, including the ability to perceive sound at certain frequencies, is lost. Based on the audiograms (see Figure 7), bare-headed human divers will be more sensitive to low-frequency components when underwater than in the air (Nedwell et al., 2007).

The physical effects in human divers exposed to high levels of underwater sound include dizziness, hearing damage, and extreme cases injuries to other sensitive organs, depending on the frequency and intensity of the sound. Indirect effects can include distraction of attention, irritability, anxiety and a potentially threatening panic reaction (Ainslie 2008).

3.3.8 Maximum exposure thresholds

The North Atlantic Treaty Organization (NATO) published safety guidelines for divers and recommended that a threshold of 154 dB re 1µPa (600 Hz to 2500 Hz) should not be exceeded for recreational divers (NATO 2006). The latter guideline is consistent with the recommendation of Parvin and Nedwell (1995) of a maximum short-term ‘exposure level’ for human divers of 155 dB re 1µPa (500 Hz to 2500 Hz).

Pestorius et al. 2009 and Parvin 2005 reported the results of a series of diver tests that included recreational divers placed in an acoustically transparent box at a depth of one meter and exposed to a seven-second pure tone swept signal at frequencies from 100 to 500 Hz and levels of 130 to 157 dB re 1µPa. Based on the resulting observations, a maximum SPL exposure of 145 dB re 1µPa was recommended for a duration of 100 seconds (s), and

141 dB re 1µPa for double the duration (200 s). Revised thresholds for human divers, are presented in Table 7 and Table 8.

Figure 7: Human audiograms in air and water (Parvin and Nedwell 1995)

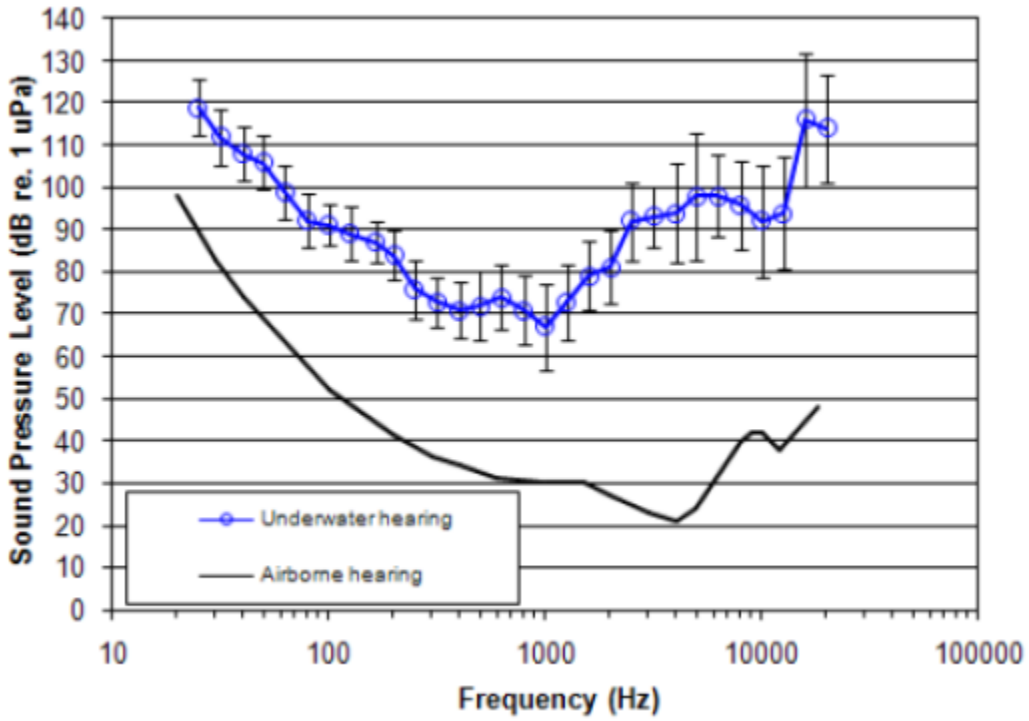


Table 7: Noise criteria for human divers exposed to a single seismic pulse

Human Diver	**Physiological Effects**
	Single exposure
	$L_{p,rms}$ dB re 1µPa
I. Slight aversion	140[1]
II. Very severe	148[1]
III. Increasingly aversive	154[1,2]
IV. Tolerance limit	170[1]
V. Physiological damage	184[1]

$L_{p,rms}$ = root-mean-square sound pressure level (weighted)
Sources: [1]Parvin 2005 [2]NATO 2006

Table 8: Noise criteria for human divers exposed to multiple seismic pulses

Human Diver	Recommended tolerance
	Cumulative exposure
	$L_{E,w}$ dB re 1µPa²·S
200s	141[1]
100s	145[1,2]
$L_{p,rms}$ = root-mean-square sound pressure level (weighted) Sources: [1]Pestorius 2009, [2]Parvin 2005	

3.4 Impacts Zones on Marine Fauna

The distances from the sound source within which various types of impacts on marine fauna can be expected (”impact zones”) are determined by modelling the transmission loss of sound in water (i.e., the decrease in noise levels when moving away from the noise source) and determining the distance at which predicted noise levels fall below the various threshold levels described in Section 3.3.

Impact zones thus identify the maximum horizontal distance from an area within which the anthropogenic noise from impulsive or non-impulsive sources may have certain types of adverse impacts on certain marine fauna species. This report defines the impact zones as follows:

- immediate impact from a single pulse or one-second signal – this is applicable if animals move out of or avoid entering the impact zone and are thus exposed at most for a short period (i.e., one-second); and
- cumulative impact from exposure over an entire event to impulsive and continuous noise – this would be applicable if an animal remains with the noise source over an entire period and thus remains within the impact zone over a 24-hour period. It is highly likely that animals will not remain in proximity of the noise source and that their exposure to sound levels above the various thresholds is much shorter. The distances identified for cumulative thresholds are thus very conservative (worst-case) and are likely to overstate the extent of the typical impact area.

This information can be used to assess the potential risk (likelihood) and impact of potential adverse noise impacts by combining the acoustic impact zones with ecological information, such as habitat significance and migratory routes, in the affected area.

4.0 Sound Transmission Loss Modelling

4.1 Modelling Input Parameters

The noise levels generated by the seismic operations will be significantly higher than ambient noise levels in the project area (86.6 to 153.6 dB re 1 µPa as described in Section 2.3.2). In simple words, ambient noise does not contribute to the cumulative noise levels with the noise of seismic operations. Therefore, ambient noise is not considered in (or material for) the determination of zones of impact.

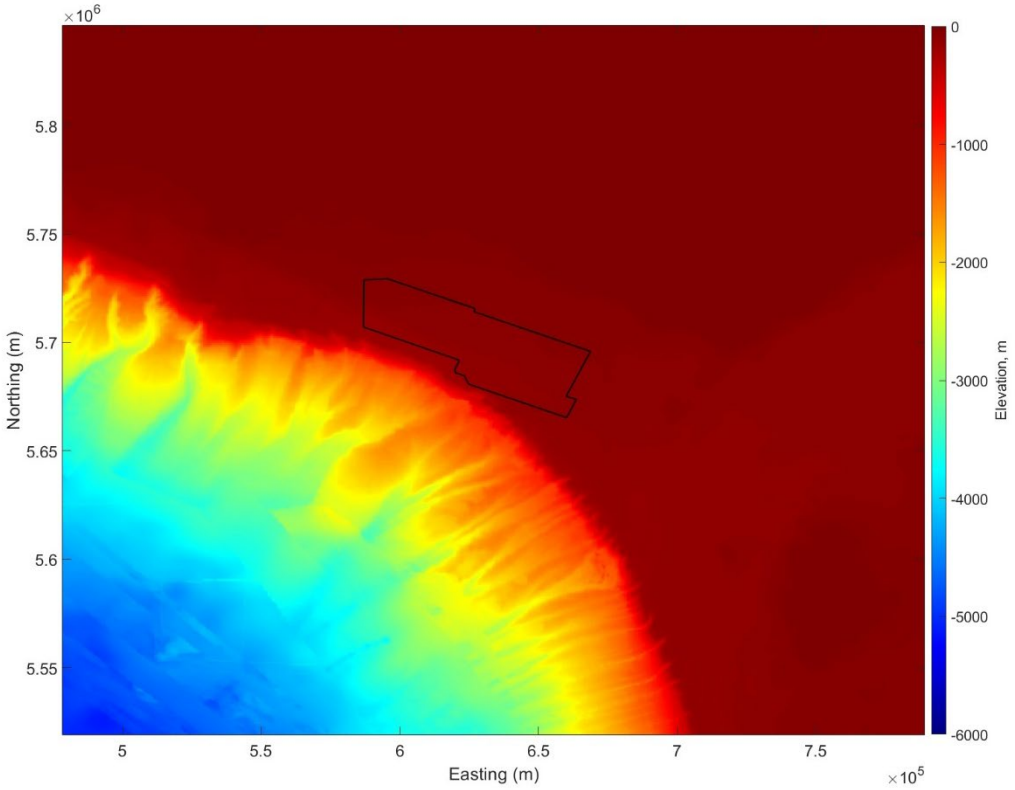
The propagation of sound is determined by how fast a sound wave travels in a medium and is slowest in gases (~343 m/s in air), faster in liquids (~1 481 m/s in water), and fastest in solids (~5 120 m/s in iron). For any one medium, sound speed is further determined by aspects that cause smaller changes in density, e.g., temperature, depth/height and (in water) salinity.

This model thus takes into account the water depth (see Section 4.1.1), salinity and water temperature (see Section 4.1.2) and seabed composition (see Section 4.1.3) in the block area. The ocean currents within the survey area are not expected to have significant effects on sound propagation due to limited current heights compared with overall water depths and low current speed compared with the sound speed within typical seawater.

4.1.1 Bathymetry

The bathymetry data used for the sound propagation modelling were obtained from the General Bathymetric Chart of the Oceans (GEBCO) dataset grid (GEBCO 2022). This is the fourth GEBCO grid developed through the Nippon Foundation-GEBCO ‘Seabed 2030 Project’ (https://seabed2030.org). Water depths throughout the modelled area were extracted from the Australian Bathymetry and Topography Grid, a 4 arc-second grid rendered for Australian waters. The bathymetric imagery within and surrounding the project area is presented in Figure 8.

Figure 8: Bathymetric imagery within and around the seismic operational area (black)



Map details: WGS 84 / UTM Zone 54H

4.1.2 Sound Speed Profiles

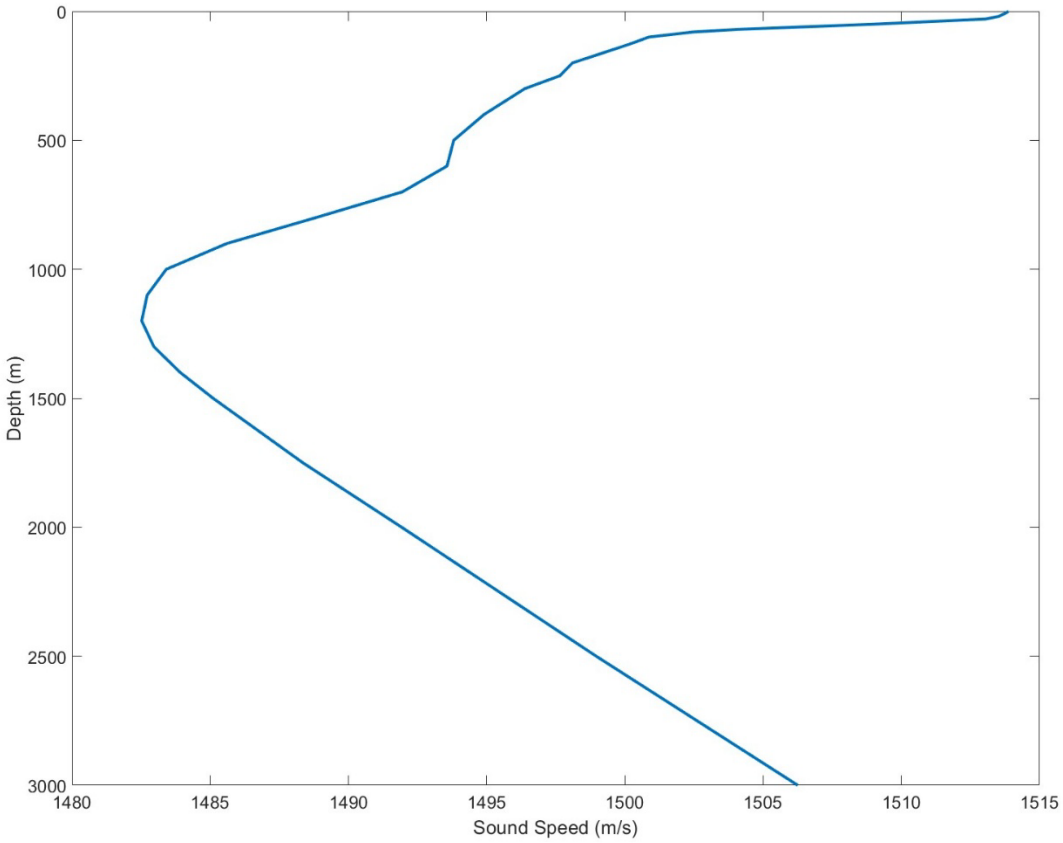
Temperature and salinity data required to derive the sound speed profiles were obtained from the World Ocean Atlas 2009 (WOA09) (Locarnini et al. 2010; Antonov et al. 2010). The hydrostatic pressure needed for the calculation of the sound speed based on the depth and latitude of each particular sample was obtained using Sanders and Fofonoff's formula (Sanders and Fofonoff 1976). The sound speed profiles were derived based on Del Grosso's equation (Del Grosso 1974).

Figure 9 presents the typical sound speed profiles for four seasons in the area of interest. The figure demonstrates that the most significant distinctions for the profiles of the four seasons occur within the mixed layer near the surface (to a depth of approximately 200 m), in which the speed of sound is susceptible to daily and local changes of heating, cooling, and wind action.

The seasonal thermocline is characterized by a negative sound speed gradient that varies with the seasons. Due to the more substantial gradient variation, the winter season is expected to favour the propagation of sound from a near-surface acoustic source array.

The winter sound speed profile was thus selected as the most conservative modelling input, i.e., the worst-case scenario. As the overall sound speed profiles of different seasons across the water column are quite similar, the differences in sound fields between different seasons are not expected to be significant.

Figure 9: Typical sound speed profile within the survey area during the winter season



4.1.3 Seafloor Geo-acoustic Model

The geoacoustics parameters used for this modelling study are similar to those reported in the Appendix B7b of the Regia MSS Acoustic and Animat Modelling for Assessing Marine Fauna Sound Exposures (Document 03301, Version 2.0) (Stephen T.J. et al. 2024).

For sites 10 and 15 (less than 68 m depth), the seabed was modelled as fine carbonate sand for the first 5 meters, followed by increasingly cemented calcarenite for the next 100 meters and then well-cemented calcarenite for the deepest layer, as detailed in Table 9. This seabed profile is consistent with measurement profiles data (McCauley et al. 2016).

For Site 7 (over 120 m depth), the seabed was modelled as silty carbonate sand to semi-silty carbonate, as detailed in Table 10. These geoacoustic parameters are derived from grain size measurements from the Australian Government's Marien Sediment Survey (MARS) database (Heap 2009).

Table 9: Geo-acoustic parameters for the proposed seabed model of sites 10 and 15

Depth below seafloor (m)	Material	Density (g/cm3)	Attenuation (dB/λ)	Shear wave attenuation (dB/λ)
0-5	Fine Carbonate Sand	2.1	0.73	3.65
5-25	Increasingly cemented calcarenite	2.2	0.34	
25-45		2.3	0.38	
45-65		2.4	0.42	
65-85		2.5	0.46	
85-105		2.6	0.50	
>105	Well-cemented calcarenite	2.7	0.50	

Table 10: Geo-acoustic parameters for the proposed seabed model of site 7

Depth below seafloor (m)	Material	Density (g/cm3)	Attenuation (dB/λ)	Shear wave attenuation (dB/λ)
0-10	Silty carbonate sand to semi-cemented carbonate	1.9	0.70	3.65
10-20		1.9	0.85	
20-50		1.9	1.15	
50-100		1.9	1.35	
100-200		2.0	1.60	
200-500		2.1	1.95	
>500		2.1	1.95	

The inclusion of shear wave attenuation in the modelling study improves the realism and accuracy of subsurface simulations by accounting for energy loss in the seabed. This improves the modelling of seismic wave reflections, refractions, and conversions, allowing for better interpretation of subsurface properties and material characterization. It also impacts source design and signal processing by influencing the amplitude and frequency content of the waveform. While increasing computational complexity, the inclusion of shear attenuation is crucial for high-fidelity modelling.

The seabed acoustic reflection is also dominated by the top sediment layer across the frequency range, with high reflection at low grazing angles and low reflection (high refraction) at higher grazing angles.

4.2 Modelling Source Scenarios

4.2.1 Source Array Configuration

The noise emissions from the conventional source array, including the source spectral levels and directivities, are modelled based on the Gundalf Designer software package (version 8.3, 2024). A conventional G-Gun II array of 2,630 CUI supplied by compressed air quads is proposed to be used for the seismic survey. The array consists of 18 active G-Gun II units (6 pairs) with two strings (1 x 1160 CUI + 1 x 1470 CUI), an average towing depth of 6 m, and an operating pressure of 2000 PSI. The operating pressure is consistent for the CUI volumes of the source array in this study (see Figure 10 and Table 11).

In general, array size and configuration are determined by the seismic survey's project-specific acquisition goals. Due to the interaction of array elements in multi-gun arrays (and the complexity of combining multiple impulsive acoustic sources), each configuration must be independently modelled to determine precise source levels.

The sound produced by a compressed air source is a function of the volume (CUI), size, and geometry of the ducts through which the air escapes. Considering a single airgun unit, the amplitude of the sound increases proportionally to the volume in CUI, so instead of a smaller number of larger source arrays to achieve appropriate source levels, multiple sources can be combined in an array, as is the case in this project.

The vessel will activate source 1, source 2, and source 3 in standard flip-flap-flop mode at 12.5 m intervals. Then the vessel will activate its three sources following the same pattern.

Sercel Bluepulse technology has the exact same array design as the conventional source array, with the sole exception that its acoustic signature is slightly different due to the airgun chambers used the bluepulse upgrade (see Figure 10 and Table 11). This technology intentionally suppresses the higher frequencies (above 200 Hz) emitted by the source that are not useful for the geophysical objectives of the survey. To differentiate between the two arrays of sources referred to in this report, the following terminology is used: Conventional and Bluepulse (BP200).

Figure 10: Schematic of seismic source array configuration (Conventional and Bluepulse 2630 CUI)

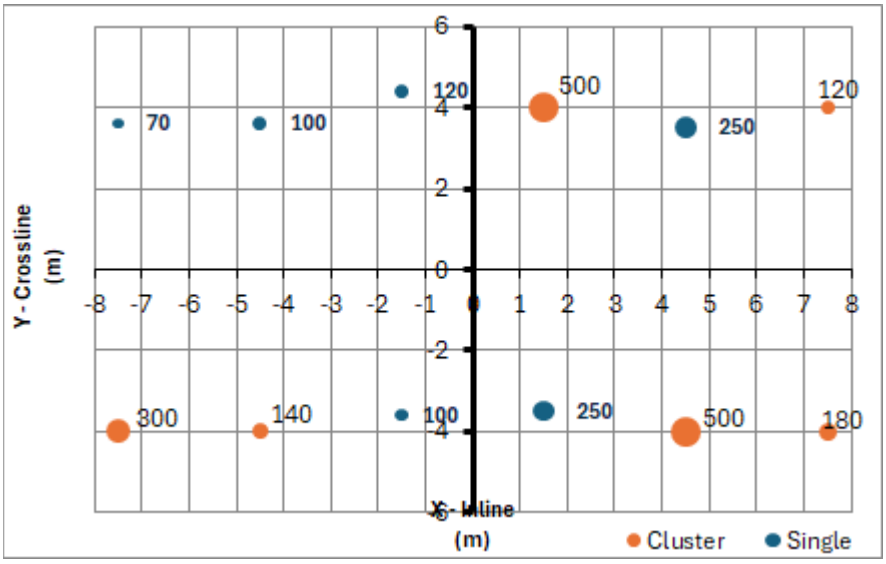


Table 11: Source array configuration (Conventional and Bluepulse 2630 CUI)

Gun	X(m)	Y(m)	Z(m)	Source element	Volume CUI
1	7.5	-4.0	6.0	Cluster	180
2	4.5	-4.0	6.0	Cluster	500
3	1.5	-3.5	6.0	Single	250
4	-1.5	-3.6	6.0	Single	100
5	-4.5	-4.0	6.0	Cluster	140
6	-7.5	-4.0	6.0	Cluster	300
7	7.5	4.0	6.0	Cluster	120
8	4.5	4.0	6.0	Cluster	250
9	1.5	4.0	6.0	Cluster	500
10	-1.5	4.0	6.0	Single	120
11	-4.5	4.0	6.0	Single	100
12	-7.5	4.0	6.0	Single	70

4.2.2 Source Locations

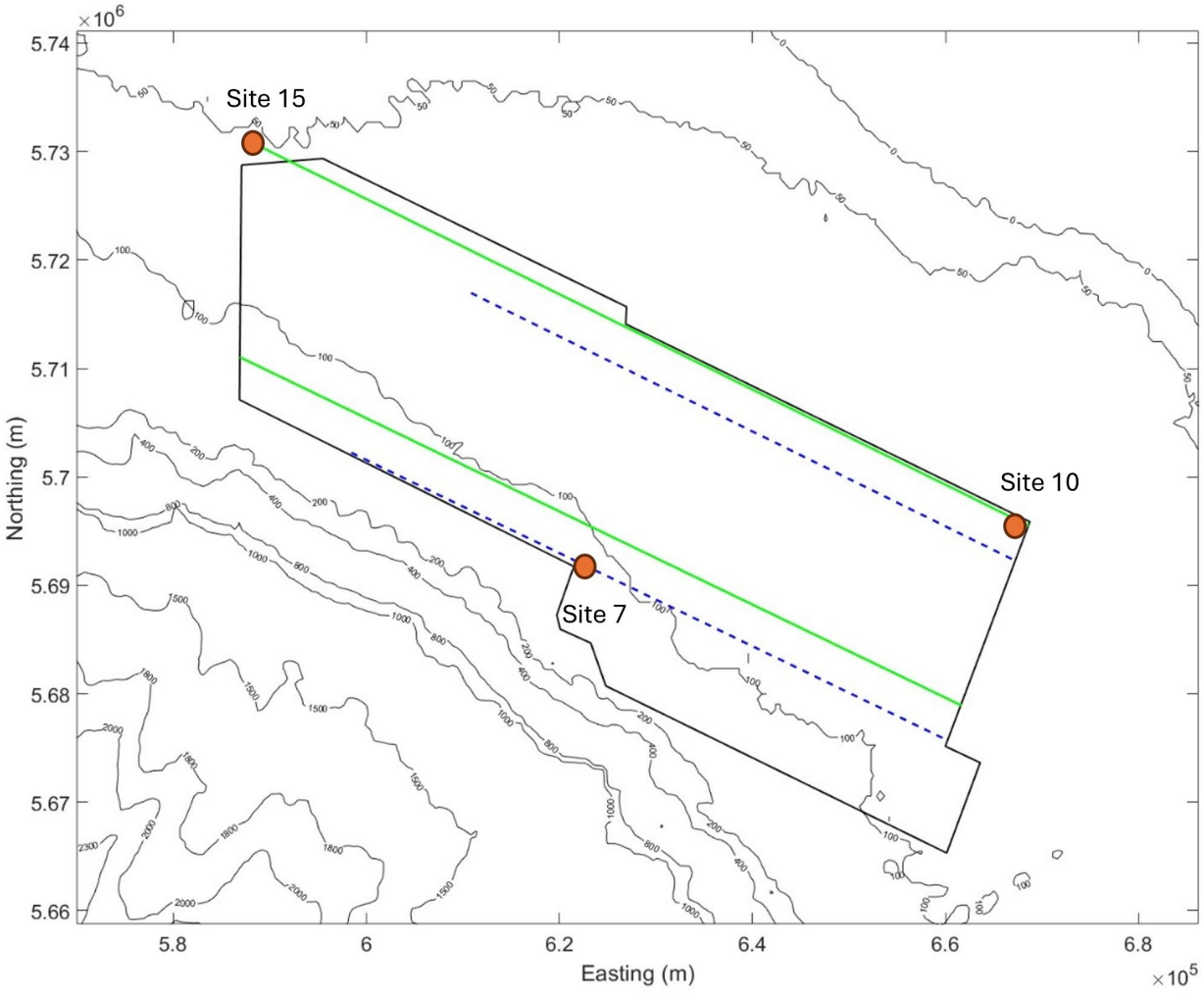
Three long-range modelling source locations are proposed for the seismic survey, as detailed in Table 12 and shown in Figure 11. The modelling is representative of the noise propagation within the seismic survey area.

Source location at site 15 represents the shallow-water environment of the northwest survey area, site 10 represents the eastern portion of the survey area; and site 7 represents the deep-water area furthest from the coast.

Table 12: Details of the three selected source locations for the long-range modelling

Source Location	Water Depth, m	UTM Coordinates Zone 54H (m)	Locality
Site 15	51.6	588878 E 5730493 S	Northwest extent of the survey area towards shallow water environments and near Biologically Important Areas (BIAs).
Site 10	67.4	663020 E 5698199 S	Eastern extent of the survey area near Biologically Important Areas (BIAs).
Site 7	124.9	621664 E 5692971 S	Southern extent of the survey area towards deep-water and further from the coast.

Figure 11: Representation of the selected source locations (orange) over the survey area



Map details: WGS 84 / UTM Zone 54 H

4.2.3 Survey Lines

Assuming a relatively fast vessel speed of 4.5knots, a single survey line takes on average, 10.15 hours and the average line change is 3.62 hours. As the survey polygon is not rectangular, these numbers vary as the length of the line changes across the survey lines. On average, the periods of seismic pulses within 24 hours would be 74.33% of 24 hours or 17.84 hours. Therefore, the approximate 18 hours is related to the maximum possible amount of shooting possible in 24 hours given the duration of the line changes at end of line and a 4.5knot speed.

The transect survey line details for the modelling scenarios A and B are detailed in Table 13 and Table 14 and indicated in Figure 12. The modelling is representative of the noise propagation within the proposed seismic areas and sites 15, 10 and 7.

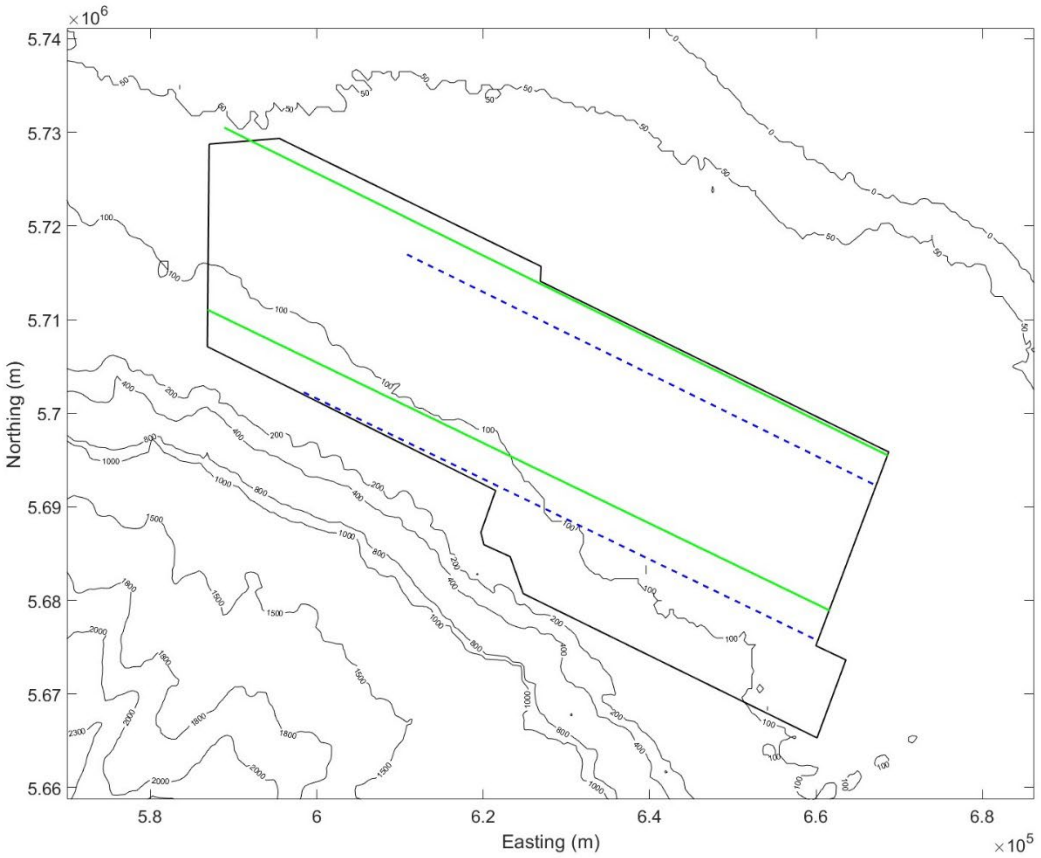
Table 13: Details of the selected transect survey lines for the cumulative SEL modelling for scenario C

Scenario C Survey Lines	UTM Coordinates Zone 54H		Distance (m)	Time (hours)	Estimated number of pulses
	Start (m)	End (m)			
1 (sites 15 and 10)	588879 E 5730494 S	668617 E 5695483 S	87,086	10.45	6,967
2	667270 E 5692245 S	610840 E 5716943 S	61,598	7.39	4,928
		Total	148,684	17.84	11,895

Table 14: Details of the selected transect survey lines for the cumulative SEL modelling for scenario D

Scenario D Survey Lines	UTM Coordinates Zone 54H		Distance (m)	Time (hours)	Estimated number of pulses
	Start (m)	End (m)			
3 (site 7)	586898 E 5711026 S	661636 E 5678916 S	81,340	9.76	6,507
4	660275 E 5675671 S	598431 E 5702221 S	67,300	8.08	5,384
		Total	148,640	17.84	11,891

Figure 12: Representation of cumulative SEL 24-hour survey lines (green and blue) over the survey area



Map details: WGS 84 / UTM Zone 54 H

4.3 Methodology and Procedure

The sub-sections below describe the modelling methodology and procedures for predicting received noise levels of relevant metrics associated with seismic survey activities.

4.3.1 Notional signature

The notional signatures are the pressure waveforms of individual source elements at a standard reference distance of 1 m. Notional signatures are modelled using the Gundalf Designer software package (version 8.3r, 2025). The Gundalf source model is developed based on the well-understood fundamental physics of source bubble oscillation and radiation as described by Ziolkowski (1970) and for an array source case, taking into account non-linear pressure interactions between source elements (Ziolkowski et al. 1982; Laws et al. 1988, 1990). Based on the preceding references, the related fundamental physics of bubble oscillation has been robustly understood for several decades.

The model solves a complex set of differential equations combining heat transfer and dynamics and has been calibrated against multiple measurements of non-interacting source elements and interacting clusters for all common source types at a wide range of deployment depths.

4.3.1.1 Far-field signatures

The notional signatures from all sources in the array are combined using appropriate phase delays in three dimensions to obtain the far-field source signature of the array. This procedure to combine the notional signatures to generate the far-field source signature is summarised as follows:

- The distances from each individual acoustic source to the nominal far-field receiving location are calculated. A 3 km & 9 km receiver set is used to verify the characteristics of the far-field signature (such as the power spectral density). Multiple ranges are considered for quality control purposes;
- The time delays between the individual acoustic sources and the receiving locations are calculated from these distances with reference to the speed of sound in water;
- The signal at each receiver location from each individual acoustic source is calculated with the appropriate time delay. These received signals are summed to obtain the array's overall far-field signature for the direction of interest, and
- The far-field signature also accounts for ocean surface reflection effects by the inclusion of the "surface ghost". Following the default settings in Gundalf Designer, a sea surface reflection coefficient of -1 is added as an additional ghost source for each acoustic source element. Alternative coefficients can be used in cases where regional sea surface information is available (typically in-situ measurements).

4.3.1.2 Beam patterns

The beam patterns of the acoustic source array are obtained as follows:

- The far-field signatures are calculated for all directions from the source using azimuthal and dip angle increments of 1-degree;
- The PSD (dB re 1 $\mu Pa^2s/Hz$ @ 1 m) for each pressure signature waveform is calculated using a Fourier transform technique, and
- The PSDs of all resulting signature waveforms are combined to form the frequency-dependent beam pattern for the array.

4.3.2 Conversion Factors

For received individual signals emitted from impulsive sources such as seismic sources, the differences between the SEL and other sound parameters, such as the PK and SPL, are expected to be greatest at the source location and then gradually decrease with receiving locations further away from the source location. This is due to the following effects:

- Theoretically, the source pulse goes through increasing waveguide distortion effects (e.g., dispersion, interference effects, seafloor and surface reflections, differences of time arrivals, etc.) with an increasing range from the source, which predominantly impact the characteristics of the pulse and the energy-based metric levels (e.g., lower peak level, extended pulse duration, etc.).

- Numerous theoretical and empirical research studies reliably support the above statement, e.g., the relevant seismic survey signal modelling and measurement studies (e.g., Austin et al. 2013; Matthews and MacGillivray 2013; Galindo-Romero et al. 2015; McCauley et al. 2000, 2016) show that the differences between the three temporal parameters (PK, SPL and SEL) are increasingly higher at the receiver closer to the source location.

4.3.2.1 SEL and PK

The difference between the PK and SEL of the far-field signature of the source array (at a reference distance of 1 m from the centre of the array) is 28 dB. This value is used as the conversion factor applied to the SEL to calculate the received peak sound pressure over the receiving range near the source location. This approach is regarded as conservative for estimating relevant near-field acoustic parameters based on SEL predictions.

4.3.2.2 SEL and SPL

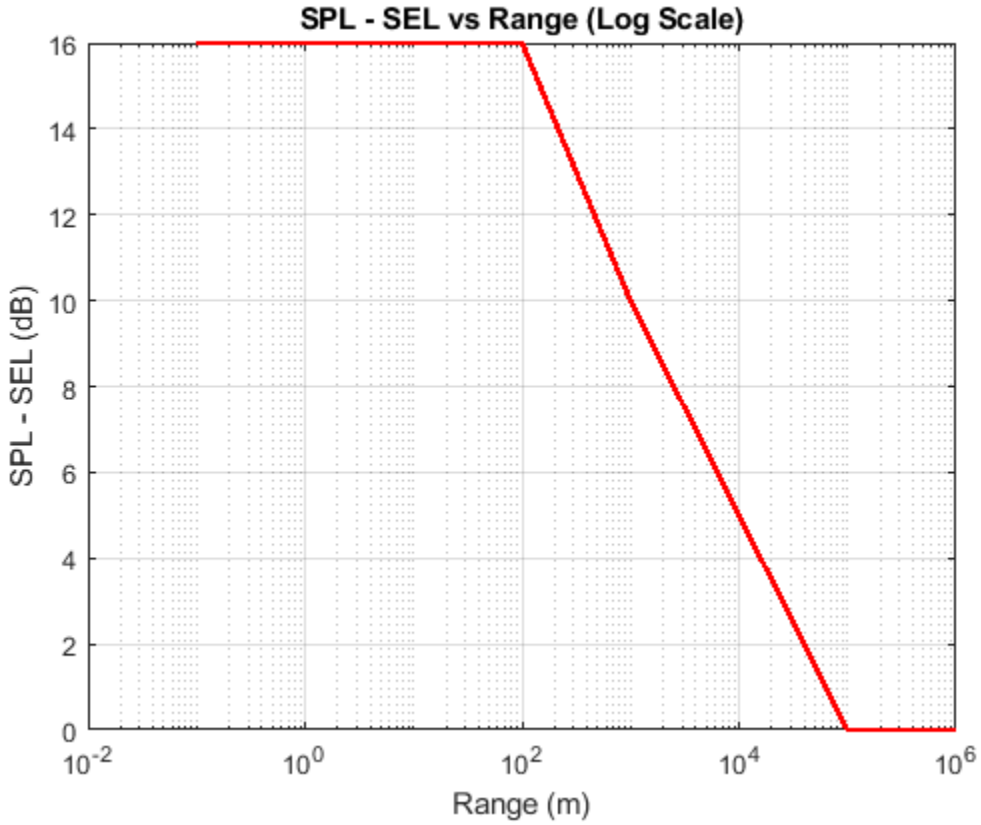
Previous empirical studies demonstrate that at relatively close distances from the noise sources (within 1.0 km), the difference between SEL and SPL could be between 10 dB and 15 dB (Austin et al. 2013; McCauley et al. 2000). The differences could drop to under 5 dB when the distances are close to 10 km (Austin et al. 2013). The differences are expected to drop further with increasing distances beyond 10 km (Simon et al. 2018).

For this project, the SPL was estimated using the following conversion factors to be applied to the modelled SEL within different distance ranges. These conversion factors are conservatively estimated based on the source array modelling results:

- 0 – 100 m, a conversion factor of 16 dB (Conventional) and 13 dB (Bluepulse);
- 100 – 1 000 m, conversion factors of 16 dB (Conventional) and 13 dB (Bluepulse) to 10 dB, following a logarithmic trend with distance;
- 1 000 – 10 000 m, conversion factors 10 dB to 5 dB, following a logarithmic trend with distance;
- 10 000 – 100 000 m, conversion factors 5 dB to 0 dB, following a logarithmic trend with distance; and
- > 100 000 m, a conversion factor of 0 dB.

The SEL to SPL conversion factors, as a function of horizontal distance from the source array, are illustrated in Figure 13.

Figure 13: SEL to SPL conversion factor as a function of horizontal range from the conventional and Bluepulse source array 2630 CUI



4.3.3 Short Range Modelling

Short-range modelling has been used to model received SELs in relative proximity to the sound source, considering the sound field's near-field effect. As such, the short-range case predictions are modelled by reconstructing the received signal waveforms from individual airgun source units within the array.

The wavenumber integration modelling algorithm SCOOTER (Porter 2001, 2020) is used to calculate the transfer functions (both amplitudes and phases) between sources and receivers. SCOOTER is a finite element code for computing acoustic fields in range-independent environments. The method is based on the direct computation of the spectral integral and is capable of dealing with an arbitrary layered seabed with both fluid and elastic characteristics.

The following procedures have been followed to calculate received SELs for short-range cases:

1 The modelling algorithm SCOOTER is executed for frequencies from 1 Hz to 1 kHz, in 1 Hz increments. The source depth is taken to be the array depth of 6.0 m. A receiver grid of 1 m in range (maximum range 4.0 km) and 1 m in depth is applied for the selected receivers. For each gridded receiver, the received SEL is calculated by following steps 2) – 5) below;

2 The range from the source to each receiver is calculated, and the transfer function between the source and the receiver is obtained by interpolating the results produced by the modelling algorithm SCOOTER in Step 1). This interpolation involves both the amplitude and phase of the signal waveform in the frequency domain;

3 The complex frequency domain signal of the notional signature waveform for each source element is calculated via the Fourier Transform and multiplied by the corresponding transfer function from Step 2) to obtain the frequency domain representation of the received signal from the source element;

4 The waveform of the received signal from the array source is reconstructed via the Inverse Fourier Transform. The received signal waveforms from all airgun sources in the array are summed to obtain the overall received signal waveform and

5 The signal waveform is squared and integrated over time to obtain the received SEL value. Alternatively, the SEL value can also be calculated via integrating the PSD over frequency in Step 3).

The modelling inputs for the short-range modelling case, such as sound speed profile and seabed geoacoustic models, have been detailed in Section 4.1. To analyse the received SEL variations with water depth changes, modelling has been undertaken for two water depths such as 60 and 120 m.

4.3.4 Long Range Modelling

Long-range modelling generally involves complex and variable environmental factors (such as sound speed profiles and bathymetric variations) along an extended range of sound propagation environments. It requires an efficient modelling prediction algorithm with reasonable accuracy. Therefore, the modelling prediction for the long-range case is carried out using the far-field source levels of octave frequency bands and their corresponding transmission loss calculations.

The fluid parabolic equation modelling algorithm RAMGeo (Collins 1993) is used to calculate the transmission loss between the source and the receiver. RAMGeo is an efficient and reliable PE algorithm for solving range-dependent acoustic problems with fluid seabed geo-acoustic properties.

The received sound exposure levels are calculated following the procedure below:

1 One-third octave source levels for each azimuth to be considered are obtained by integrating the horizontal plane source spectrum over each frequency band; these levels are then corrected to SELs;

2 Transmission loss is calculated using RAMGeo at one-third octave band central frequencies from 8 Hz to 1 kHz, with a maximum range of 200 km and at 5-degree azimuth increments. The bathymetry variation along each modelling track is obtained via interpolation from the bathymetry dataset;

3 The one-third octave source SEL levels and transmission loss are combined to obtain the received SEL levels as a function of range, depth, and frequency; and

4 The overall received SEL levels are calculated by summing all frequency band SEL levels.

4.3.5 Cumulative SEL Modelling

The cumulative SEL accounts for the total acoustic energy received from all seismic impulses within a full period of 24 hours[3]. A typical survey will generate thousands of sound pressure

[3] As the survey vessel moves continuously, the area affected by noise also changes, and no one area will be exposed to the same noise levels for 24 hours continuously. This scenario therefore rather assumes that a receptor, i.e., marine animal, remains in proximity to (moves with) the survey vessel for a 24-hour period.

releases (“pulses”) within a 24-hour period. This model assumes that the propagation environment for a set of consecutive pulses is similar, and therefore, one propagation model is to be representative of the total number of sound pressure releases.

The cumulative SELs (frequency unweighted and weighted) are modelled as follows:

1 The received SELs at individual grid locations (a 100-m grid size for this study) from individual representative survey shots considered (one in every ten shots for this study) is modelled based on the long-range modelling methodology and procedure as detailed in Section 4.3.4, and then the results are adjusted for the rest of the survey shots based on their shot locations;

2 The SEL at individual receiving grid locations is obtained by summing SEL contribution from all survey shots within a 24-hour period for the survey operation scenario considered;

3 For weighted SEL for individual marine mammal hearing groups, the source spectra are adjusted, accounting for the frequency weighting functions for individual hearing groups (as in Appendix B), and the weighted SEL for individual hearing groups to be obtained by repeating the first two steps as above; and

4 For the high-frequency energy component, which is important for marine mammals with high-frequency hearing range, the source spectra and propagation modelling are extended up to 10 kHz, with the source spectra being close to $1/f$ attenuation for frequencies above 1 kHz (LandrØ et al. 2011), so that the high-frequency energy component to be included for the weighted SEL predictions.

It should be noted that the source level inputs for long-range modelling, as detailed in Section 5.3, are based on the array source noise emissions in the horizontal plane, and this approach may underestimate the actual sound field close to the array source (< 4 km). As such, the sound fields close to the array source predicted by the long-range modelling described in Step (1) above are adjusted by benchmarking them against short-range modelling results, accounting for the near-field effects and providing a realistic model result.

4.3.6 Model Validation

The accuracy of source array sound field modelling depends on the suitability and accuracy of the array source model and the transmission loss model, as well as the realism of the parameters defining the sound propagation environment, including the bathymetry, seafloor geo-acoustics and sound speed profiles.

The following model validation exercises have been undertaken previously in regard to the array source model, short-range model and long-range model that have been used in this modelling study:

- The source modelling software Gundalf has been calibrated against various datasets of near-field recorded signatures and has been verified against other source array sound signature models (Ainslie et al. 2016); and
- The short-range and long-range models have been validated against various underwater acoustic measurement programs undertaken by independent third parties, with good agreements between modelled and measured results being reported (e.g., Simon et al. 2018; Li et al. 2021).

4.4 Impact Zones on Marine Fauna

The distances from the sound source within which various types of impacts on marine fauna can be expected (”impact zones”) are determined by modelling the transmission loss of sound in water (i.e., the decrease in noise levels when moving away from the noise source) and determining the distance at which predicted noise levels fall below the various threshold levels described in Section 3.3.

Impact zones thus identify the maximum horizontal distance from an area within which the anthropogenic noise from impulsive or non-impulsive sources may have certain types of adverse impacts on certain marine fauna species. This report defines the impact zones as follows:

- immediate impact from a single pulse – this is applicable if animals move out of or avoid entering the impact zone and are thus exposed at most for a short period (i.e., one-second); and
- cumulative impact from exposure over an entire event to impulsive noise – this would be applicable if an animal remains or moves with the noise source over an entire period and thus remains within the impact zone over an extended period of time. It is highly likely that animals will not remain in proximity of the noise source and that their exposure to sound levels above the various thresholds is much shorter. The distances identified for cumulative thresholds are thus very conservative (worst case) and very likely to overstate the extent of the typical impact area.

This information can be used to assess the risk (likelihood) of potential adverse noise impacts by combining the acoustic impact zones with ecological information such as habitat significance and migratory routes in the affected area.

5.0 Modelling Results

This section presents the modelling results for the seismic surveys, including the notional signature, far-field signature, and beam patterns of the source array configuration, as well as the short-range, long-range, and cumulative noise exposure modelling.

5.1 Seismic Source

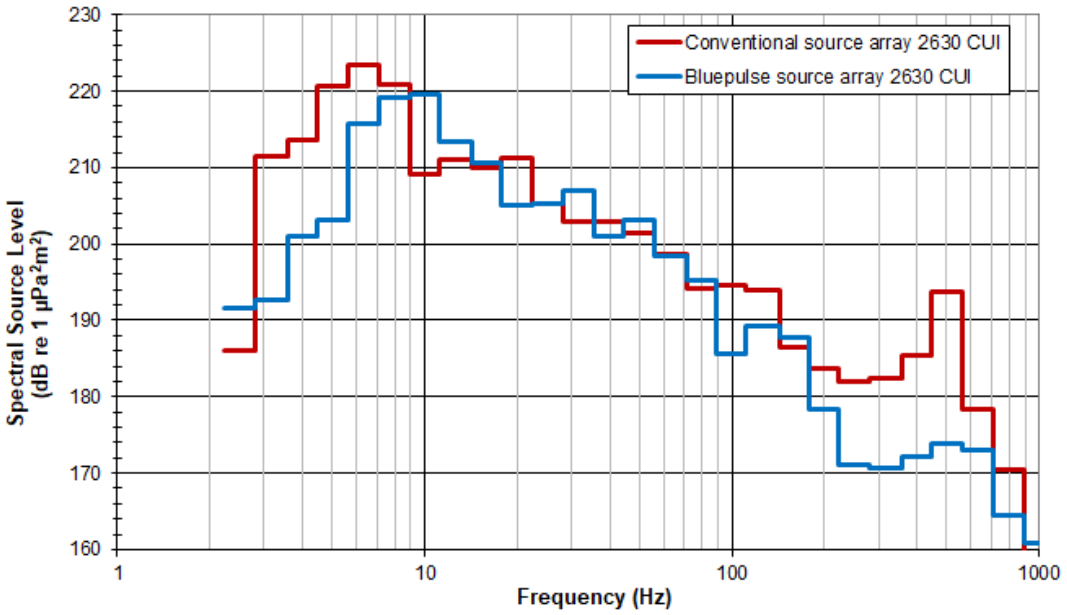
Received noise levels can be predicted by modelling the sound propagation transmission loss of known source levels as sound travels away from the source. As a first step, the noise emitted from the seismic array must be modelled before sound transmission loss is modelled.
The parameters and source levels of the modelled seismic source arrays are presented in Table 15.

Table 15: Noise source levels (Conventional and Bluepulse 2630 CUI)

Acoustic Metric	Conventional	Bluepulse
zero-to-peak sound pressure level, PK ($L_{p,pk}$, dB re 1 µPa @ 1 m)	256	249
root-mean-square sound pressure level, SPL ($L_{p,rms}$, dB re 1 µPa @ 1 m) with a 90%-energy pulse duration	243	237
Unweighted sound exposure level SEL (L_E, dB re µPa^2·s @ 1 m)	228	224

The one-third octave band spectral SL to be used as sound transmission modelling input for both source arrays are presented in Figure 14.

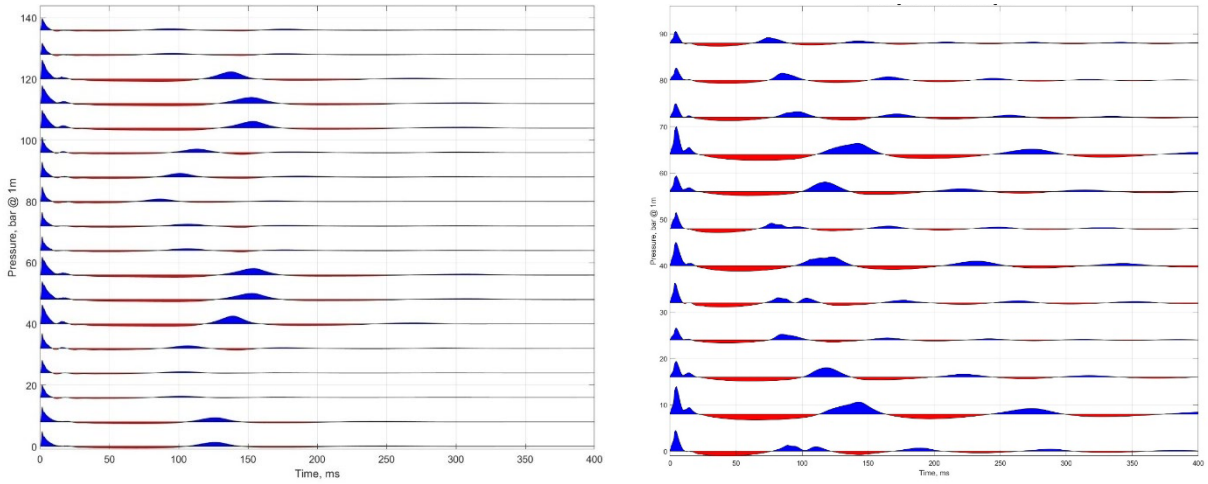
Figure 14: One-third-octave band spectral SL (Conventional and Bluepulse 2630 CUI)



5.1.1 Notional Signature

Figure 15 shows the notional source signatures for the individual/cluster active source elements in the conventional and Bluepulse source array as details in Section 4.2.1 (see Figure 10 and Table 11). Noticeable pressure variations last between 150 and 400 milliseconds (ms). In the Bluepulse array, certain airgun pairs (two guns of the same volume separated by 0.75 m) have been combined into a cluster of equivalent total volume. There is no meaningful variation between the conventional separation scheme and clustering in this particular scenario. The output shows positive (blue) and negative (red) pressure produced by each source element as a sound is produced.

Figure 15: Notional source signatures for the source elements in the source array 2630 CUI - Conventional (left) and Bluepulse (right)



5.1.2 Far-field Signatures

Figure 16 shows the far-field signature waveform and power spectral density of the conventional and Bluepulse proposed airgun arrays (simulated by the Gundalf Designer software 2024). The signatures are for the vertically downward direction with surface ghost included.

Figure 16: Waveform of the far-field signature in the vertically downward direction for the Conventional and Bluepulse (BP200) source array 2630 CUI

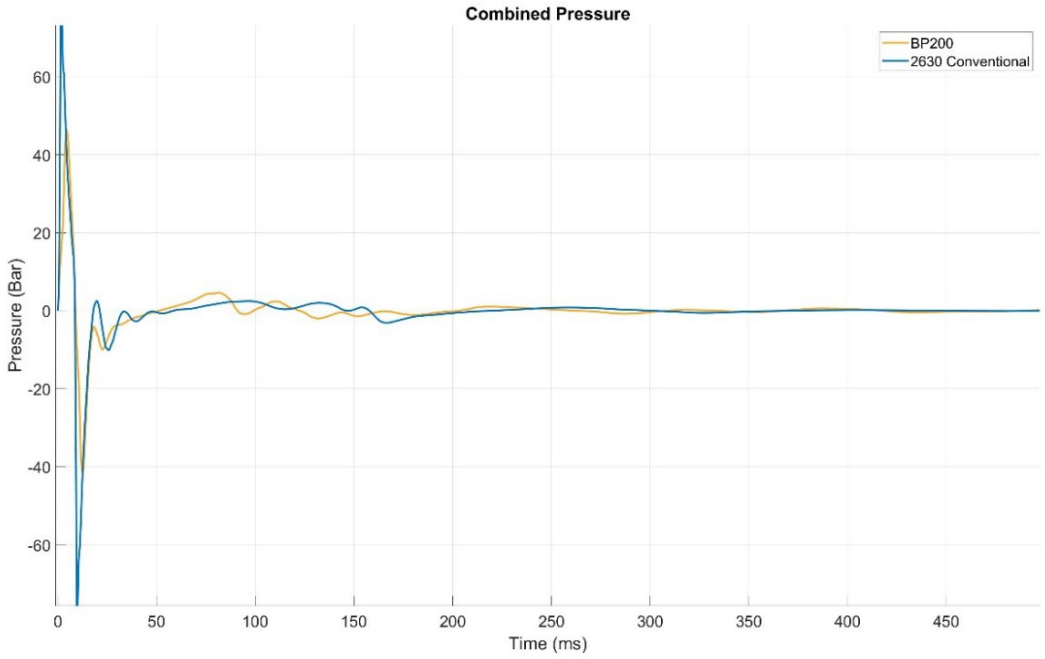
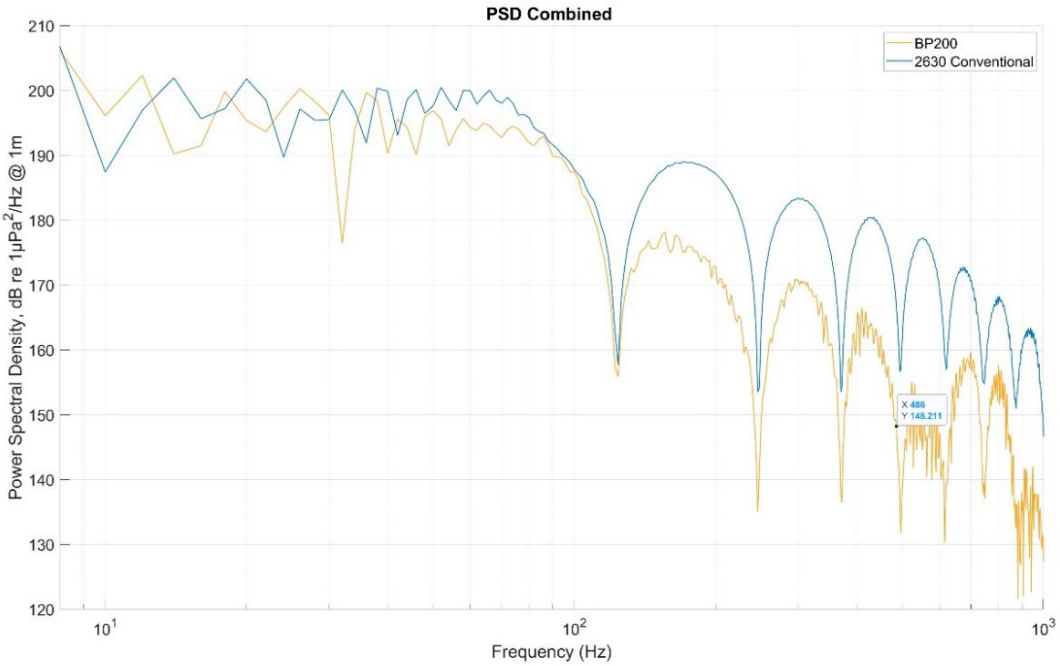


Figure 17: Power spectral density of the far-field signature for the Conventional and Bluepulse (BP200) source array 2630 CUI



5.1.3 Beam Patterns

The beam patterns in Figure 18 illustrate the strong angle and frequency dependence of the energy radiation from each array. The array far-field beam patterns of the following three cross sections are presented:

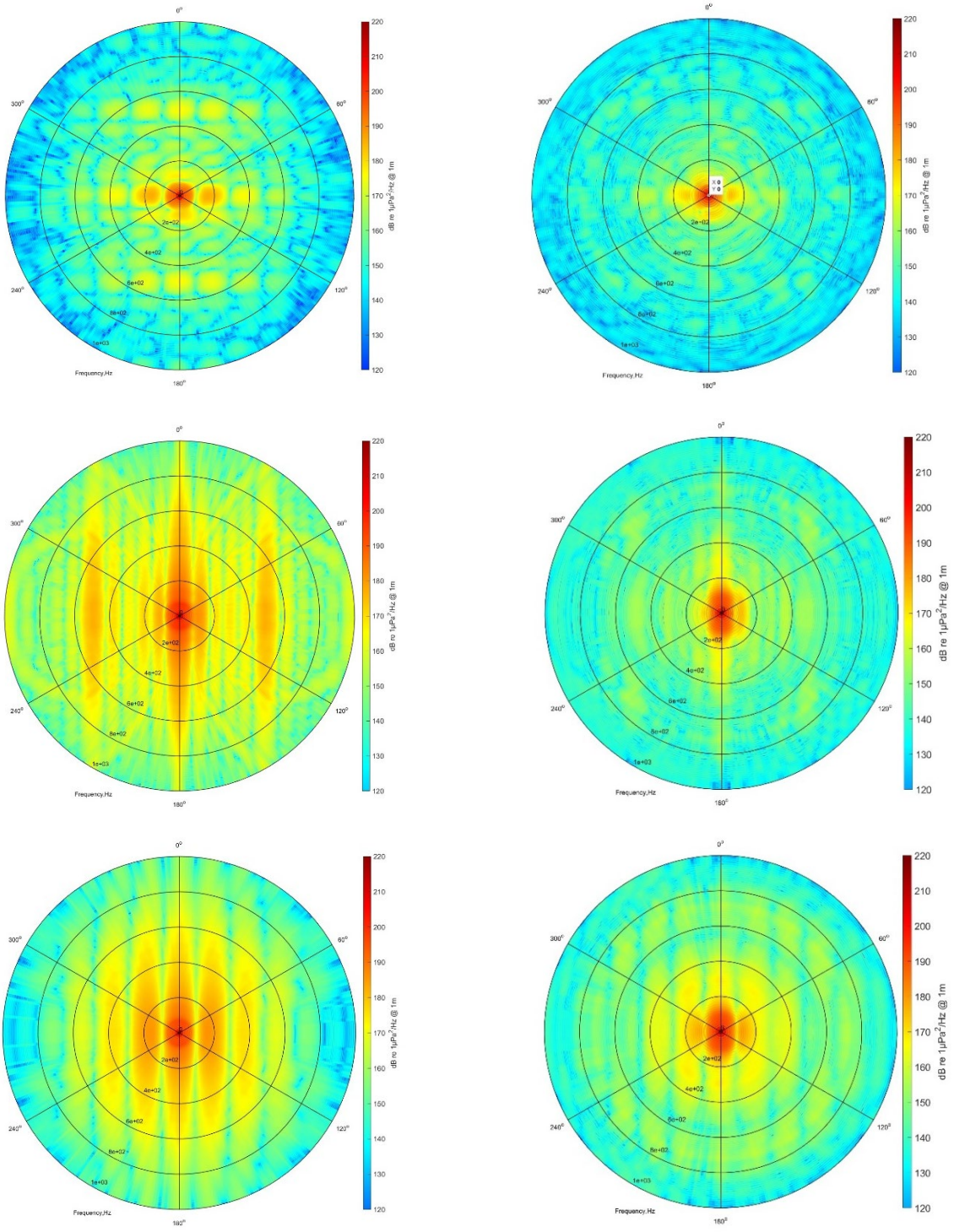
- The horizontal plane (i.e., dip angle of 90 degrees) with an azimuthal angle of 0 degrees corresponding to the in-line direction;
- The vertical plane for the in-line direction (i.e., azimuthal angle of 0 degrees) with dip angle of 0 degrees corresponding to the vertically downward direction; and
- The vertical plane for the crossline direction (i.e., azimuthal angle of 90 degrees) with a dip angle of 0 degrees corresponding to the vertically downward direction.

The beam pattern in the horizontal plane shows relatively stronger energy radiation in the crossline direction (perpendicular to the direction of vessel travel) than in the in-line direction (directly ahead of the surveying vessel). The beam patterns of the in-line and crossline vertical planes have the strongest radiation in the vertical direction (vertically downward from the horizontal plane of the surveying vessel and highly directional).

Source-level values in the horizontal plane are extracted at a dip angle of 90 degrees to conservatively estimate the distance to thresholds and determine exclusion zones appropriate for monitoring and mitigation.

An overall comparison of both source arrays (Conventional vs Bluepulse) shows a higher concentration of energy at the vertical plane for both the inline and crossline directions.

Figure 18: Array far-field beam patterns for Conventional (left) and Bluepulse (right) array 2630 CUI as a function of orientation and frequency.



Top: The horizontal plane with 0 degrees corresponding to the in-line direction (Dip: 90^0 Azim: 0 – 360^0). Middle: The vertical plane for the in-line direction (Dip: 0^0– 360^0 Azm: 0). Bottom: The vertical plane for the crossline direction (Dip: 0 – 360^0 Azim: 90^0). The 0-degree dip angle corresponds to the vertically downward direction.

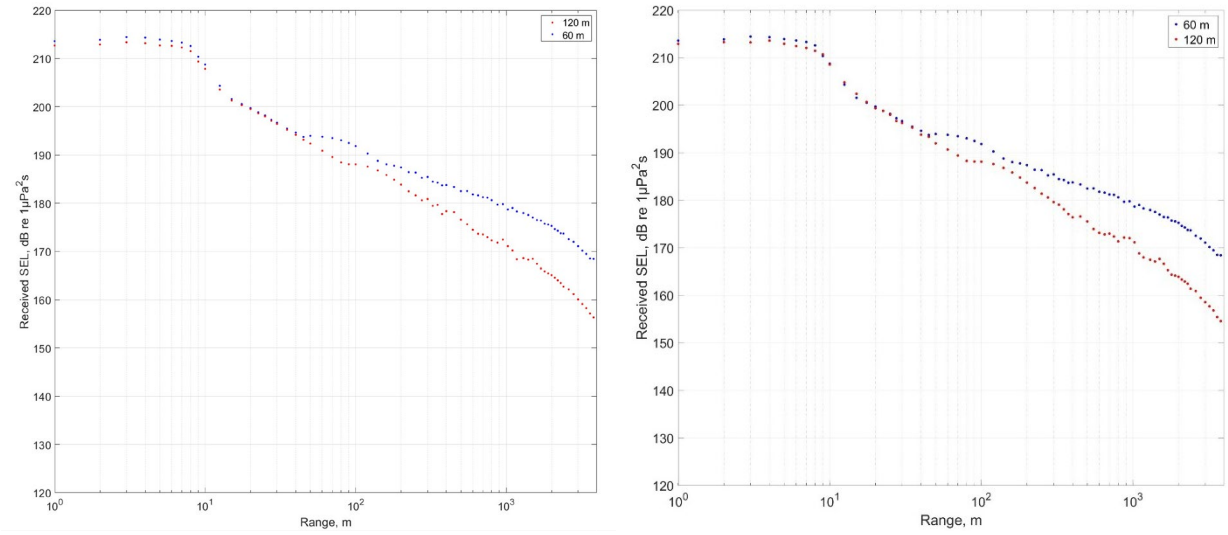
5.2 Short Range Modelling

SELs were modelled for two water depths (i.e., 60 and 120 m) for verification purposes against the long-range RAMGeo model.

The scatter plots of the predicted maximum SELs across the water column for all azimuths as a function of the horizontal range (0 – 4 km) from the source array are displayed in Figure 19 for the two water depths modelled (60 and 120 m). It is noted that:

- For the proposed seismic surveys, the maximum SELs are nearly identical for the first 40 m at the horizontal range; therefore, the maximum SELs will be dominated by acoustic energy directly arriving from the array source.
- At a horizontal distance of more than 40 m from the noise source, the maximum SELs are predicted to be higher in shallow water depth of 60 m than for deeper areas (120 m). This is because more acoustic energy is reflected from the seabed in shallower depths from the unique geo-acoustic profile of the sediments, which amplifies the resulting SEL.
- The two source arrays (Conventional and Bluepulse) have many similarities in the way sound propagates over short range (0 – 4 km).

Figure 19: Modelled maximum SELs across the water column for all azimuths as a function of range (0 – 4 km) from the source locations for the Conventional (left) and Bluepulse (right) array 2630 CUI



5.3 Long Range Modelling

Long range modelling results are presented in Appendix E. The noise contour images show the horizontal distances (in increments of 50 km) of the maximum SELs predicted from a single seismic pulse emitted at sites 15, 10 and 7. SEL is unweighted, and the maximum level across the water column is shown.

Figures E-1 to E-6 indicate that noise after a seismic pulse would be brief (see Section 5.1) above the ambient noise (>100 dB) before attenuating with the distance. Underwater noise is propagated at greater distances towards the southwest, where the depths are greater, while it attenuates more rapidly towards the coast, where the sea is shallower.

Figures E-7 to E-12 show the vertical contour images (depth and extent) of predicted maximum SELs across the water column towards the four cardinal directions from a single seismic pulse emitted at sites 15, 10 and 07. The horizontal axis shows distances from the noise source (seismic array at 0 m on the left) in increments of 20 km.

As evidenced in the horizontal contour images, the vertical contours show that sound travels further towards the west and south, where depths are greater compared to areas to the north and east, which are shallower.

The strong attenuation of the sound at site 10 is due to the shallow areas and the strong interaction between the sound signal and the seabed across the continental shelf. Site 7 (with west and south directions) shows a good example of how sound waves travel through the deep-water Sound Fixing and Ranging (SOFAR) channel. For these directions, the seabed depth variations are insignificant along the propagation paths within the deep-water region; and the directivity of received noise is dominated by the directionality of the source array.

5.4 Cumulative SEL Modelling

Cumulative modelling results are presented in Appendix E. The sound exposure contributions from consecutive survey shots vary with the distances from the receiving locations to the survey line. Cumulative modelling is carried out for a modelling radius of 200 km from the selected sites, with a 100-metre grid size, ensuring the modelling area is sufficiently large to encompass all potential zones of impact for assessed marine fauna species.

The cumulative SEL modelling has been carried out for an entire period of continuous exposure as described in Sections 4.2.3 and 4.3.5[4], based on the modelling methodology and procedure as laid out for the unweighted SEL scenario and weighted SEL_W scenario with frequency weighting functions of different marine mammal hearing groups applied (see Appendix B).

The modelled cumulative unweighted SEL contour map for the survey scenarios C and D of the seismic surveys for the two source arrays (Conventional and Bluepulse) is presented in Figures E-13 and E-16. For visualization purposes, the radius covered is approximately 60 km from each point along the survey line.

The results indicate that while noise levels attenuate rapidly in shallow waters, they attenuate at larger distances in deep waters. Also, sound exposure contributions from multiple adjacent pulses along the survey lines become more proportionally significant compared with the survey pulses closer to the survey lines.

6.0 Impact Zones

The modelled noise levels of all scenarios were compared against the latest noise exposure criteria for potential fauna impacts listed in Section 3.3. The resulting extent of impact zones (i.e., modelled horizontal distance for maximum range) for different noise exposure scenarios is presented below.

For immediate exposure to single pulse (i.e., impulsive noise), the additional two relevant SPL metrics (i.e., $L_{p,pk}$ and $L_{p,rms}$) are derived based on conservative conversion factors applied to the

[4] As the survey vessel moves continuously, the area affected by noise also changes, and no one area will be exposed to the same noise levels for 24 hours continuously. This scenario therefore rather assumes that a receptor, i.e., marine animal, remains in proximity to (moves with) the survey vessel for a 24-hour period.

predicted unweighted SEL values for the various receiving distances from the source location. These conversion factors are detailed in Section 4.3.2.

For cumulative exposure to multiple pulses (i.e., impulsive noise), the unweighted SEL metric (i.e., L_E) is applied for the fish groups, and the weighted SEL metric (i.e., $L_{E,w}$) is applied for turtles and marine mammal hearing groups based on the auditory weighting functions for each group (see Appendix B).

6.1 Immediate Exposure from Single Pulses

This section considers noise emissions during full operation of the conventional and BP200 source arrays 2360 CUI from a single pulse at the different locations detailed in Table 12.

The following subsections outline the resulting extent of impact zones for the AUD INJ, TTS, and behavioural disturbance based on immediate noise exposure metrics such as zero-to-peak sound pressure level, PK ($L_{p,pk}$, dB re 1 µPa), root-mean-square sound pressure level, SPL ($L_{p,rms}$, dB re 1 µPa), sound exposure level, SEL (L_E, dB re 1 µPa^2·s) for different marine fauna groups i.e., marine mammals, turtles, fish, diving seabirds and invertebrates (for detailed species classification, see Appendix C).

Behaviour disturbance modelling results are presented in Appendix E (Figures E-17 to E-22).

6.1.1 Marine Mammals and Turtles

The impact zones for AUD INJ and TTS due to immediate single-pulse seismic exposure of marine mammals and turtles are presented in Appendix D. All marine mammal hearing groups may experience AUD INJ, PTS or TTS from the noise produced by a single pulse from the Conventional and Bluepulse source arrays 2630 CUI. The following are maximum distances from the source within which LF cetaceans and turtles may experience impact or behavioural disturbance:

- LF cetaceans
  - AUD INJ: 73 m (sites 15 and 10) – Conventional source array
  - AUD INJ: 62 m (sites 15 and 10) – Bluepulse source array
  - TTS: 86 m (sites 15 and 10) – Conventional source array
  - TTS: 76 m (site 15) – Bluepulse source array
  - Behaviour disturbance: 160.6 km (site 07) – Conventional source array
  - Behaviour disturbance: 129.7 km (site 07) – Bluepulse source array
- Turtles
  - AUD INJ: 51 m (site 15) – conventional source array
  - AUD INJ: 39 m (site 15) – Bluepulse source array
  - TTS: 64 m (sites 15 and 10) – Conventional source array
  - TTS: 53 m (sites 15) – Bluepulse source array
  - Behaviour disturbance: 1.6 km (site 10) – Conventional source array
  - Behaviour disturbance: 1.3 km (site 10) – Bluepulse source array

6.1.2 Fish

The impact zones for AUD INJ and TTS due to immediate single-pulse seismic exposure of fish are presented in Appendix D. The zones of potential injuries for fish grouped by size are predicted to be the ones with the larger zones, followed up by the fish species with a swim bladder. Fish species without a swim bladder are less sensitive and have slightly smaller zones of impact. The following are maximum distances from the source within which fish with swim bladder, eggs, and larvae may experience impact or behavioural disturbance:

- Fish with swim bladder, eggs, and larvae:
  - Mortality and recoverable injury: 210 m (site 15) – Conventional source array
  - Mortality and recoverable injury: 104 m (site 15) – Bluepulse source array
  - Behaviour disturbance: 13.8 km (site 10) – Conventional source array
  - Behaviour disturbance: 12.7 km (site 10) – Bluepulse source array

6.1.3 Diving Seabirds

The impact zones for AUD INJ and TTS due to immediate single-pulse seismic exposure of diving seabirds are presented in in Appendix D. The following are maximum distances from the source within which diving seabirds (e.g. penguins) may experience impact or behavioural disturbance:

- Penguins:
  - AUD INJ: 55 m (sites 15 and 10) – Conventional source array
  - AUD INJ: 44 m (site 15) – Bluepulse source array
  - TTS: 68 m (sites 15 and 10) – Conventional source array
  - TTS: 58 m (site 15) – Bluepulse source array
  - Behaviour disturbance: 10.6 km (site 10) – Conventional source array
  - Behaviour disturbance: 2.3 km (site 10) – Bluepulse source array

6.1.4 Invertebrates

The impact zones for behaviour disturbance due to immediate single-pulse seismic exposure of invertebrates are presented in in Appendix D. Sponges and Coral may not respond at such threshold. The following are maximum distances from the source within which scallops, lobster and squid may experience a change on behaviour:

- Scallops:
  - Behaviour disturbance: 90 m (sites 15 and 10) – Conventional source array
  - Behaviour disturbance: 80 m (sites 15 and 10 – Bluepulse source array
- Lobster:
  - Behaviour disturbance: 397 m (site 15) – Conventional source array
  - Behaviour disturbance: 220 m (site 15) – Bluepulse source array
- Squid:
  - Behaviour disturbance: 2.7 km (site 15) – Conventional source array
  - Behaviour disturbance: 2.4 km (site 15) – Bluepulse source array

6.1.5 Human Divers

The impact zones for physiological effects due to immediate single-pulse seismic exposure of human divers are presented in in Appendix D. The following are maximum distances from the source within which human divers may experience slight aversion:

- Humna divers:
  - Slight aversion: 24.1 km (site 15) – Conventional source array
  - Slight aversion: 23.5 km (site 15) – Bluepulse source array

6.2 Cumulative Exposure from Multiple Pulses

This section considers the impact zones arising from theoretical continuous full-time exposure to a seismic survey. As noted earlier in Section 4.3.5, this scenario assumes thousands pulses from the seismic source and that a receptor, i.e., marine animal, remains in proximity to (continuously moves with) the moving survey vessel for a 24-hour period and thus remains within the impact zone, which is unlikely but presents a very conservative worst-case scenario. Most likely, exposure of animals will lie somewhere between the very short-term exposure assumed in Section 6.1 and the 24-hour exposure assumed in Section 6.2 as the animal moves in the ocean and changes its position relative to the seismic survey vessel, either in response to the vessel or in response to other environmental triggers.

The following subsections outline the resulting extent of impact zones for AUD INJ, and TTS based on cumulative noise metrics such as sound exposure level, SEL (L_E, dB re 1 μPa^2·s) for fish and SEL_W ($L_{E,w}$, dB re 1 μPa^2·s) for marine mammals and turtles (for detailed species classification, see Appendix C).

6.2.1 Marine Mammals and Turtles

The impact zones of AUD INJ and TTS due to cumulative multi-pulse seismic exposure of marine mammals and turtles are presented in Appendix D. All marine mammal hearing groups may experience AUD INJ, or TTS from the noise produced by multiple pulses from the Conventional and Bluepulse source arrays 2630 CUI.

The following are maximum distances from the source within which LF cetaceans and turtles may experience impact during survey scenarios C and D.

- LF cetaceans:
  - AUD INJ: 8.5 km (scenario D) – Conventional source array
  - AUD INJ: 1.4 km (scenario D) – Bluepulse source array
  - TTS: 27.9 km (scenario D) – Conventional source array
  - TTS: 10.1 km (scenario D) – Bluepulse source array
- Turtles
  - AUD INJ: 1.0 km (scenario C) – Conventional source array
  - AUD INJ: 0.3 km (scenario C) – Bluepulse source array
  - TTS: 6.2 km (scenario C) – Conventional source array
  - TTS: 3.4 km (scenario C) – Bluepulse source array

6.2.2 Fish

The impact zones of AUD INJ and TTS due to cumulative multi-pulse seismic exposure of fish groups are presented in Appendix D. All hearing fish groups may be susceptible to mortality and non-recoverable injury, with small fish (< 2 g) being the most vulnerable to TTS from exposure to survey scenario A. Fish with swim bladders involved in hearing being are the most susceptible to AUD INJ, followed up by fish eggs and larvae.

Existing experimental data regarding recoverable injury and TTS impacts on fish eggs and larvae are sparse, and no guideline recommendations have been provided. However, based on peer-reviewed literature (Popper et al. 2014), noise impacts related to recoverable injury and TTS on fish eggs and larvae are expected to be moderate in the near field (tens of meters) from the source location and low for intermediate and far-field distances from the source location.

The following are maximum distances from the source within which fish with swim bladder, involved in hearing may experience impact:

- Fish with swim bladder, involved in hearing:
  - Mortality: 1.2 km (scenario C) – Conventional source array
  - Mortality: 0.8 km (scenario C) – Bluepulse source array
  - TTS: 10.9 km (scenario C) – Conventional source array
  - TTS: 9.2 km (scenario C) – Bluepulse source array

6.2.3 Diving Seabirds

The impact zones for AUD INJ and TTS due to cumulative multi-pulse seismic exposure of diving seabirds are presented in Appendix D. The following are maximum distances from the source within which diving seabirds (e.g. penguins) may experience impact:

- Penguins:
  - AUD INJ: 55 m (scenario C) – Conventional source array
  - AUD INJ: 50 m (scenario C) – Bluepulse source array
  - TTS: 1.0 km (scenario C) – Conventional source array
  - TTS: 0.1 km (scenario C) – Bluepulse source array

6.2.4 Invertebrates

Comprehensive analyses of cumulative exposure to anthropogenic noise in invertebrates have not yet been carried out (see Section 3.3.5).

6.2.5 Human Divers

The impact zones for recommended tolerance due to multi-pulse seismic exposure of human divers are presented in Appendix D. The following are maximum distances from the source within which human divers may tolerate seismic noise:

- Humna divers:
  - Max Time (200s): 165.6 km (scenario D) – Conventional source array
  - Max Time (200s): 162.5 km (scenario D) – Bluepulse source array

7.0 Discussion

The modelling study shows how site-specific geoacoustic profiles, validated acoustic propagation models, and updated biological criteria can produce realistic and precautionary estimates of underwater noise impact. At Site 15 and Site 10, the seabed was modelled as fine carbonate sand overlying increasingly cemented calcarenite, transitioning to well-cemented calcarenite at depth. This profile yields strong seabed reflections, particularly in shallow water, which amplifies received sound levels and increases the extent of near-field impact zones. In contrast, Site 7, located in deeper water, was modelled with silty carbonate sand transitioning to semi-cemented carbonate, which absorbs more acoustic energy and reduces reflection, resulting in lower near-field SELs and more directional propagation. These geoacoustic differences significantly influence both short-range and long-range modelling outcomes.

The modelling results per immediate exposure from single pulses show that physiological impacts such as AUD INJ and TTS are limited to relatively small zones around the source, particularly for regional marine mammals. For example, LF cetaceans such as the pygmy blue whale and the southern right whale can suffer hearing loss (AUD INJ and TTS) within 100 m of a conventional emission source. Similarly, fish in general are expected to suffer mortality or recoverable injuries within 250 m. In contrast, the impact zones are slightly reduced for all animal groups when the Bluepulse source array is used. An overall reduction in distances of 10 m for marine mammals and 100 m for fish is anticipated.

Behavioural disturbance covers much larger areas. Marine mammals can exhibit behavioural disturbance up to 160 km from the source when conventional arrays are used offshore and at greater depths (>100 m). Bluepulse technology can reduce this distance by 30 km. Other animal groups are affected behaviourally at shorter distances, and for all species, the use of Bluepulse reduces the impact zone. These distances highlight the broad ecological impact of seismic noise, especially for species that rely on acoustic cues for navigation, communication, and foraging. The model uses the lowest root-mean-square SPL thresholds for immediate exposure of a species to a single pulse, which better reflects behavioural alteration than injury.

In the cumulative exposure analysis, the model assumes that animals follow the vessel and are exposed to the total number of seismic pulses over a 24-hour period. However, this is a conservative scenario representing the worst-case scenario. In reality, marine fauna, such as marine mammals, sea turtles, fish, and diving seabirds, are unlikely to remain near survey vessels unless they are tied to specific feeding or breeding grounds or are unable to move (e.g., plankton, fish eggs, and larvae). Therefore, the projected cumulative impact zones likely overestimate actual exposure and should be considered precautionary limits.

The cumulative results demonstrate the extent of impact zones for various hearing groups. For LF cetaceans, AUD INJ is predicted within 6.2 km (Scenario C) and 8.5 km (Scenario D), while TTS may occur up to approximately 24 km and 28 km, respectively when a conventional source array is used. However, a considerable difference is visible when a Bluepulse source array is applied. For LF cetaceans, AUD INJ is reduced to 3.5 km (Scenario C) and 1.4 km (Scenario D), while TTS may also decrease up to approximately 13 km and 10 km, respectively. These distances reflect the influence of the acoustic signature for each active element of the source array used as well as lower energy at higher frequencies (>200 Hz).

Other hearing groups, such as HF and very-high-frequency VHF cetaceans, exhibit significantly smaller zones of impact because of their different auditory weighting functions and decreased sensitivity to low-frequency seismic pulses. A summary of the maximum impact zones modelled by the STLM analysis for all the marine fauna and human divers is detailed in Table 16.

Table 16: Summary of maximum impact zones modelled by the STLM study

Group	Noise Impact	Immediate Exposure (Single Pulse)		Cumulative Exposure (24 hrs)	
		Conventional	Bluepulse	Conventional	Bluepulse
Low-Frequency Cetaceans (e.g., pygmy blue whale, southern right whale	AUD INJ	73 m	62 m	8.5 km	3.5 km
	TTS	86 m	76 m	28 km	10 km
	Behavioural	160 km	130 km	-	
Turtles	AUD INJ	51 m	39 m	1.0 km	0.4 km
	TTS	64 m	53 m	6.2 km	3.4 km
	Behavioural	1.6 km	1.3 km	-	
Fish	Mortality	210 m	104 m	1.2 km	0.8 km
	TTS	-	-	10.9 km	9.2 km
	Behavioural	13.8 km	12.7 km	-	
Diving Seabirds (e.g., penguins)	AUD INJ	55 m	44 m	55 m	50 m
	TTS	68 m	58 m	1.0 km	0.1 km
	Behavioural	10.6 km	2.3 km	-	
Invertebrates	Behavioural (Lobster)	397 m	220 m	-	
	Behavioural (squid)	2.7 km	2.4 km		
Human Divers	Slight Aversion	24 km	23.5	-	
	Tolerance limit	-		165 km	162 km

AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift; a dash means threshold is not available or there is limited data.

The results of the Animat modelling indicate that exposure ranges to physiological thresholds (PTS and TTS) and behavioural thresholds for SPL vary significantly depending on the source type and scenario. Conventional source array consistently produced higher exposure ranges compared to Bluepulse, suggesting that Bluepulse offers a substantial advantage in mitigating high-level acoustic impacts. Scenario C (Site 15) yielded higher exposure ranges than Scenario D (Site 7), reflecting the spatial variability in sound propagation and animal distribution.

Modelling with Animat of pygmy blue whales and southern right whales with specific behavioural profiles further underscores the importance of considering the ecological context, such as feeding versus migration states and mother-calf dynamics, in exposure assessments.

8.0 Closure

Thank you for retaining SLR to provide this service.

Regards,

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Appendix A Acoustic Terminology

Regia Marine Seismic Survey in the Otway Basin

Underwater Sound Transmission Loss Modelling Study

Klarite Pty Ltd

SLR Project No.: 675.073227.00001

December 1, 2025

A.1 Acoustic Terminology

Term	Definition
1/3 Octave Band Levels	The energy of a sound is split into a series of adjacent frequency bands, each being one-third of an octave wide.
Impulsive noise	Noise that is typically very short (in seconds), broadband and has high peak pressure with rapid time and decay back to ambient levels (e.g., noise from pile driving, seismic surveys and explosives).
Non-Impulsive noise	It is typically continuous and produces sounds that can be narrowband, or tonal, and brief or prolonged. It does not have the high peak sound pressure with rapid rise time typical of impulsive sounds (e.g., drilling and vibratory pile driving).
Continuous noise	Noise with a sound pressure level that remains above ambient sound during the entire observation period (e.g., vessel noise, drilling and vibratory pile driving).
Power Spectral Density (PSD)	PSD describes how the power of a signal is distributed with frequency.
Sound Pressure (p)	A deviation from the ambient hydrostatic pressure caused by a sound wave.
Source Level (SL)	The acoustic source level is the level referenced to a distance of 1 m from a point source.
Peak Sound Pressure Level (PK)	The peak sound pressure level is the logarithmic ratio of the peak pressure over the impulsive signal event to the reference pressure.
root-mean-square Sound Pressure Level (SPL)	The mean-square sound pressure is the average of the squared pressure over the pulse duration. The root-mean-square sound pressure level is the logarithmic ratio of the root of the mean-square pressure to the reference pressure. Pulse duration is taken as the duration between the 5% and the 95% points on the cumulative energy curve.
Sound Exposure Level (SEL)	SEL is a measure of energy. Specifically, it is the decibel level of the cumulative sum of squared sound pressures for 1-s equivalent duration referenced to 1 µPa for water. The time duration and frequency range shall be specified.
Sound Exposure Level, Weighted (SEL_w)	Weighted sound exposure level is the level of the power quantity weighted time-integrated squared sound pressure. The integration time and frequency range shall be specified.
Permanent Threshold Shift (PTS)	A permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing above a previously established level.
Auditory Injury (AUD INJ)	Damage to the inner ear that can result in destruction of tissue, such as the loss of cochlear neuron synapses or auditory neuropathy. Auditory injury may or may not result in a permanent threshold shift (PTS).
Temporary hearing Threshold Shift (TTS)	TTS is defined as a temporary, reversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level.

Appendix B Auditory Weighting Functions

Regia Marine Seismic Survey in the Otway Basin

Underwater Sound Transmission Loss Modelling Study

Klarite Pty Ltd

SLR Project No.: 675.073227.00001

December 1, 2025

B.1 Auditory Weighting Functions

This appendix provides the recommended frequency-weighting functions for use in assessing the effects of relatively intense sounds on hearing. This information is derived based on all available relevant data and published literature (i.e., the state of current knowledge).

Marine animals do not hear equally well at all frequencies within their functional hearing range. Based on the hearing range and sensitivities, NMFS (2024) have categorised marine mammal species (i.e., cetaceans and pinnipeds) into five underwater hearing groups: low-frequency (LF), high-frequency (HF), very high-frequency (VHF) cetaceans, Phocid pinnipeds in water (PW) and Otariid pinnipeds in water (OW). For each specific marine mammal species, refer to Appendix C within the reference document for their corresponding hearing groups.

The potential noise effects on animals depend on how well the animals can hear the noise. Frequency weighting is a method of quantitatively compensating for the differential frequency response of sensory systems (Southall et al. 2019).

When developing updated scientific recommendations in marine mammal noise exposure criteria, Southall et al. (2019) adopted the auditory weighting functions as expressed in the equation below, which are based on the quantitative method by Finneran (2016) and are consistent with the U.S. National Oceanic and Atmospheric Administration (NOAA) technical guidance (NMFS 2024).

The department of the U.S. Navy (DoN 2017) revised the auditory-weighting functions for sea turtle (TU). Audiogram slopes were calculated across a frequency range of one octave for five species (refer to Appendix C with composite audiograms based on experimental data.

$$W(f) = C + 10log10\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\} \quad \text{(b.1)}$$

Where:

W(f) is the weighting function amplitude (in dB) at frequency f (in kHz).

f_1 represents LF transition value (in kHz), i.e., the lower frequency at which the function amplitude begins to change from the flat, central portion of the curve.

f_2 represents HF transition value (in kHz), i.e., the upper frequency at which the function amplitude begins to change from the flat, central portion of the curve.

a represents the LF exponent value (dimensionless) which defines the rate of decline of the weighting function amplitude at low frequencies. The change in weighting function amplitude with frequency at low frequencies (the LF slope) is 20a dB/decade.

b represents the HF exponent value (dimensionless) which defines the rate of decline of weighting function amplitude at high frequencies, becoming linear with the logarithm of frequency. The change in weighting function amplitude with frequency at high frequencies (the HF slope) is -20b dB/decade.

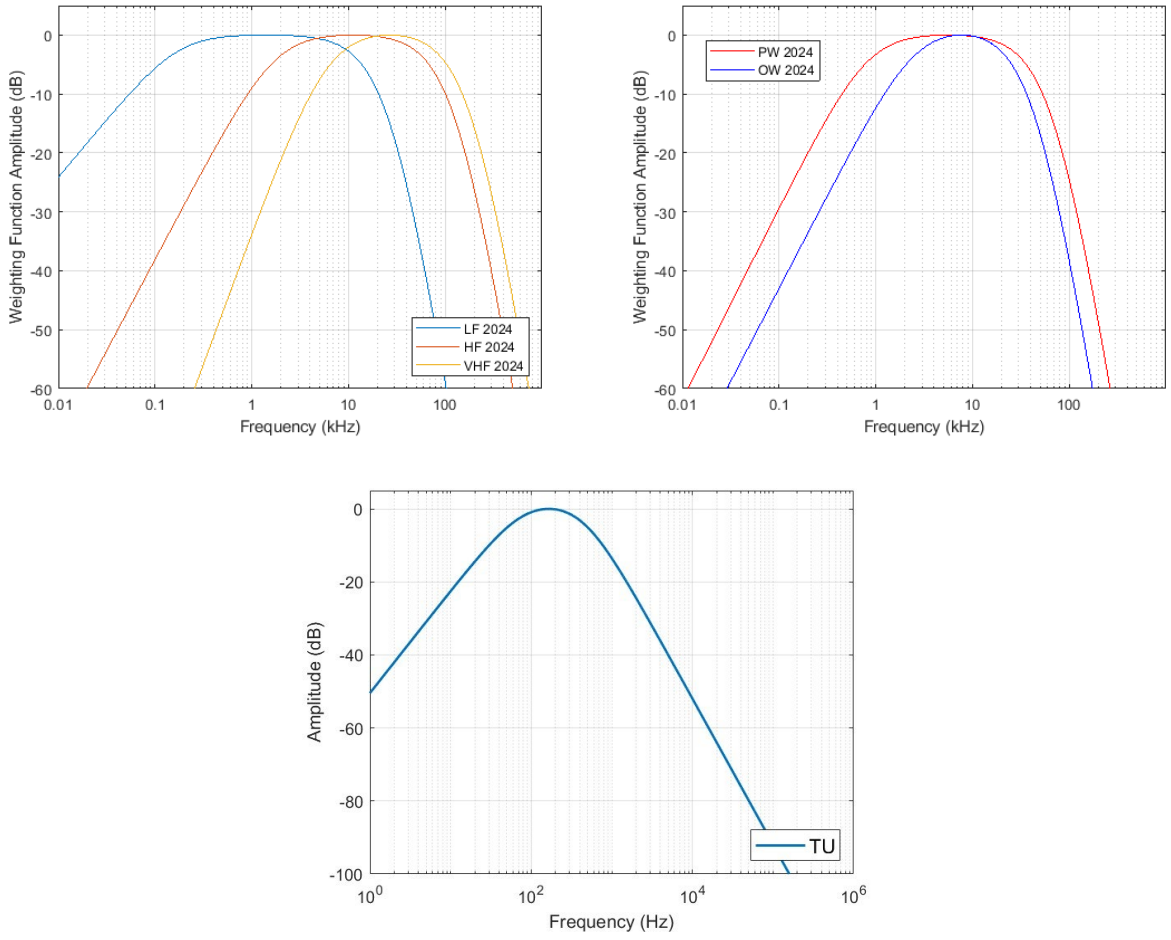
C is the constant that defines the vertical position of the curve. It is defined so that the maximum amplitude of the weighting function equals 0 dB (with all other values being negative).

Table B-1 lists the auditory weighting parameters as defined above for the seven hearing groups. The corresponding auditory weighting functions for all hearing groups are presented in Figure B-1.

Table B-1: Auditory weighting functions – revised parameters
(NMFS 2024; DoN 2017)

Marine mammal hearing group	a	b	f1 (kHz)	f2 (kHz)	C (dB)
Low-frequency cetaceans (LF)	0.99	5	0.163	26.6	0.12
High-frequency cetaceans (HF)	1.55	5	1.73	129	0.32
Very-high-frequency cetaceans (VHF)	2.23	5	5.93	186	0.91
Phocid pinnipeds in water (PW)	1.63	5	0.81	68.3	0.29
Otariid pinnipeds in water (OW)	1.58	5	2.53	43.8	1.37
Sea turtles (TU)	1.4	2	0.077	0.44	2.35

Figure B-1: Auditory weighting functions – spectral plots
(NMFS 2024; DoN 2017)



Appendix C Marine Fauna Classification

Regia Marine Seismic Survey in the Otway Basin

Underwater Sound Transmission Loss Modelling Study

Klarite Pty Ltd

SLR Project No.: 675.073227.00001

December 1, 2025

C.1 Marine Fauna Classification

The following appendix gives a summary of marine fauna hearing group classification. Not all animals listed in the Table C-1 are expected to be found in the vicinity of the project area, however, special attention is paid to those highlighted in green, as they are listed as endangered species in Australia and are considered vitally important due to biologically important behaviours and critical life stages that are known to occur in the region.

Table C-1: Summary of marine mammal classification

Classification	Common Name	Scientific Name
Low frequency cetaceans (adapted from Appendix 1 Southall et al. 2019)	Bowhead whale	*Balaena mysticetus*
	Blue whale	*Balaenoptera musculus*
	Pygmy blue whale	*Balaenoptera musculus brevicauda*
	Southern right whale	*Eubalaena australias*
	North Atlantic right whale	*Eubalaena glacialis*
	North Pacific right whale	*Eubalaena japonica*
	Common minke whale	*Balaenoptera acutorostrata*
	Antarctic minke whale	*Balaenoptera bonaerensis*
	Sei whale	*Balaenoptera borealis*
	Bryde's whale	*Balaenoptera edeni*
	Omura's whale	*Balaenoptera omurai*
	Fin whale	*Balaenoptera physalus*
	Humpback whale	*Megaptera novaeangliae*
	Pygmy right whale	*Caperea marginata*
	Gray whale	*Eschrichtius robustus*
High frequency cetaceans (adapted from Appendix 2 Southall et al. 2019)	Sperm whale	*Physeter macrocephalus*
	Arnoux' beaked whale	*Berardius arnuxii*
	Baird's beaked whale	*Berardius bairdii*
	Northern bottlenose whale	*Hyperoodon ampullatus*
	Southern bottlenose whale	*Hyperoodon planifrons*
	Tropical bottlenose whale	*Indopacetus pacificus*
	Sowerby's beaked whale	*Mesoplodon bidens*
	Andrews' beaked whale	*Mesoplodon bowdoini*
	Hubb's beaked whale	*Mesoplodon carlbubbsi*
	Blainville's beaked whale	*Mesoplodon densirostris*
	Gervais' beaked whale	*Mesoplodon europaeus*

Classification	Common Name	Scientific Name
High frequency cetaceans (extracted from Appendix 2 Southall et al. 2019)	Ginkgo-toothed beaked whale	*Mesoplodon ginkgodens*
	Gray's beaked whale	*Mesoplodon grayi*
	Hector's beaked whale	*Mesoplodon hectori*
	Deraniyagala's beaked whale	*Mesoplodon hotaula*
	Layard's beaked whale	*Mesoplodon layardii*
	True's beaked whale	*Mesoplodon mirus*
	Perrin's beaked whale	*Mesoplodon perrini*
	Pygmy beaked whale	*Mesoplodon peruvianus*
	Stejneger's beaked whale	*Mesoplodon stejnegeri*
	Spade-toothed whale	*Mesoplodon traversii*
	Tasman beaked whale	*Tasmacetus shepherdi*
	Cuvier's beaked whale	*Ziphius cavirostris*
	Killer whale	*Orcinus orca*
	Beluga	*Delphinapterus leucas*
	Narwhal	*Monodon monoceros*
	Common dolphin	*Delphinus delphis*
	Pygmy killer whale	*Feresa attenuata*
	Short-finned pilot whale	*Globicephala macrorhynchus*
	Long-finned pilot whale	*Globicephala melas*
	Risso's dolphin	*Grampus griseus*
	Fraser's dolphin	*Lagenodelphis hosei*
	Atlantic white-sided dolphin	*Lagenorhynchus acutus*
	White-beaked dolphin	*Lagenorhynchus albirostris*
	Pacific white-sided dolphin	*Lagenorhynchus obliquidens*
	Dusky dolphin	*Lagenorhynchus obscurus*
	Northern right whale dolphin	*Lissodelphis borealis*
	Southern right whale dolphin	*Lissodelphis peronii*
	Irrawaddy dolphin	*Orcaella brevirostris*
	Australian snubfin dolphin	*Orcaella heinsohni*
	Melon-headed whale	*Peponocephala electra*
	False killer whale	*Pseudorca crassidens*
	Indo-Pacific humpback dolphin	*Sousa chinensis*
	Indian Ocean humpback dolphin	*Sousa plumbea*
	Australian humpback dolphin	*Sousa sahulensis*
	Atlantic humpback dolphin	*Sousa teuszii*
	Tucuxi	*Sotalia fluviatilis*

Classification	Common Name	Scientific Name
High frequency cetaceans (extracted from Appendix 2 Southall et al. 2019)	Guiana dolphin	*Sotalia guianensis*
	Pantropical spotted dolphin	*Stenella attenuata*
	Clymene dolphin	*Stenella clymene*
	Striped dolphin	*Stenella coeruleoalba*
	Atlantic spotted dolphin	*Stenella frontalis*
	Spinner dolphin	*Stenella longirostris*
	Rough-toothed dolphin	*Steno bredanensis*
	Indo-Pacific bottlenose dolphin	*Tursiops aduncus*
	Bottlenose dolphin	*Tursiops truncatus*
	South Asian river dolphin	*Platanista gangetica*
Very high frequency cetaceans (extracted from Appendix 3 Southall et al. 2019)	Peale's dolphin	*Lagenorhynchus australis*
	Hourglass dolphin	*Lagenorhynchus cruciger*
	Commerson's dolphin	*Cephalorhynchus commersonii*
	Chilean dolphin	*Cephalorhynchus eutropia*
	Heaviside's dolphin	*Cephalorhynchus heavisidii*
	Hector's dolphin	*Cephalorhynchus hectori*
	Narrow-ridged finless porpoise	*Neophocaena asiaeorientalis*
	Indo-Pacific finless porpoise	*Neophocaena phocaenoides*
	Spectacled porpoise	*Phocoena dioptrica*
	Harbor porpoise	*Phocoena phocoena*
	Vaquita	*Phocoena sinus*
	Burmeister's porpoise	*Phocoena spinipinnis*
	Dall's porpoise	*Phocoenoides dalli*
	Amazon river dolphin	*Inia geoffrensis*
	Yangtze river dolphin	*Lipotes vexillifer*
	La Plata dolphin	*Pontoporia blainvillei*
	Pygmy sperm whale	*Kogia breviceps*
	Dwarf sperm whale	*Kogia sima*

Classification	Common Name	Scientific Name
Phocid pinnipeds in water (extracted from Appendix 5 Southall et al. 2019)	Hooded seal	*Cystophora cristata*
	Bearded seal	*Erignathus barbatus*
	Gray seal	*Halichoerus grypus*
	Ribbon seal	*Histriophoca fasciata*
	Leopard seal	*Hydrurga leptonyx*
	Weddell seal	*Leptonychotes weddellii*
	Crabeater seal	*Lobodon carcinophaga*
	Northern elephant seal	*Mirounga angustirostris*
	Southern elephant seal	*Mirounga leonina*
	Mediterranean monk seal	*Monachus monachus*
	Hawaiian monk seal	*Neomonachus schauinslandi*
	Ross seal	*Ommatophoca rossii*
	Harp seal	*Pagophilus groenlandicus*
	Spotted seal	*Phoca largha*
	Harbor seal	*Phoca vitulina*
	Caspian seal	*Pusa caspica*
	Ringed seal	*Pusa hispida*
	Baikal seal	*Pusa sibirica*
Otariid pinnipeds in water (extracted from Appendix 6 Southall et al. 2019)	Walrus	*Odobenus rosmarus*
	South American fur seal	*Arctocephalus australis*
	New Zealand fur seal	*Arctocephalus forsteri*
	Galapagos fur seal	*Arctocephalus galapagoensis*
	Antarctic fur seal	*Arctocephalus gazella*
	Juan Fernandez fur seal	*Arctocephalus philippii*
	Cape fur seal/Australian fur seal	*Arctocephalus pusillus*
	Subantarctic fur seal	*Arctocephalus tropicalis*
	Northern fur seal	*Callorhinus ursinus*
	Steller sea lion	*Eumetopias jubatus*
	Australian sea lion	*Neophoca cinerea*
	South American sea lion	*Otaria byronia*

Classification	Common Name	Scientific Name
Otariid pinnipeds in water (extracted from Appendix 6 Southall et al. 2019)	Hooker's sea lion	*Phocarctos hookeri*
	California sea lion	*Zalophus californianus*
	Galapagos sea lion	*Zalophus wollebaeki*
	Polar bear	*Ursus maritimus*
	Sea otter	*Enhydra lutris*
	Marine otter	*Lontra feline*
Sea Turtles (extracted from DoN 2017)	Green sea turtle	*Chelonia mydas*
	Kemp's ridley sea turtle	*Lepidochelys kempii*
	Loggerhead sea turtle	*Caretta*
	Leatherback sea turtle	*Dermochelys coriacea*
	Hawksbill sea turtle	*Eretmochelys imbricata*
Penguins (extracted from https://birdwatchinghq.com/penguins-of-australia/)	Little Penguin	*Eudyptula minor*
	Gentoo Penguin	*Pygoscelis papua*
	King Penguin	*Aptenodytes patagonicus*
	Chinstrap Penguin	*Pygoscelis antarcticus*
	Southern Rockhopper Penguin	*Eudyptes chrysocome*
	Fiordland Penguin	*Eudyptes pachyrhynchus*

Appendix D Noise Modelling Table Results

Regia Marine Seismic Survey in the Otway Basin

Underwater Sound Transmission Loss Modelling Study

Klarite Pty Ltd

SLR Project No.: 675.073227.00001

December 1, 2025

D.1 Immediate Exposure from Single Pulses

D.1.1 Marine Mammals and Turtles

Table D-1: Immediate exposure impact zones (AUD INJ and TTS) from a single seismic pulse (Conventional source array 2630 CUI) for marine mammals and turtles

Animal hearing group	AUD INJ onset				TTS onset			
	$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)			$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07		Site 15	Site 10	Site 07
LF	222	73	73	67	216	86	86	80
HF	230	55	55	51	224	68	68	63
VHF	202	369	397	232	196	907	1100	439
PW	223	70	70	65	217	84	83	78
OW	230	55	55	51	224	68	68	63
SI	225[1]	66	66	61	219	80	79	74
TU	232[1]	51	50	47	226	64	64	59

$L_{p,pk}$ = zero to peak sound pressure level; AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift. [1]SI and TU animal groups use the noise criteria for PTS = permanent hearing threshold shift. Green shaded areas highlight the groups likely to be present within the operational area.

Table D-2: Immediate exposure impact zones (AUD INJ and TTS) from a single seismic pulse (Bluepulse source array 2630 CUI) for marine mammals and turtles

Animal hearing group	AUD INJ onset				TTS onset			
	$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)			$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07		Site 15	Site 10	Site 07
LF	222	62	62	57	216	76	75	69
HF	230	44	44	40	224	58	56	50
VHF	202	218	204	112	196	404	550	270
PW	223	60	61	56	217	74	73	65
OW	230	44	43	39	224	58	56	51
SI	225[1]	55	56	51	219	69	68	62
TU	232[1]	39	40	35	226	53	52	48

$L_{p,pk}$ = zero to peak sound pressure level; AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift. [1]SI and TU animal groups use the noise criteria for PTS = permanent hearing threshold shift. Green shaded areas highlight the groups likely to be present within the operational area.

D.1.2 Fish Groups

Table D-3: Immediate exposure impact zones (mortality and recovery injury) from a single seismic pulse (Conventional source array 2630 CUI) for fish

Fish Group	Mortality and Non-Recoverable Injury				Recoverable Injury			
	$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)			$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07		Site 15	Site 10	Site 07
Fish without swim bladder	213	94	94	86	213	94	94	86
Fish: with swim bladder not involved in hearing	207	210	201	104	207	210	201	104
Fish: with swim bladder involved in hearing	207	210	201	104	207	210	201	104
Eggs and larvae	207	210	201	104	-	-		
Fish ≥ 2g	-	-			206	236	230	111
Fish < 2g					206	236	230	111
$L_{p,pk}$ = zero to peak sound pressure level; a dash indicates the threshold is not available for the fish category.								

Table D-4: Immediate exposure impact zones (mortality and recovery injury) from a single seismic pulse (Bluepulse source array 2630 CUI) for fish

Fish Group	Mortality and Non-Recoverable Injury				Recoverable Injury			
	$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)			$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07		Site 15	Site 10	Site 07
Fish without swim bladder	213	83	83	76	213	83	83	76
Fish: with swim bladder not involved in hearing	207	104	100	91	207	104	100	91
Fish: with swim bladder involved in hearing	207	104	100	91	207	104	100	104
Eggs and larvae	207	104	100	91	-	-		
Fish ≥ 2g	-	-			206	108	103	94
Fish < 2g					206	108	103	94
$L_{p,pk}$ = zero to peak sound pressure level; a dash indicates the threshold is not available for the fish category.								

D.1.3 Diving Seabirds

Table D-5: Immediate exposure impact zones (AUD INJ and TTS) from a single seismic pulse (conventional source array 2630 CUI) for diving seabirds

Animal hearing group	AUD INJ onset				TTS onset			
	$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)			$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07		Site 15	Site 10	Site 07
Diving Seabird (e.g. penguins)	230	55	55	51	224	68	68	63

$L_{p,pk}$ = zero to peak sound pressure level; AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift.

Table D-6: Immediate exposure impact zones (AUD INJ and TTS) from a single seismic pulse (Bluepulse source array 2630 CUI) for diving seabirds

Animal hearing group	AUD INJ onset				TTS onset			
	$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)			$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07		Site 15	Site 10	Site 07
Diving Seabird (e.g. penguins)	230	44	43	39	224	58	56	51

$L_{p,pk}$ = zero to peak sound pressure level; AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift.

D.1.4 Invertebrates

Table D-7: Immediate exposure impact zones (injury) from a single seismic pulse (Conventional and Bluepulse source arrays 2630 CUI) for invertebrates

Animal hearing group	Behaviour disturbance							
	Conventional				Bluepulse			
	$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)			$L_{p,pk}$ dB re 1µPa	Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07		Site 15	Site 10	Site 07
Sponges and Coral[1]	226	-	-	-	226	-	-	-
Scallops	212	90	90	85	212	80	80	75
Lobster	202	397	369	232	202	220	200	125

$L_{p,pk}$ = zero to peak sound pressure level; a dash means threshold was not reached.
[1] receiver modelled at 50 cm above the seafloor

Table D-8: Immediate exposure impact zones (injury) from a single seismic pulse (Conventional and Bluepulse source arrays 2630 CUI) for squid

Animal hearing group	Behaviour disturbance							
	Conventional				Bluepulse			
	L_E dB re 1µPa²·s	Maximum horizontal distance (m)			L_E dB re 1µPa²·s	Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07		Site 15	Site 10	Site 07
Squid	162[1]	2,740	2,230	960	162	2,420	1,580	600
L_E = sound exposure level (not weighted)								

D.1.5 Human Divers

Table D-10: Immediate exposure impact zones (injury) from a single seismic pulse (Conventional and Bluepulse source arrays 2630 CUI) for human divers

Human Diver	Physiological Effects						
	$L_{p,rms}$ dB re 1µPa	Conventional			Bluepulse		
		Maximum horizontal distance (m)			Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07	Site 15	Site 10	Site 07
I. Slight aversion	140[1]	24,180	20,020	17,020	23,570	16,860	14,610
II. Very severe	148[1]	15,680	12,710	10,220	14,590	10,730	8,060
III. Increasingly aversive	154[1,2]	11,000	8,630	5,620	10,200	7,210	5,100
IV. Tolerance limit	170[1]	2,720	2,300	1,140	2430	1,780	940
V. Physiological damage	184[1]	520	480	300	440	380	270
$L_{p,rms}$ = root-mean-square sound pressure level Sources: [1]Parvin 2005 [2]NATO 2006							

D.1.6 Behaviour Disturbance

Table D-9: Immediate exposure impact zones (behavioural disturbance) from a single seismic pulse (Conventional source arrays 2630 CUI) for all marine fauna

Marine Fauna	Behavioural disturbance			
	$L_{p,rms}$ dB re 1µPa	Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07
Marine Mammals	120	71,250	69,166	160,620
	140	20,020	24,180	17,010
	160	5,460	6,960	3,120
Fish	150	11,930	13,810	7,940
Turtles	175	1,300	1,640	590
Diving Seabirds	120[1]	7,400	10,620	5,660

$L_{p,rms}$ = root-mean-square sound pressure level
[1] Behaviour disturbance threshold weighted as OW

Table D-10: Immediate exposure impact zones (behavioural response) from a single seismic pulse (Bluepulse source arrays 2630 CUI) for all marine fauna

Marine Fauna	Behavioural disturbance			
	$L_{p,rms}$ dB re 1µPa	Maximum horizontal distance (m)		
		Site 15	Site 10	Site 07
Marine Mammals	120	63,330	62,420	129,740
	140	16,710	23,340	14,610
	160	4,400	6,230	2820
Fish	150	9,260	12,710	6,950
Turtles	175	1,020	1,330	390
Diving Seabirds	120[1]	2,200	2,300	1,400

$L_{p,rms}$ = root-mean-square sound pressure level
[1]Behaviour disturbance threshold weighted as OW

D.2 Cumulative Exposure from Multiple Pulses

D.2.1 Marine Mammals and Turtles

Table D-11: Cumulative exposure impact zones (AUD INJ and TTS) to multiple seismic pulses (Conventional source array 2630 CUI) for marine mammals and turtles

Animal hearing group	AUD INJ onset			TTS onset		
	$L_{E,w}$ dB re 1µPa²·s	Maximum horizontal distance (m)		$L_{E,w}$ dB re 1µPa²·s	Maximum horizontal distance (m)	
		C	D		C	D
LF	183	6,250	8,530	168	23,630	27,920
HF	193	80	80	178	600	280
VHF	159	90	90	144	840	380
PW	183	1,060	620	168	7,410	5,500
OW	185	55	50	170	1,020	660
SI	190[1]	40	40	175	90	90
TU	204[1]	1,060	500	189	6,250	4,160

$L_{E,w,24h}$ = weighted sound exposure level over a 24h period; AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift. [1]The sirenian and TU animal groups use the noise criteria for PTS = permanent hearing threshold shift. Green shaded areas highlight the groups likely to be present within the operational area.

Table D-12: Cumulative exposure impact zones (AUD INJ and TTS) to multiple seismic pulses (Bluepulse source array 2630 CUI) for marine mammals and turtles

Animal hearing group	AUD INJ onset			TTS onset		
	$L_{E,w}$ dB re 1µPa²·s	Maximum horizontal distance (m)		$L_{E,w}$ dB re 1µPa²·sS	Maximum horizontal distance (m)	
		C	D		C	D
LF	183	3,520	1,450	168	12,860	10,120
HF	193	40	35	178	80	75
VHF	159	50	40	144	100	85
PW	183	115	90	168	1,450	840
OW	185	50	45	170	120	85
SI	190[1]	-	-	175	50	40
TU	204[1]	360	220	189	3,400	1,300

$L_{E,w,24h}$ = weighted sound exposure level over a 24h period; AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift. Green shaded areas highlight the groups likely to be present within the operational area. [1]The sirenian and TU animal groups use the noise criteria for PTS = permanent hearing threshold shift.

D.2.2 Fish Groups

Table D-13: Cumulative exposure impact zones (mortality, recovery injury and TTS) to multiple seismic pulses (Conventional source array 2630 CUI) for fish

Fish Group	Mortality and Non-Recoverable Injury			Recoverable Injury			TTS onset		
	L_E dB re 1µPa²·s	Maximum horizontal distance (m)		L_E dB re 1µPa²·s	Maximum horizontal distance (m)		L_E dB re 1µPa²·s	Maximum horizontal distance (m)	
		C	D		C	D		C	D
Fish without swim bladder	219	230	110	216	310	200	186	10,950	7,570
Fish: with swim bladder not involved in hearing	210	740	380	203	2,010	930	186	10,950	7,570
Fish: with swim bladder involved in hearing	207	1,230	540	203	2,010	930	186	10,950	7,570
Eggs and larvae	210	740	380	-	-		-	-	
Fish ≥ 2g	-	-		187	10,670	7,100	-	-	
Fish < 2g				183	14,280	10,030			

L_E = unweighted sound exposure level over multiple pulses; TTS = temporary hearing threshold shift; a dash indicates the threshold is not available for the fish category.

Table D-14: Cumulative exposure impact zones (mortality, recovery injury and TTS) to multiple seismic pulses (Bluepulse source array 2630 CUI) for fish

Fish Group	Mortality and Non-Recoverable Injury			Recoverable Injury			TTS onset		
	L_E dB re 1µPa²·s	Maximum horizontal distance (m)		L_E dB re 1µPa²·S	Maximum horizontal distance (m)		L_E dB re 1µPa²·s	Maximum horizontal distance (m)	
		C	D		C	D		C	D
Fish without swim bladder	219	205	105	216	275	160	186	9,210	6,090
Fish: with swim bladder not involved in hearing	210	540	300	203	1540	580	186	9,210	6,090
Fish: with swim bladder involved in hearing	207	820	385	203	1540	580	186	9,210	6,090
Eggs and larvae	210	540	300	-	-		-	-	
Fish ≥ 2g	-	-		187	8,570	5410	-	-	
Fish < 2g				183	13,150	8240			

L_E = unweighted sound exposure level over multiple pulses; TTS = temporary hearing threshold shift; a dash indicates the threshold is not available for the fish category.

D.2.3 Diving Seabirds

Table D-15: Cumulative exposure impact zones (AUD INJ and TTS) to multiple seismic pulses (Conventional source array 2630 CUI) for diving seabirds

Animal hearing group	AUD INJ onset			TTS onset		
	$L_{E,w}$ dB re 1µPa²·s	Maximum horizontal distance (m)		$L_{E,w}$ dB re 1µPa²·s	Maximum horizontal distance (m)	
		C	D		C	D
Diving Seabirds (e.g., penguins)	185	55	50	170	1,020	660

$L_{E,w,24h}$ = weighted sound exposure level over a 24h period; AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift. [1]The sirenian and TU animal groups use the noise criteria for PTS = permanent hearing threshold shift.

Table D-16: Cumulative exposure impact zones (AUD INJ and TTS) to multiple seismic pulses (Bluepulse source array 2630 CUI) for diving seabirds

Animal hearing group	AUD INJ onset			TTS onset		
	$L_{E,w}$ dB re 1µPa²·s	Maximum horizontal distance (m)		$L_{E,w}$ dB re 1µPa²·s	Maximum horizontal distance (m)	
		C	D		C	D
Diving Seabirds (e.g., penguins)	185	50	45	170	120	85

$L_{E,w,24h}$ = weighted sound exposure level over a 24h period; AUD INJ = auditory injury onset; TTS = temporary hearing threshold shift. [1]The sirenian and TU animal groups use the noise criteria for PTS = permanent hearing threshold shift.

D.2.4 Human Divers

Table D-17: Zones of impact for cumulative exposure (100 and 200s) to multiple seismic pulses for– human divers

Human Diver	Recommended tolerance				
	$L_{E,w}$ dB re 1µPa²·s	Conventional		Bluepulse	
		Maximum horizontal distance (m)		Maximum horizontal distance (m)	
		C	D	C	D
200s	141[1]	165,600	59,700	162,500	59,210
100s	145[1,2]	39,090	42,350	38,920	41,130

$L_{E,w}$ = weighted sound exposure level over 100s and 200s period.
Sources: [1]Pestorius 2009, [2]Parvin et al. 2002

Appendix E Noise Modelling Figure Results and Exclusion Zone Maps

Regia Marine Seismic Survey in the Otway Basin

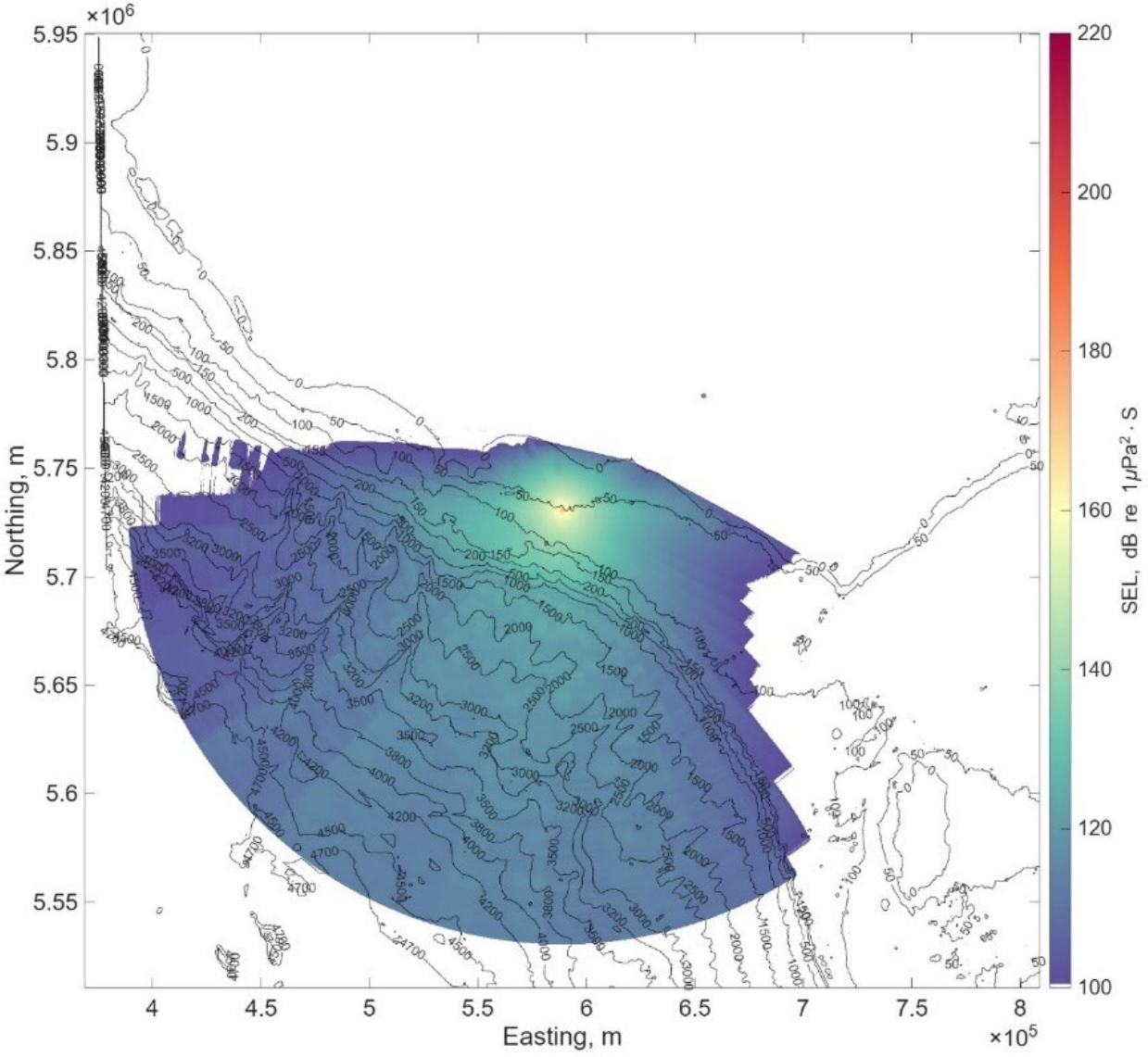
Underwater Sound Transmission Loss Modelling Study

Klarite Pty Ltd

SLR Project No.: 675.073227.00001

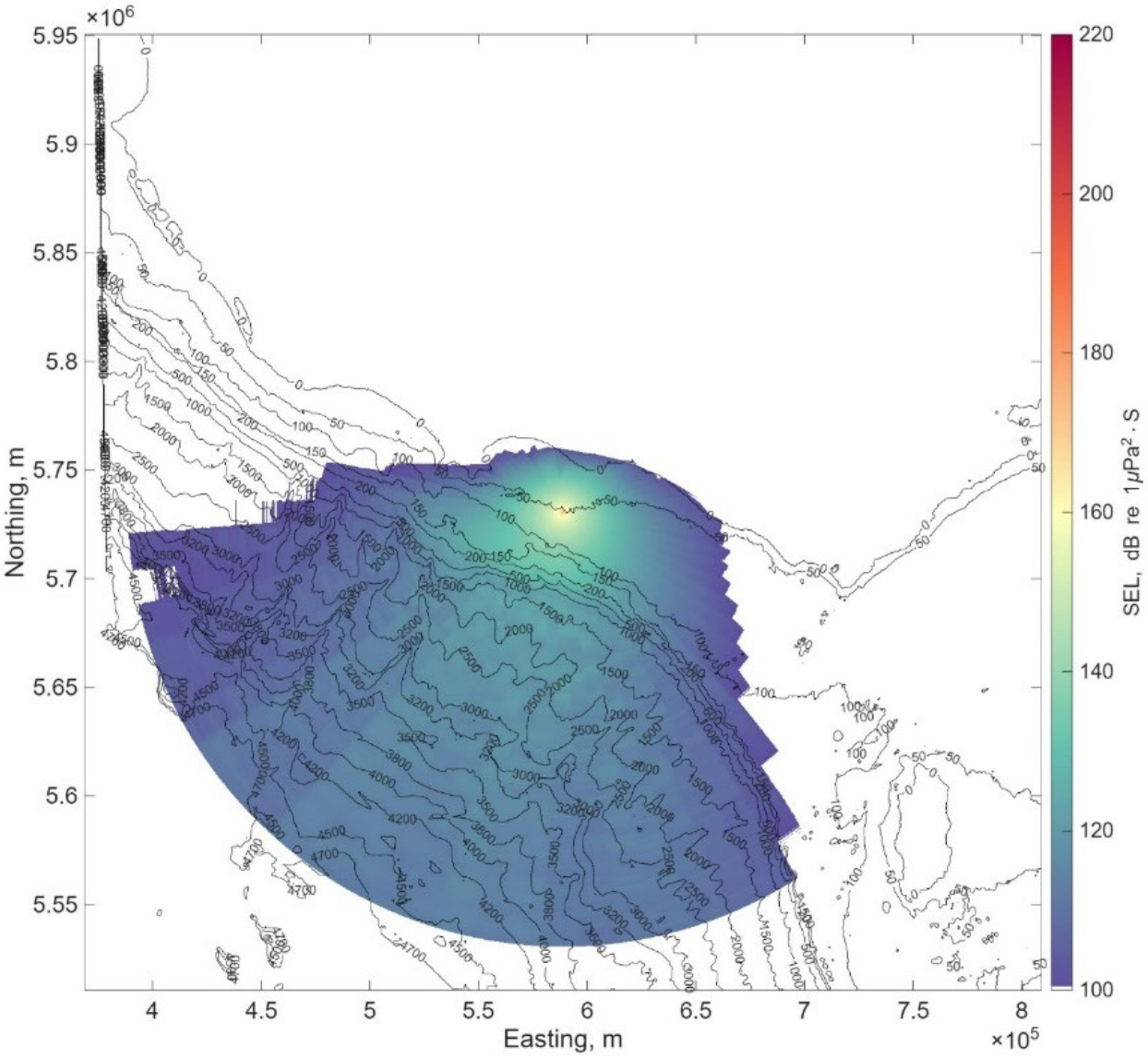
December 1, 2025

Figure E-1: Modelled maximum SEL unweighted contours for a single pulse from the Conventional array 2630 CUI at site 15



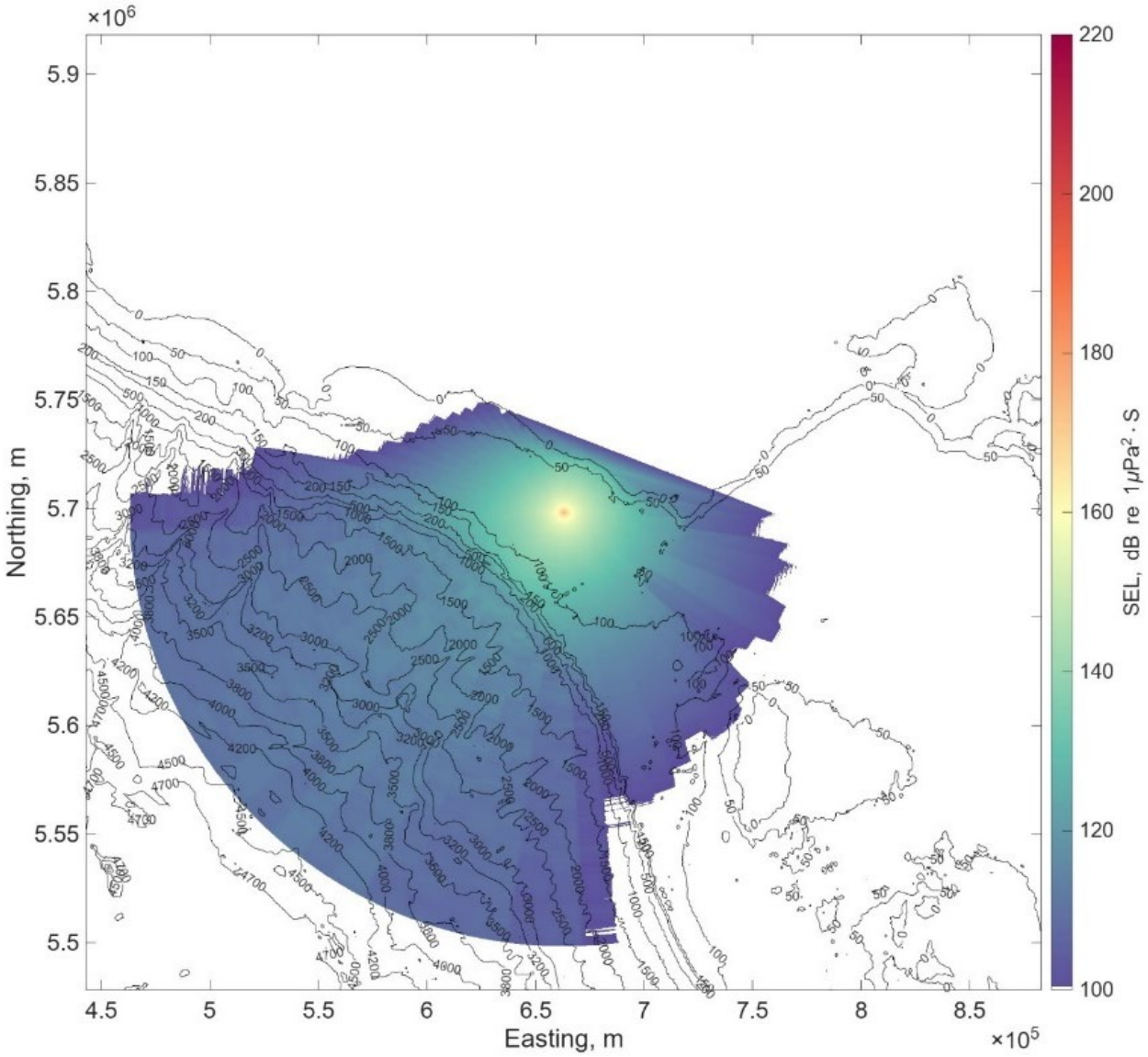
Map details: WGS 84 / UTM Zone 54H

Figure E-2: Modelled maximum SEL unweighted contours for a single pulse from the Bluepulse array 2630 CUI at site 15



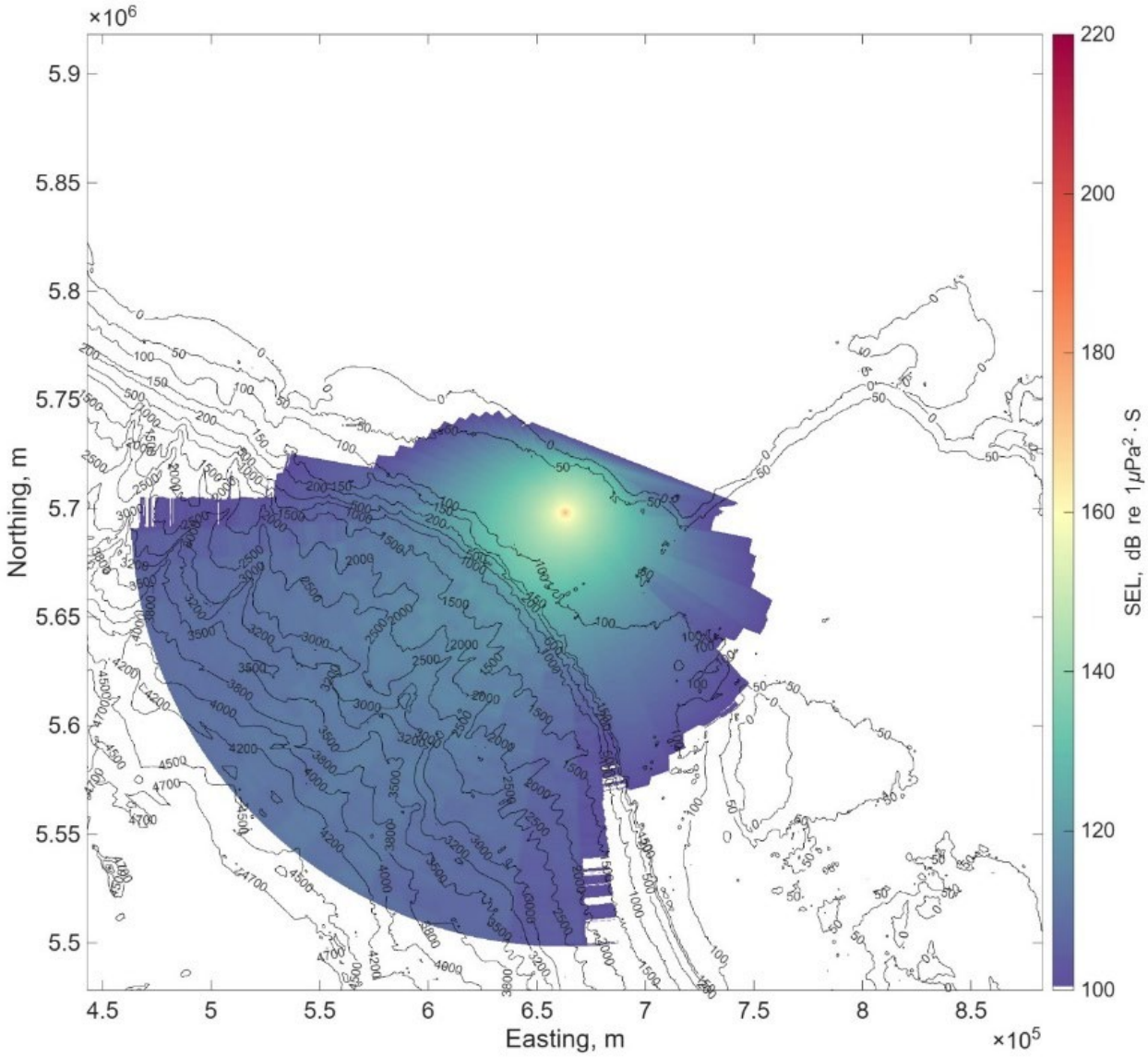
Map details: WGS 84 / UTM Zone 54H

Figure E-3: Modelled maximum SEL unweighted contours for a single pulse from the Conventional array 2630 CUI at site 10



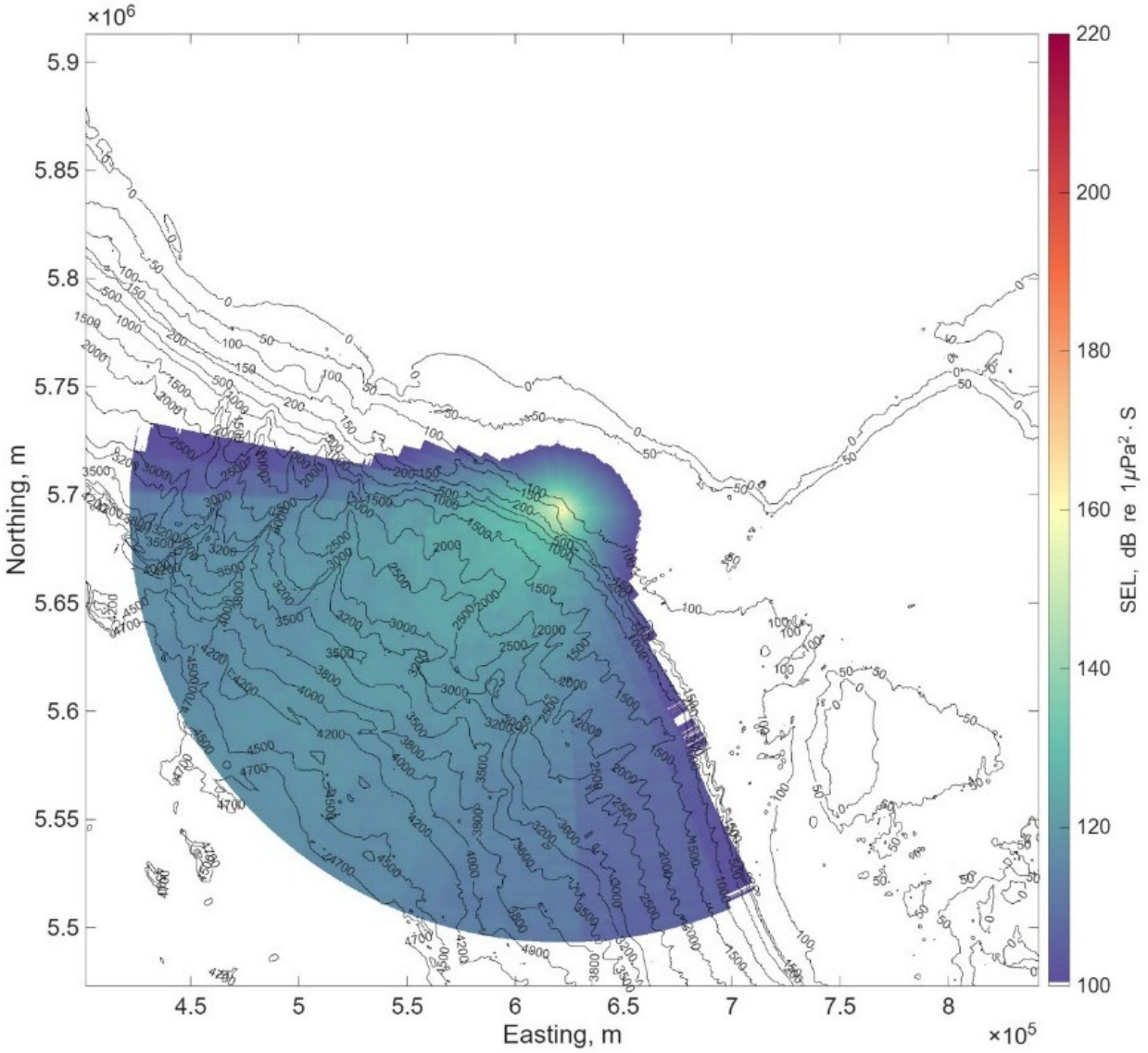
Map details: WGS 84 / UTM Zone 54H

Figure E-4: Modelled maximum SEL unweighted contours for a single pulse from the Bluepulse array 2630 CUI at site 10



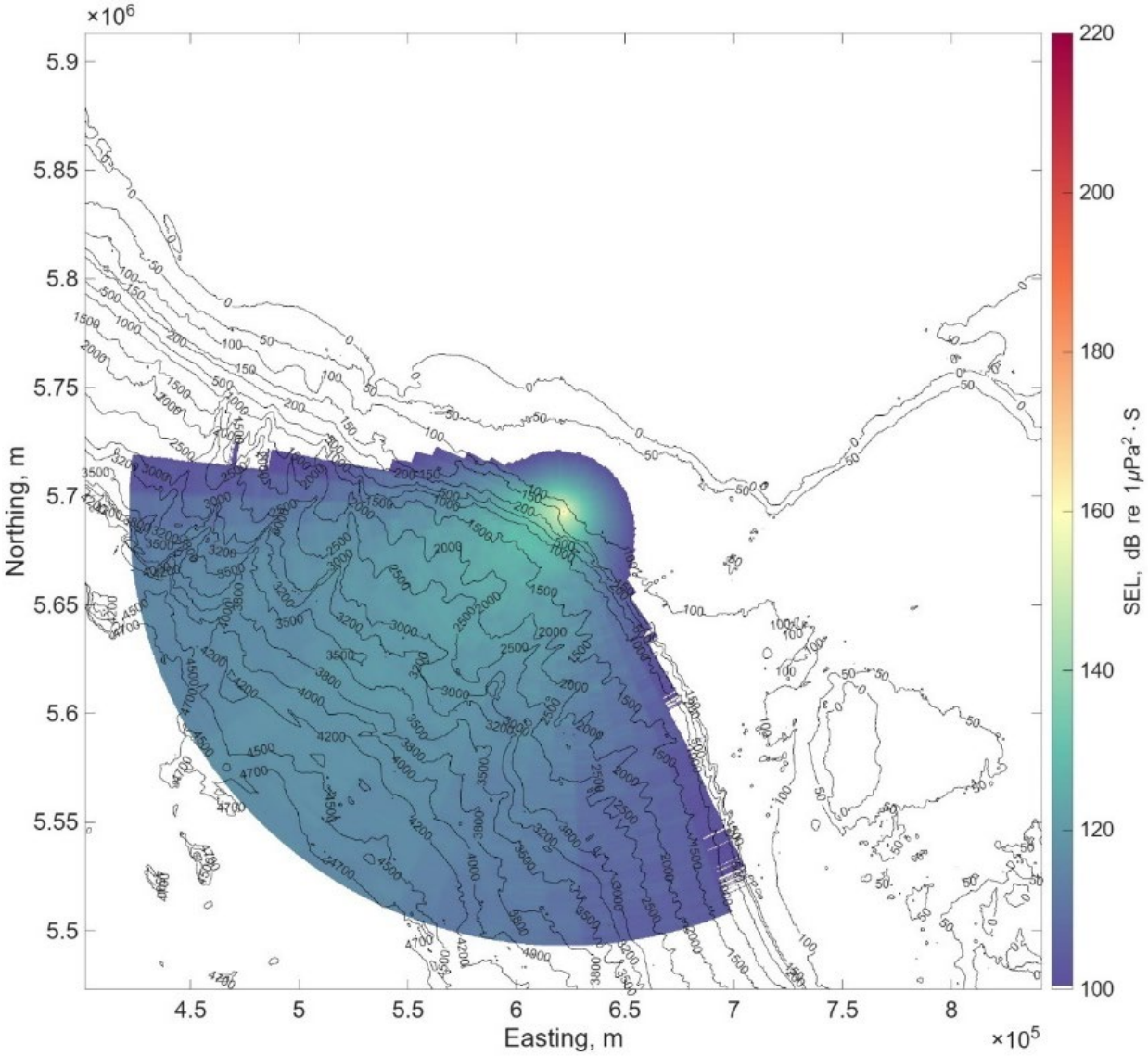
Map details: WGS 84 / UTM Zone 54H

Figure E-5: Modelled maximum SEL unweighted contours for a single pulse from the Conventional array 2630 CUI at site 7



Map details: WGS 84 / UTM Zone 54H

Figure E-6: Modelled maximum SEL unweighted contours for a single pulse from the Bluepulse array 2630 CUI at site 7



Map details: WGS 84 / UTM Zone 54H

Figure E-7: Modelled SELs (unweighted) vs. distance from the source ("range") and depth for the Conventional array 2630 CUI at site 15

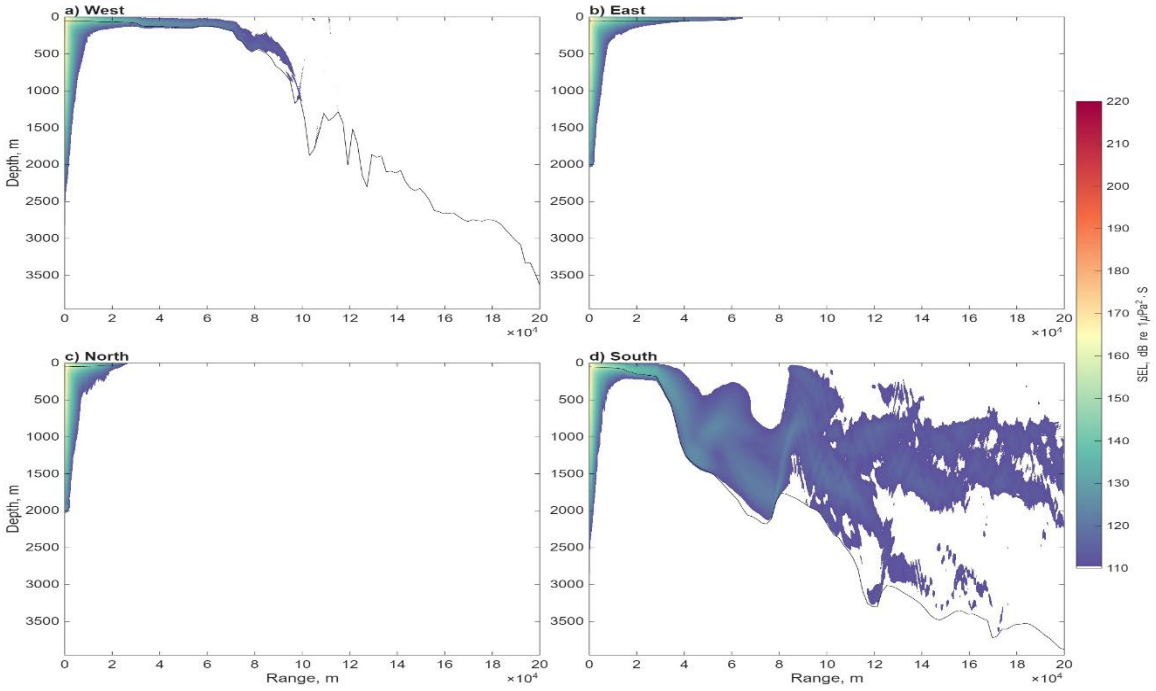


Figure E-8: Modelled SELs (unweighted) vs. distance from the source ("range") and depth for the Bluepulse array 2630 CUI at site 15

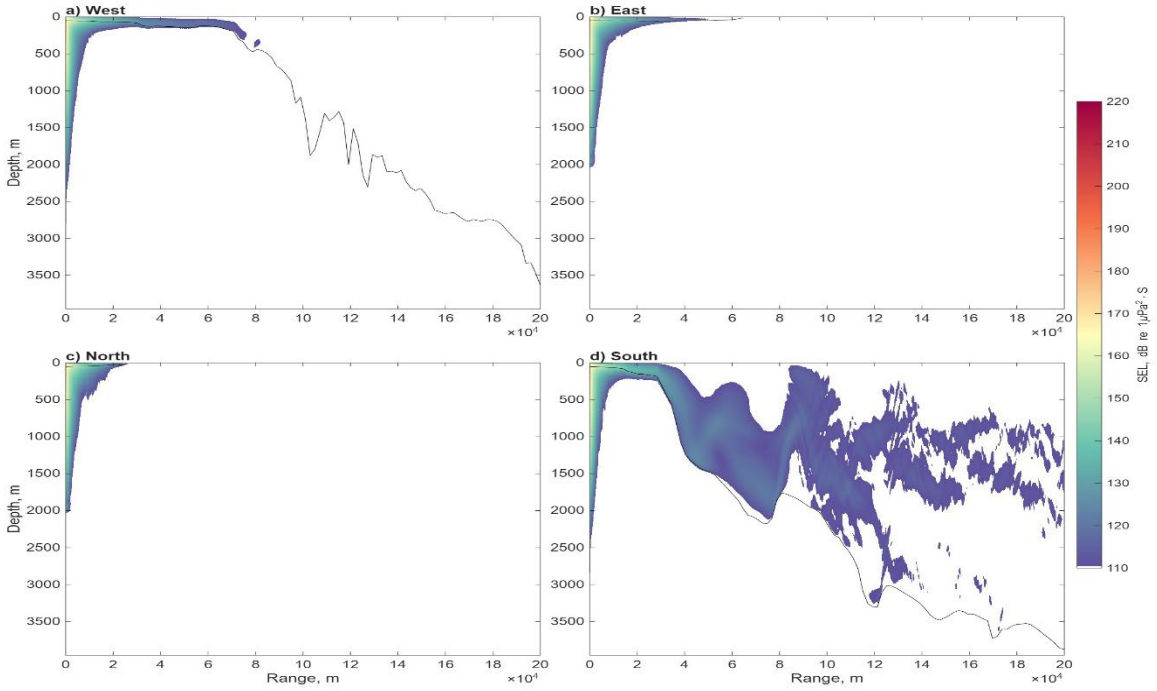


Figure E-9: Modelled SELs (unweighted) vs. distance from the source ("range") and depth for the Conventional array 2630 CUI at site 10

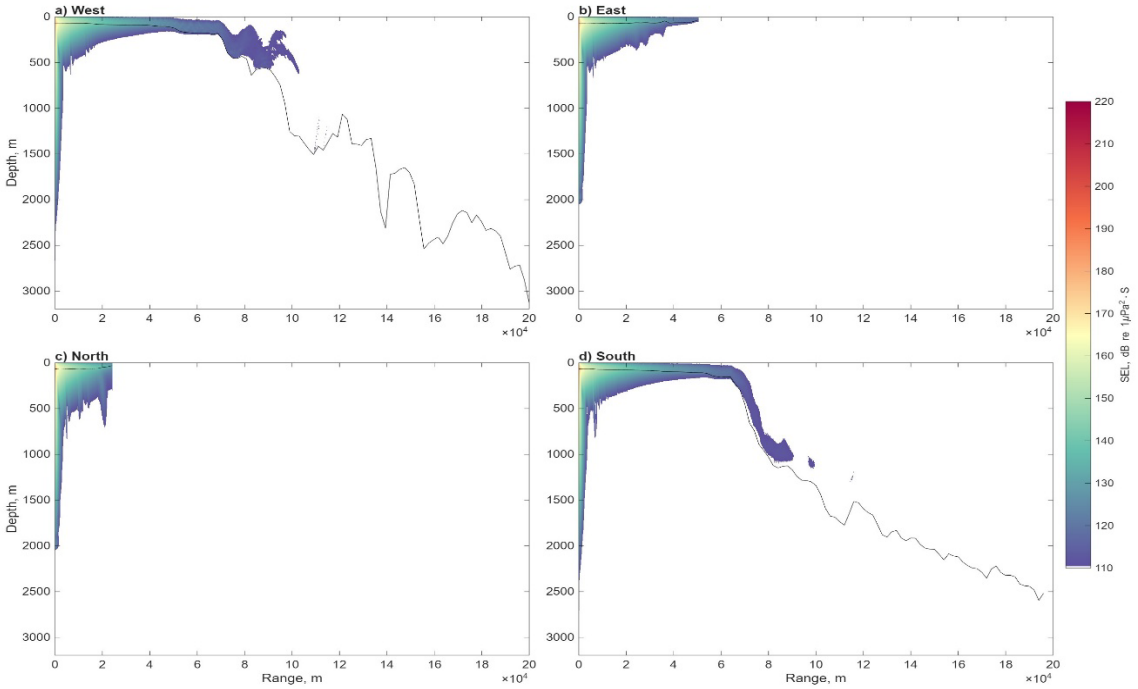


Figure E-10: Modelled SELs (unweighted) vs. distance from the source ("range") and depth for the Bluepulse array 2630 CUI at site 10

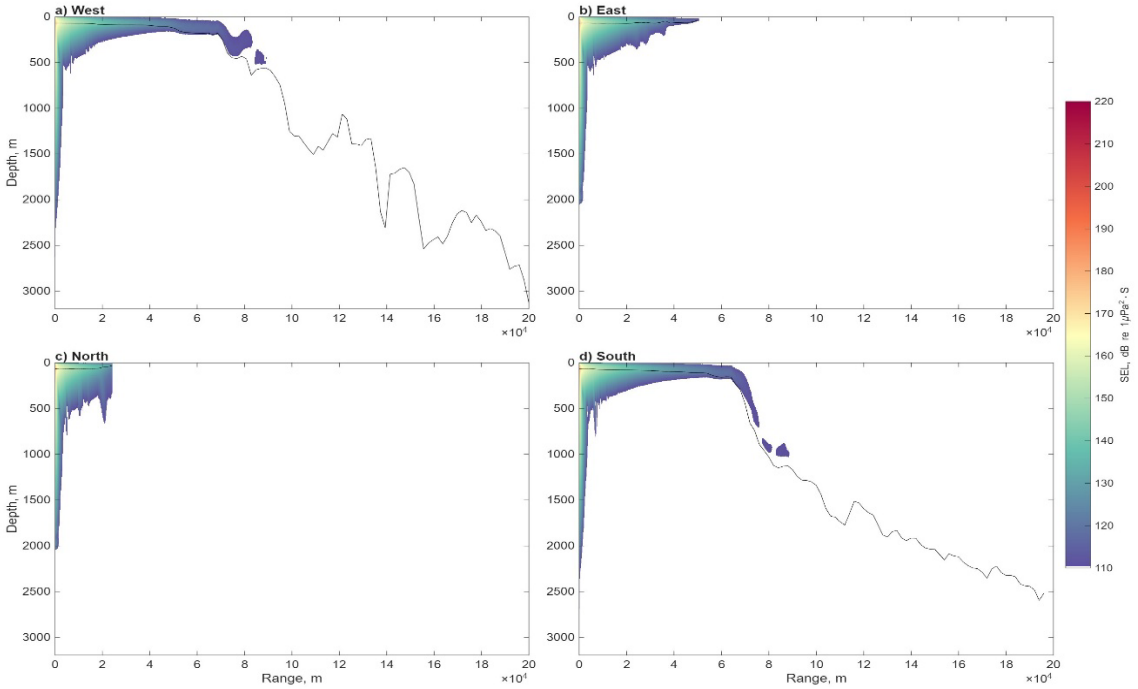


Figure E-11: Modelled SELs (unweighted) vs. distance from the source ("range") and depth for the Conventional array 2630 CUI at site 7

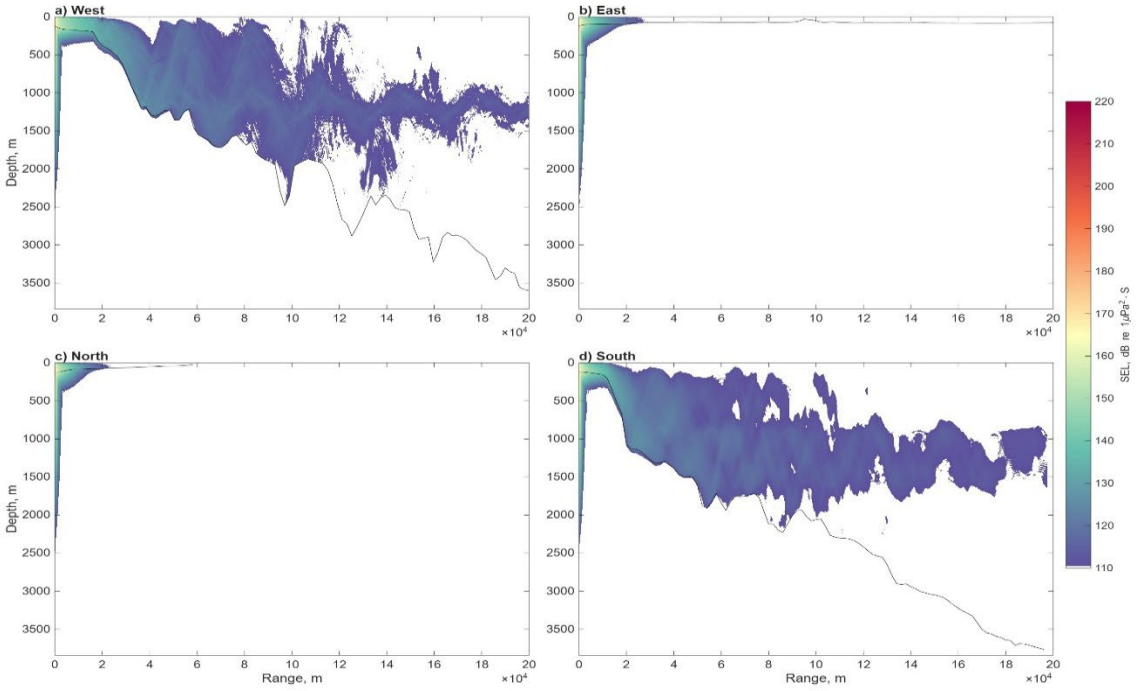


Figure E-12: Modelled SELs (unweighted) vs. distance from the source ("range") and depth for the Bluepulse array 2630 CUI at site 7

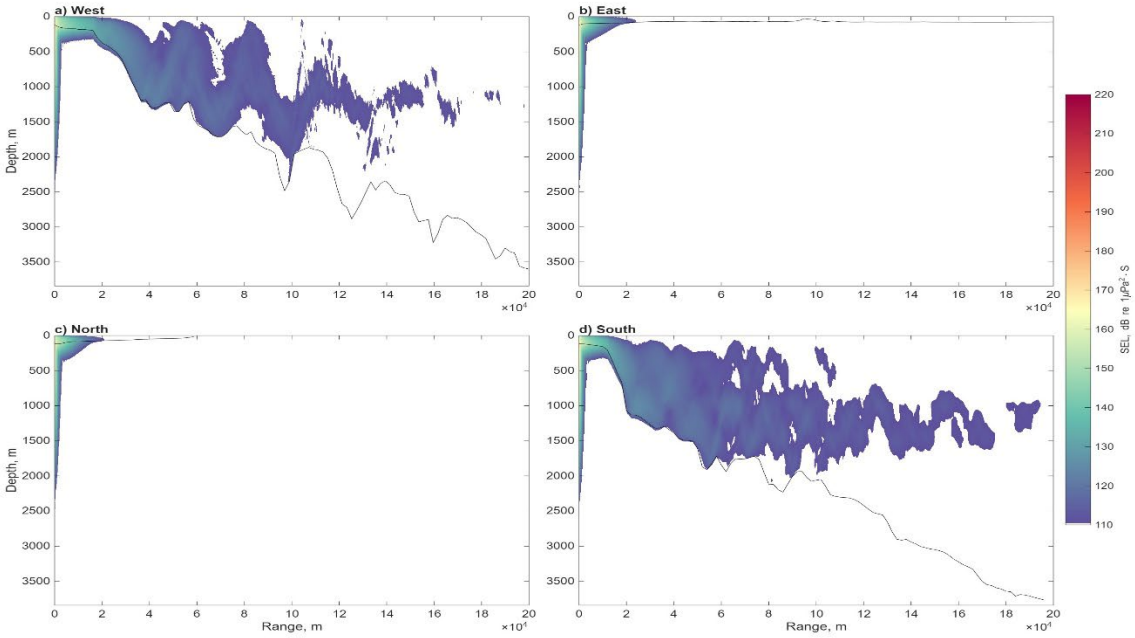
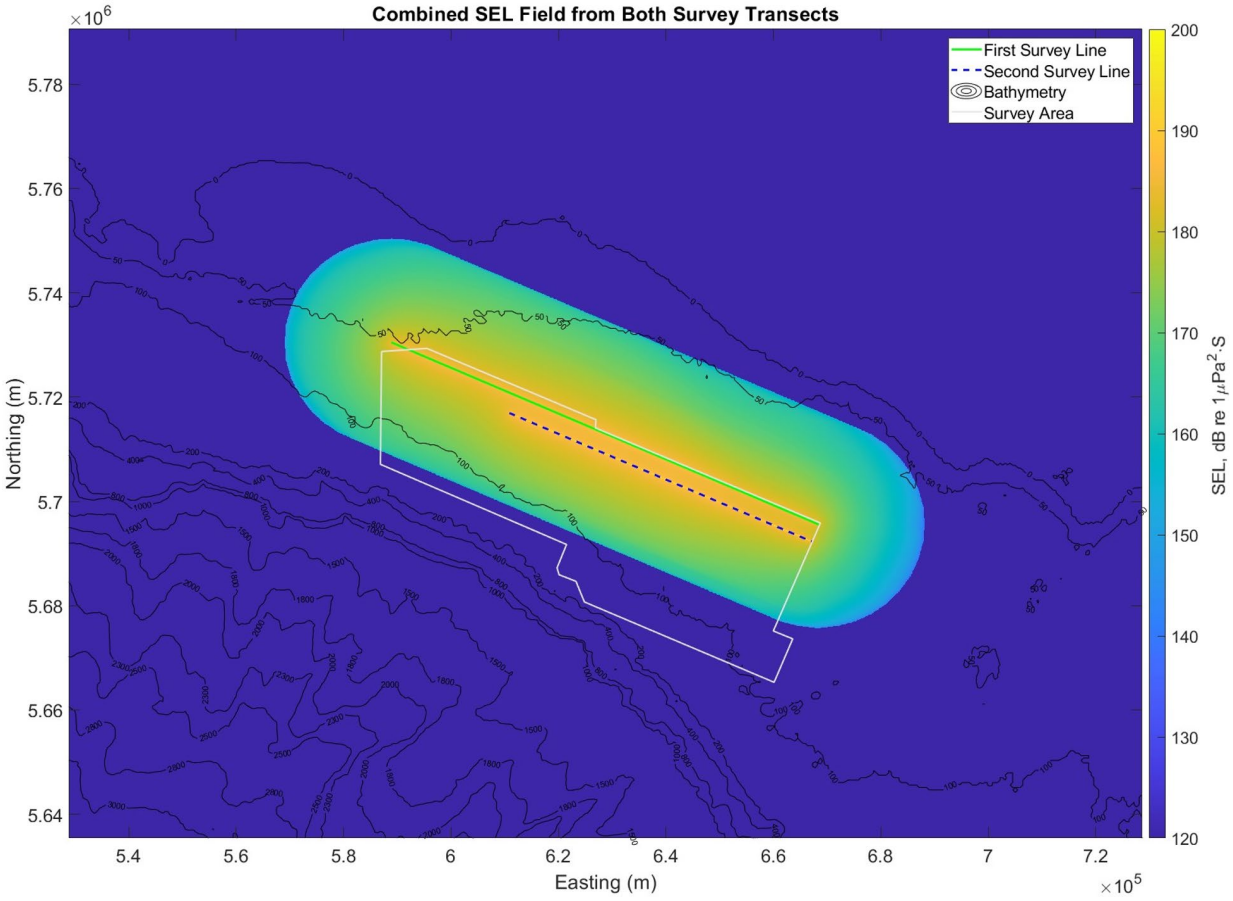
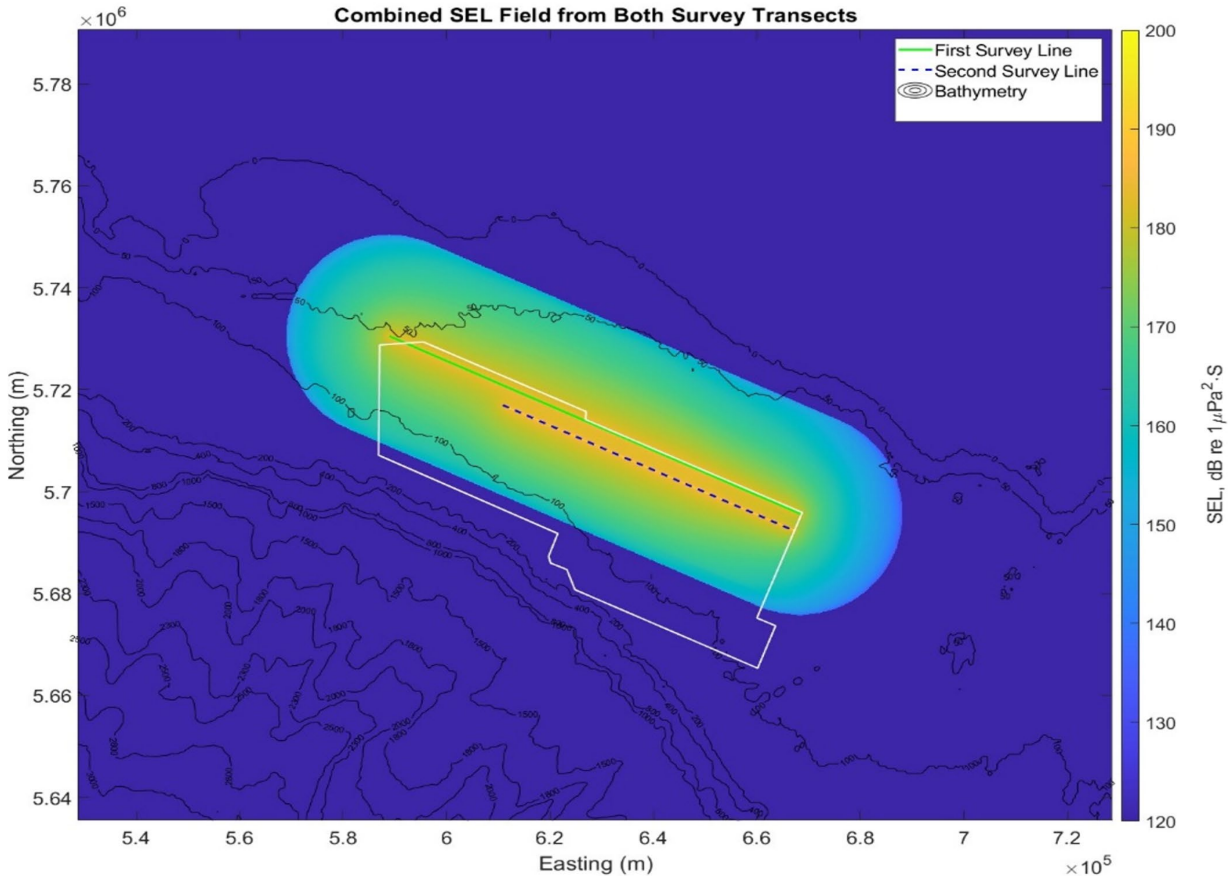


Figure E-13: Combined maximum unweighted SEL for the seismic survey scenarios C Conventional array 2630 CUI



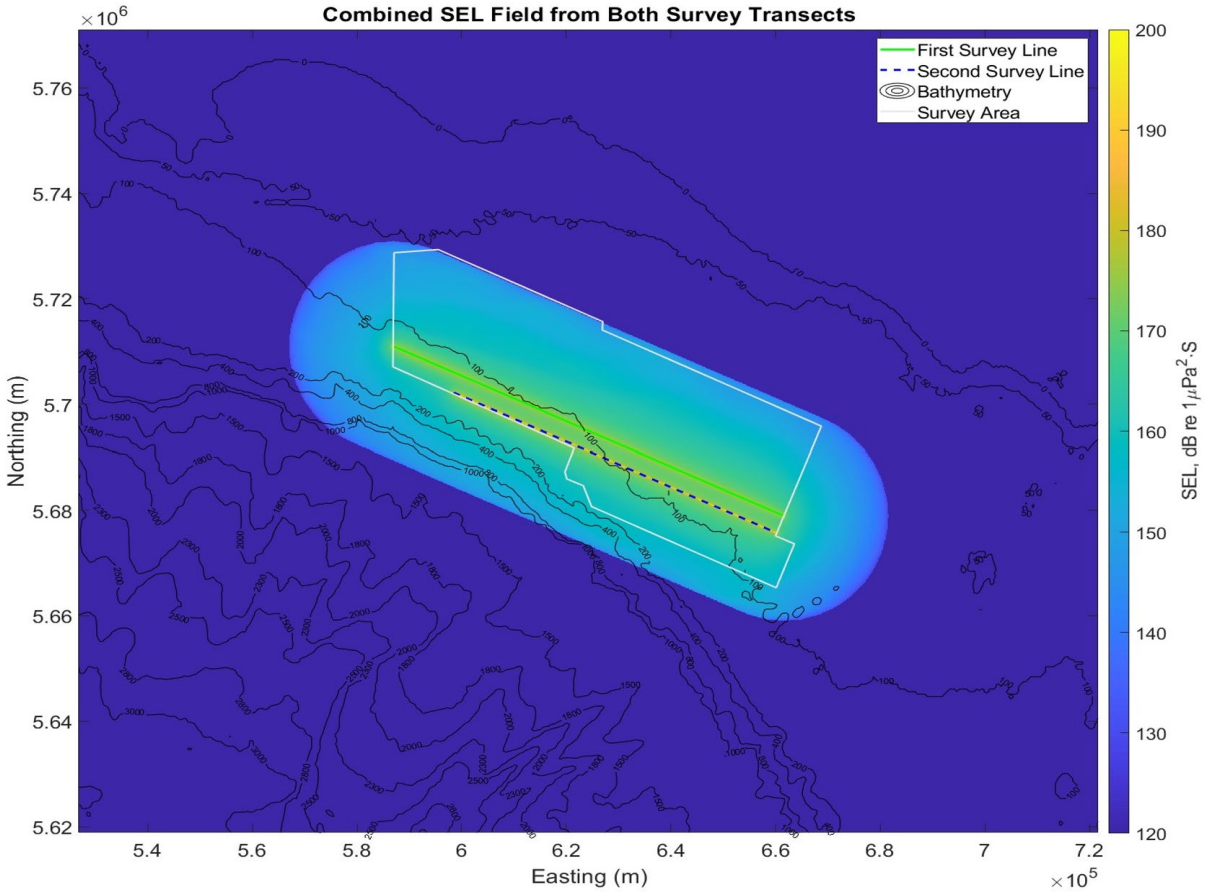
Map details: WGS 84 / UTM Zone 54H

Figure E-14: Combined maximum unweighted SEL for the seismic survey scenarios C Bluepulse array 2630 CUI



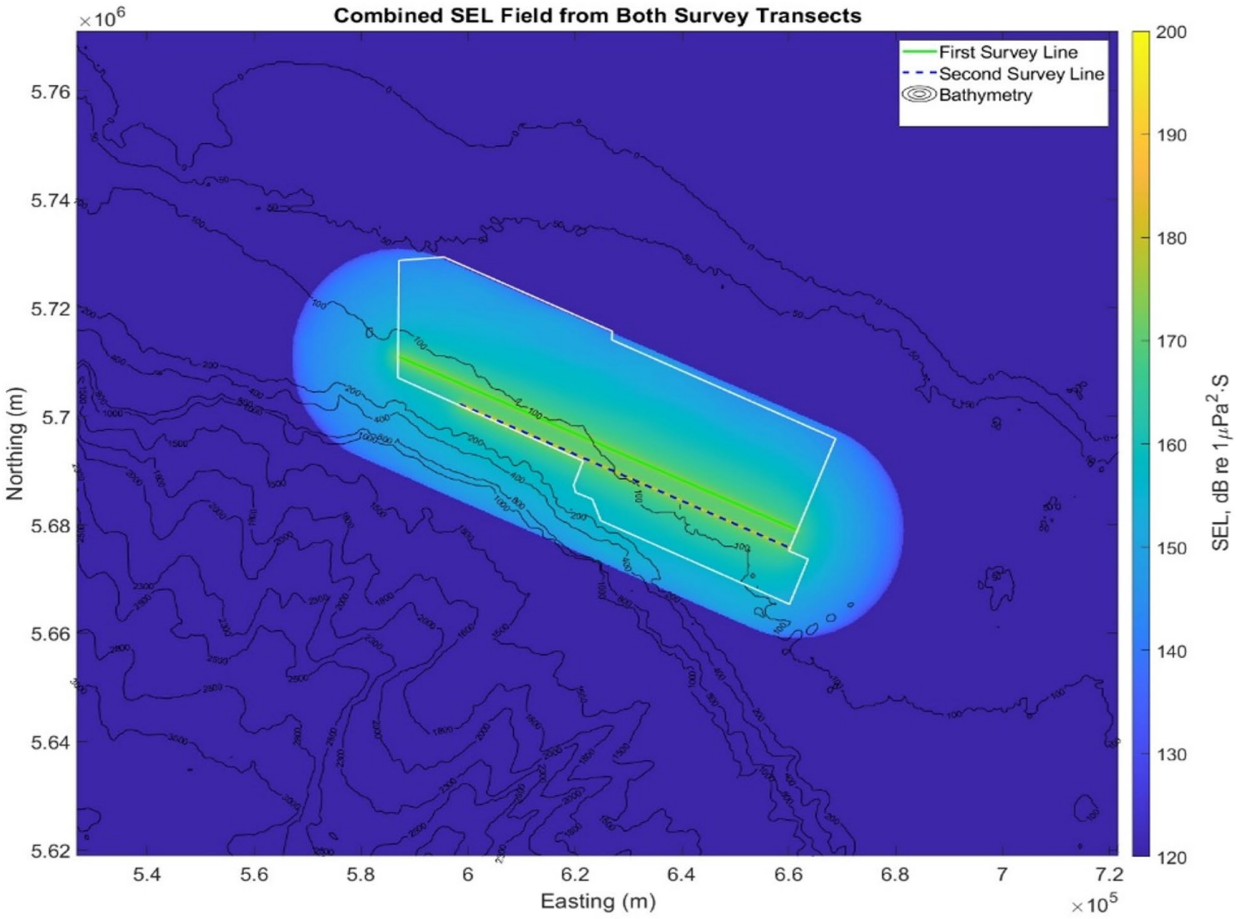
Map details: WGS 84 / UTM Zone 54H

Figure E-15: Combined maximum unweighted SEL for the seismic survey scenarios D Conventional array 2630 CUI



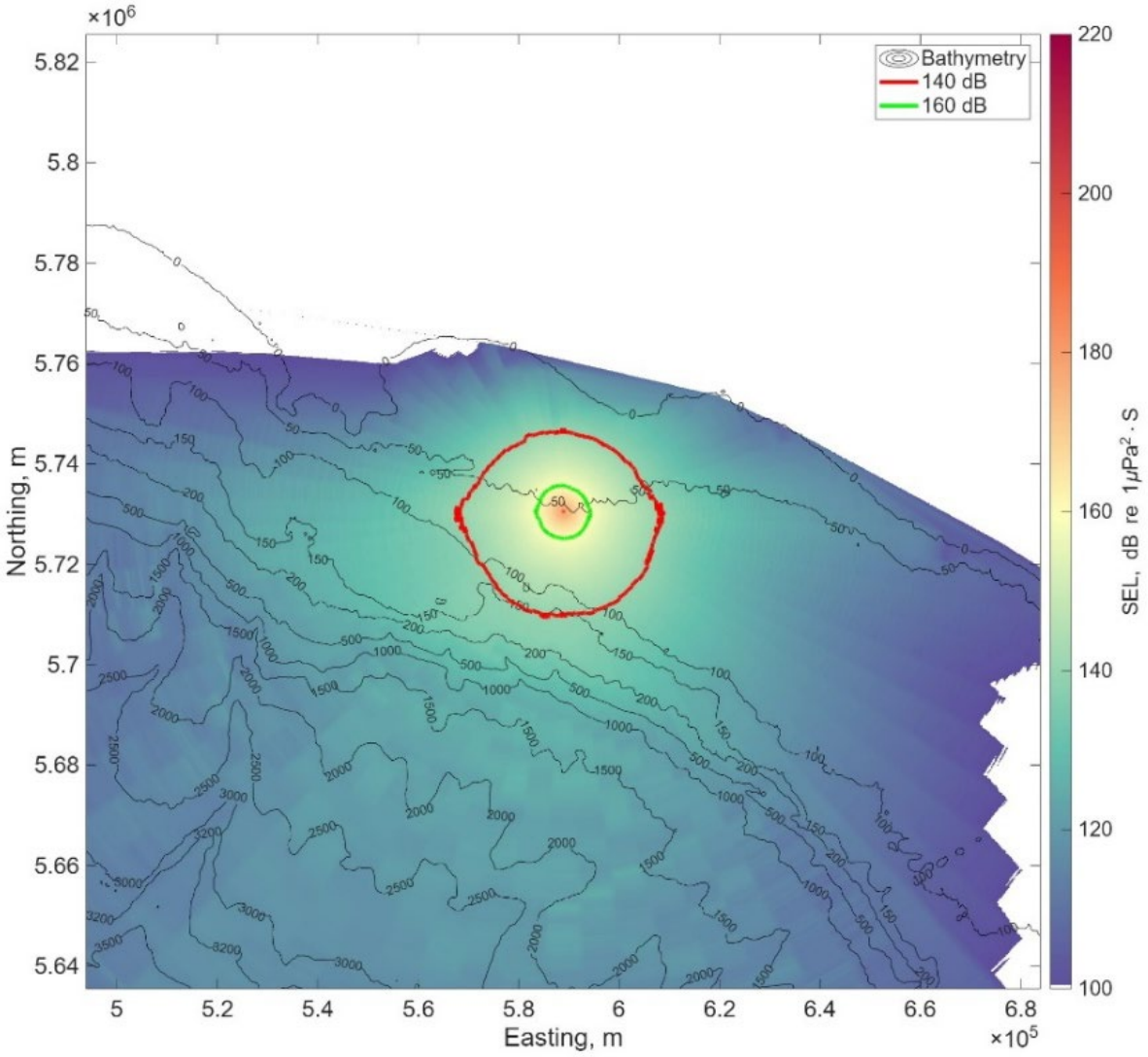
Map details: WGS 84 / UTM Zone 54H

Figure E-16: Combined maximum unweighted SEL for the seismic survey scenarios D Bluepulse array 2630 CUI



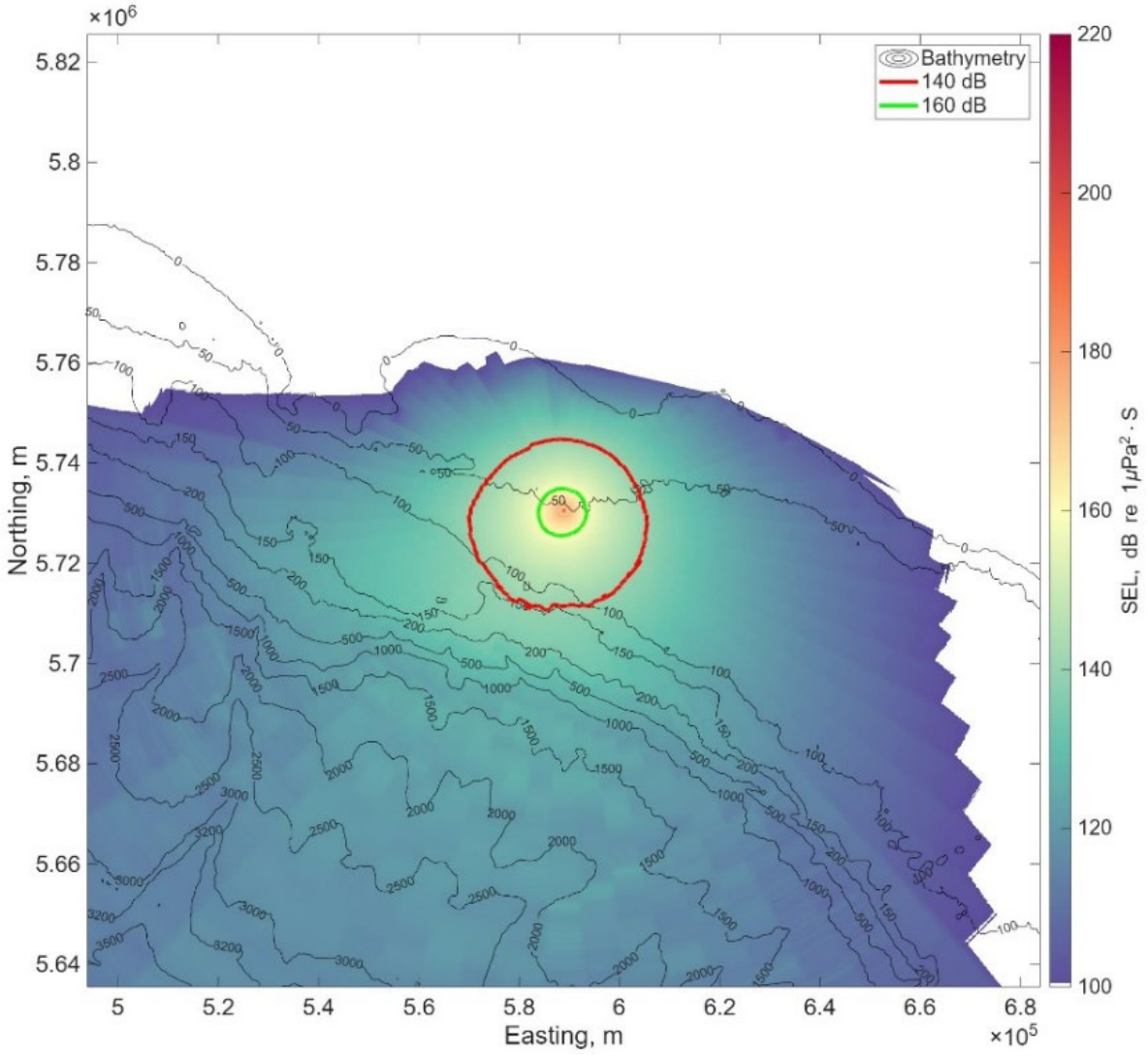
Map details: WGS 84 / UTM Zone 54H

Figure E-17: Exclusion zone map for behavioural disturbance of marine mammals for Conventional array 2630 CUI - Site 15



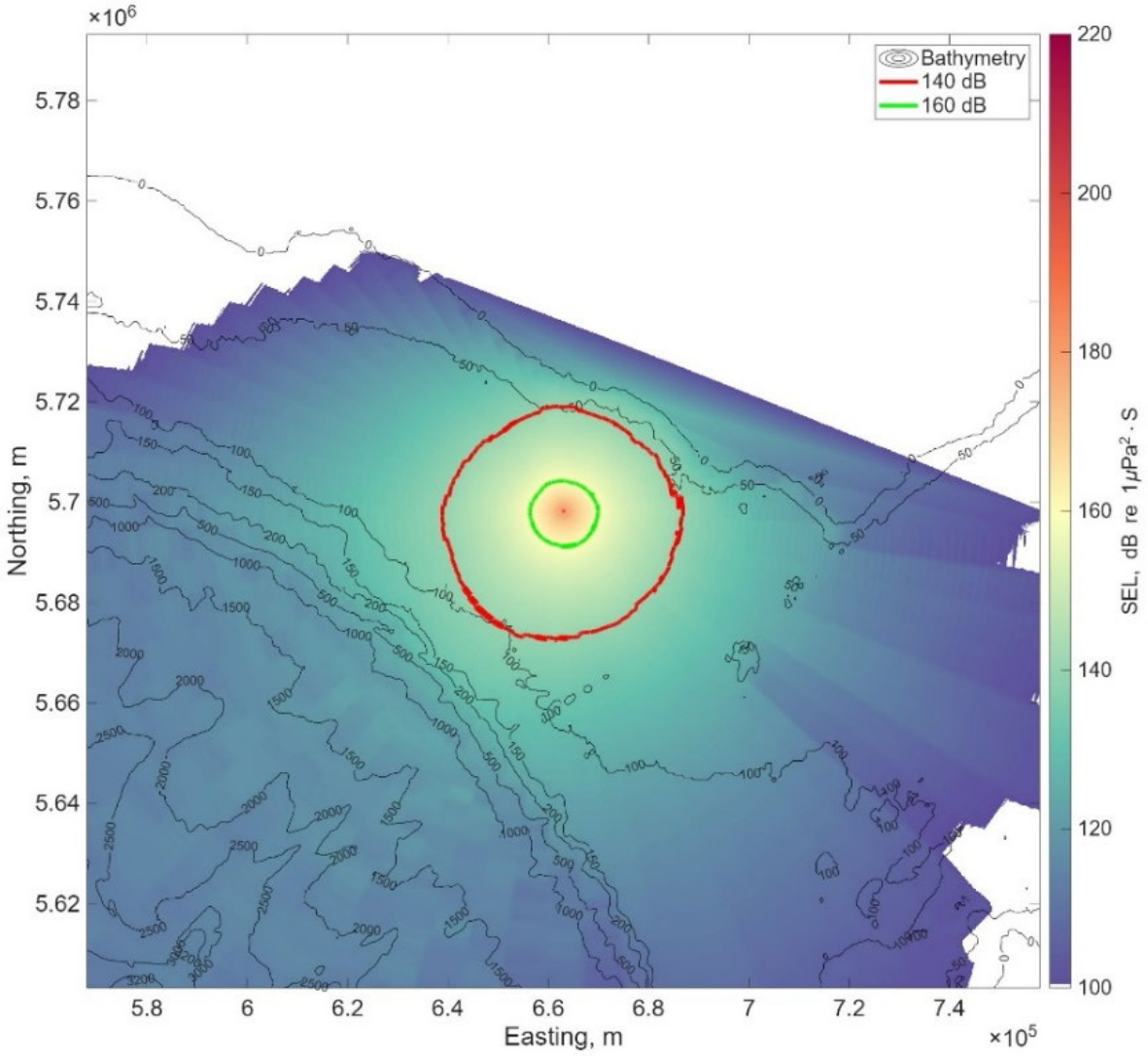
Map details: WGS 84 / UTM Zone 54H

Figure E-18: Exclusion zone map for behavioural disturbance of marine mammals for Bluepulse array 2630 CUI - Site 15



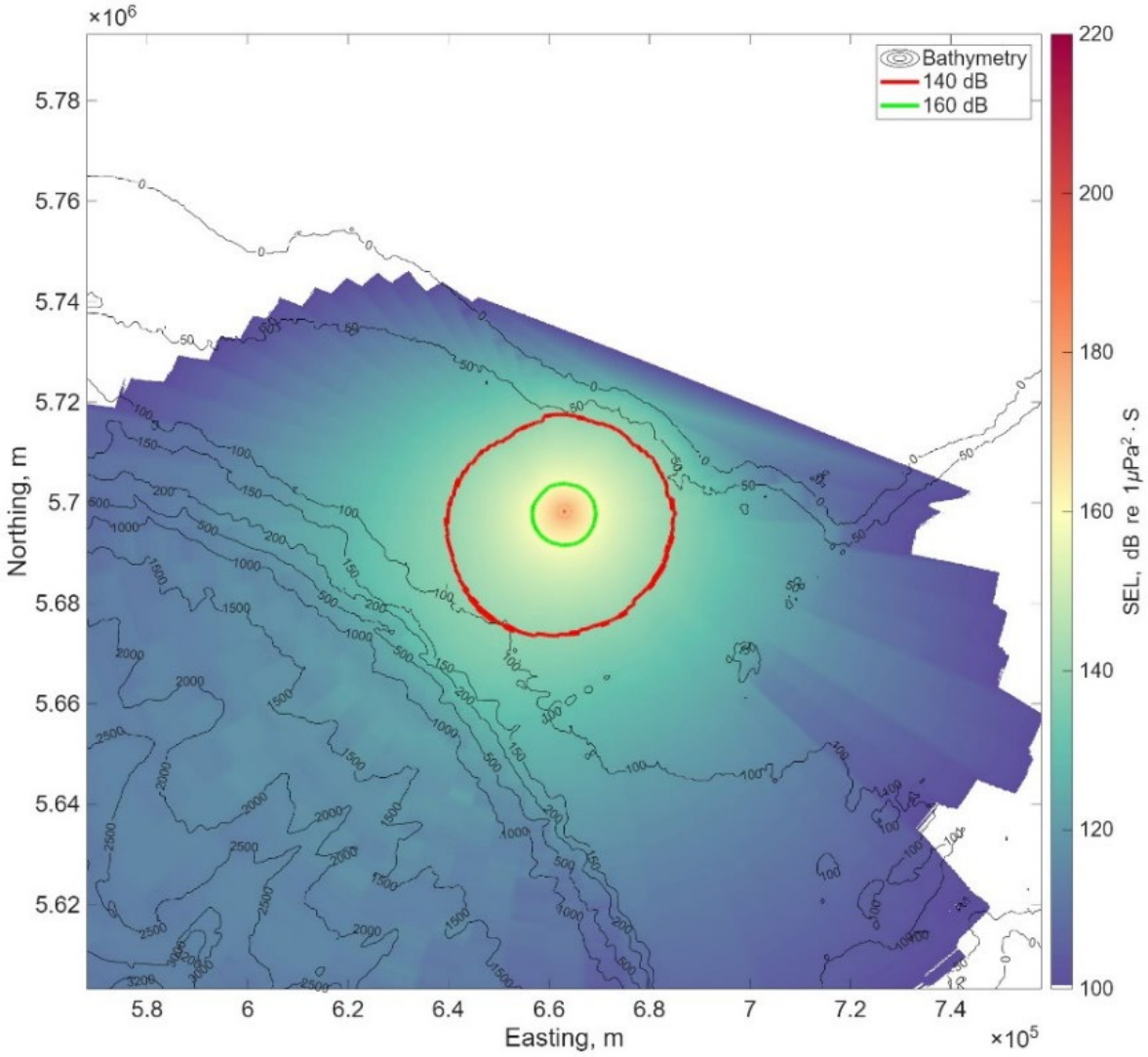
Map details: WGS 84 / UTM Zone 54H

Figure E-19: Exclusion zone map for behavioural disturbance of marine mammals for Conventional array 2630 CUI - Site 10



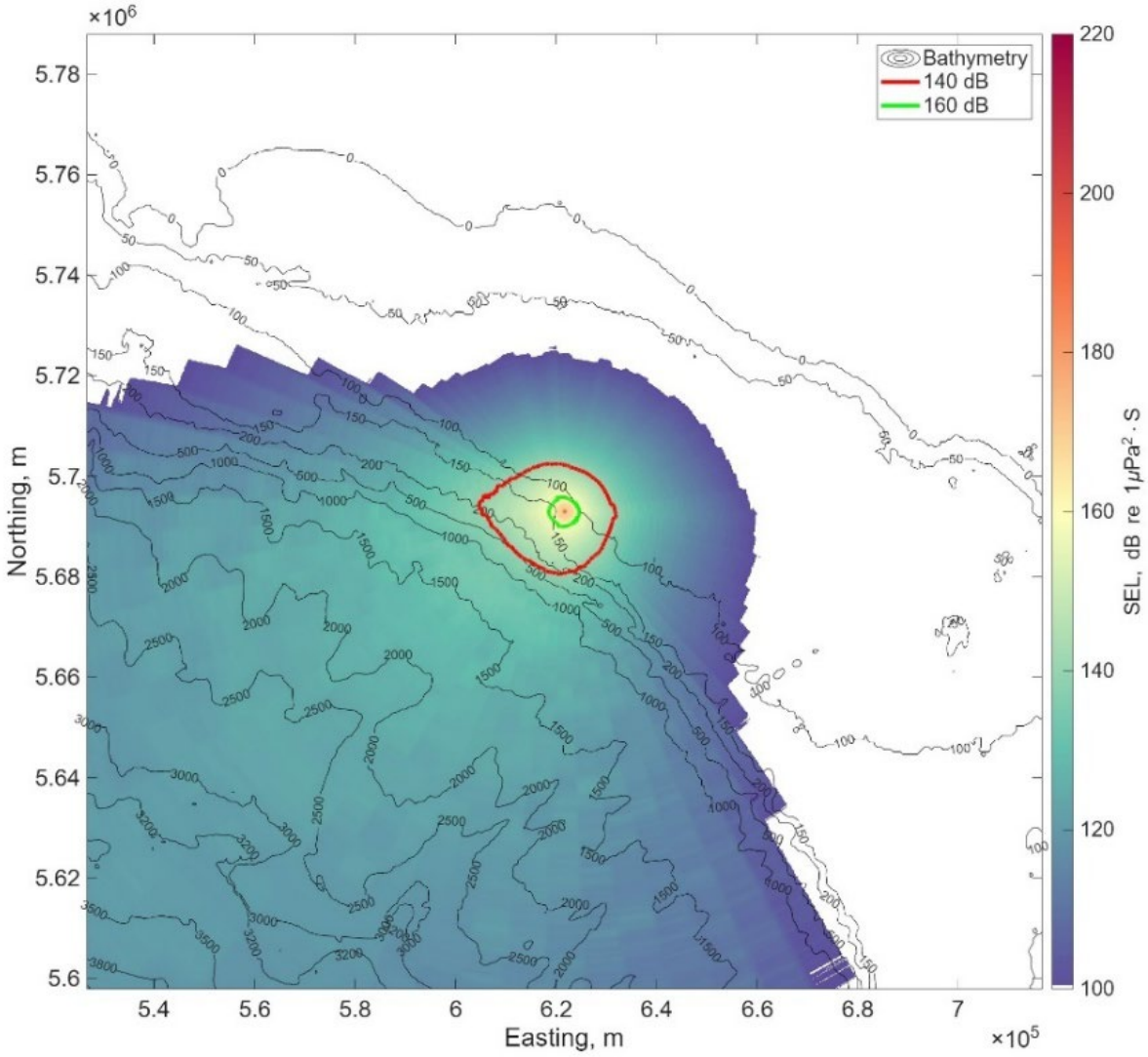
Map details: WGS 84 / UTM Zone 54H

Figure E-20: Exclusion zone map for behavioural disturbance of marine mammals for Bluepulse array 2630 CUI - Site 10



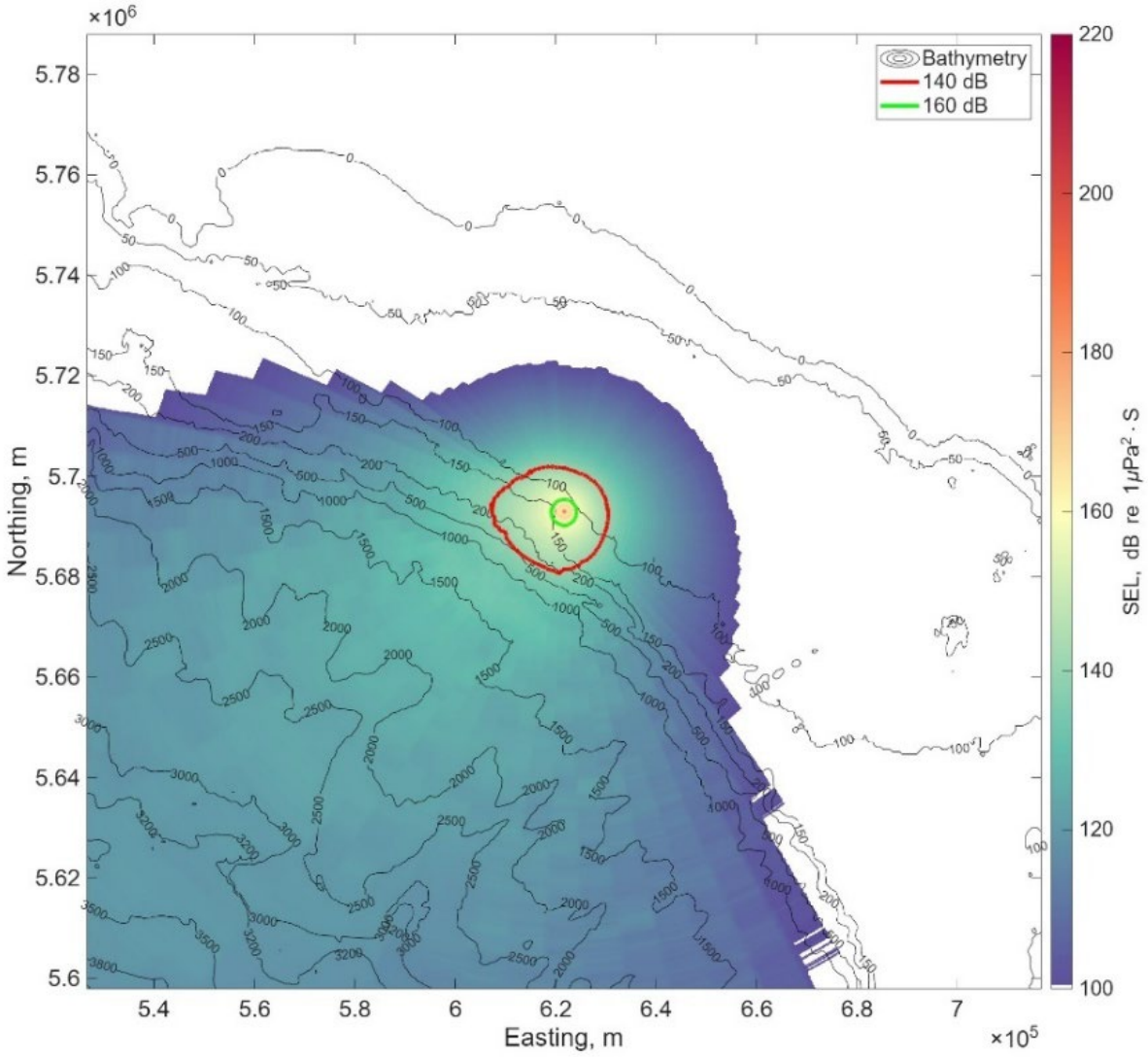
Map details: WGS 84 / UTM Zone 54H

Figure E-21: Exclusion zone map for behavioural disturbance of marine mammals for Conventional array 2630 CUI - Site 7



Map details: WGS 84 / UTM Zone 54H

Figure E-22: Exclusion zone map for behavioural disturbance of marine mammals for Bluepulse array 2630 CUI - Site 7



Map details: WGS 84 / UTM Zone 54H

Appendix F MAI Otway Basin Animat Modelling Report

Regia Marine Seismic Survey in the Otway Basin

Underwater Sound Transmission Loss Modelling Study

Klarite Pty Ltd

SLR Project No.: 675.073227.00001

December 1, 2025

Animat Modeling for a Seismic Survey in Otway Basin

Prepared For:

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Version 3.0
November 2025

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Research – Operations – Engineering – Design - Analysis

TABLE OF CONTENTS

1 Introduction 6
2 Animat Modeling Scenarios 6
3 Acoustic Criteria 8
4 Exposure Modeling 9
4.1.1 Methodology 9
4.1.2 Animat Model Output 10
4.1.3 Exposure Range Estimation 11
5 Species Specific Behavior Profiles 11
5.1.1 Pygmy Blue Whale Behavior Profiles 11
5.1.2 Southern Right Whale Behavior Profiles 12
6 AnimaT Exposure Ranges 14
7 Exposure Range Histograms 16
7.1 Scenario C (Site 15) 16
7.1.1 Pygmy Blue Whales Female 16
7.1.2 Pygmy Blue Whales Male 18
7.1.3 Southern Right Whales – Migrating with Calf 20
7.1.4 Southern Right Whales – Migrating without Calf 22
7.1.5 Southern Right Whales – Foraging with Calf 24
7.1.6 Southern Right Whales – Foraging without Calf 26
7.2 Scenario D (Site 7) 28
7.2.1 Pygmy Blue Whales Female 28
7.2.2 Pygmy Blue Whales Male 30
7.2.3 Southern Right Whales – Migrating with Calf 32
7.2.4 Southern Right Whales – Migrating without Calf 34
7.2.5 Southern Right Whales – Foraging with Calf 36
7.2.6 Southern Right Whales – Foraging without Calf 38
8 Discussion 39
9 Literature Cited 40
Appendix A: Animat Modeling Parameters 44

LIST OF TABLES

Table 1. Modeling scenarios used in animat modeling to estimate exposure ranges of marine mammal species of interest. 7

Table 2. Marine mammal physiological (AUD INJ, TTS; NMFS, 2024) thresholds for the low frequency (LF) hearing group for impulsive sounds. SEL thresholds are weighted using the LF auditory weighting function and peak thresholds are unweighted. 9

Table 3. Summary of 95th percentile exposure ranges (km) estimated for pygymy blue whales due to the operation of Conventional and Bluepulse airguns. SEL thresholds have units of dB re 1µPa^{2}s and peak (PK) and SPL thresholds have units of dB re 1µPa. 14

Table 4. Summary of 95th percentile exposure ranges (km) estimated for migrating and foraging southern right whales due to the operation of Conventional and Bluepulse airguns. SEL thresholds have units of dB re 1µPa^{2}s and peak (PK) and SPL thresholds have units of dB re 1µPa. 15

LIST OF FIGURES

Figure 1. Model scenarios, acoustic propagation modeling sites, and modeling box used in the animat modeling of the seismic surveys in Otway Basin. 8

Figure 2. Histograms showing the distribution of ranges (km) of the modeled female pygmy blue whale animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 16

Figure 3. Histograms showing the distribution of ranges (km) of the modeled female pygmy blue whale animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 17

Figure 4. Histograms showing the distribution of ranges (km) of the modeled male pygmy blue whale animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 18

Figure 5. Histograms showing the distribution of ranges (km) of the modeled male pygmy blue whale animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the

Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 19

Figure 6. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale mother with calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 20

Figure 7. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale mother with calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 21

Figure 8. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale adult without calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 22

Figure 9. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale adult without calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 23

Figure 10.Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale mother with calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 24

Figure 11. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale mother with calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 25

Figure 12. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale adult without calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the

ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 26

Figure 13. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale adult without calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 27

Figure 14. Histograms showing the distribution of ranges (km) of the modeled female pygmy blue whale animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 28

Figure 15. Histograms showing the distribution of ranges (km) of the modeled female pygmy blue whale animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 29

Figure 16. Histograms showing the distribution of ranges (km) of the modeled male pygmy blue whale animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 30

Figure 17. Histograms showing the distribution of ranges (km) of the modeled male pygmy blue whale animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 31

Figure 18. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale mother with calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 32

Figure 19. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale mother with calf animats from the source during Scenario D. Grey bars

indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 33

Figure 20. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale adult without calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 34

Figure 21. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale adult without calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 35

Figure 22.Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale mother with calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 36

Figure 23. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale mother with calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 37

Figure 24. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale adult without calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species..... 38

Figure 25. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale adult without calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species. 39

1 INTRODUCTION

Marine Acoustics, Inc (MAI) was contracted by SLR Consulting Ltd. (SLR) to perform animat modeling of pygmy blue whales and southern right whales for a seismic survey within Otway Basin, located off the southern coast of Australia. The scope of work included animat modeling of two seismic airgun sources (Conventional [2630 cubic inches] and Bluepulse) along two representative track lines. SLR provided the modeled sound fields and MAI performed animat modeling using the provided inputs.

Tasks in this scope included:

1. Translation of SLR provided sound fields and track lines into usable format for ingestion into MAI animat model
    - SLR provided track lines for each representative track
    - SLR provided sound fields (low-frequency (LF) weighted single pulse sound exposure level (SEL) field, unweighted sound pressure level (SPL) field, unweighted peak SPL field) from a single model site along each track line (Site 15 and Site 7) for both seismic source types
    - While SLR modeled three sites (Site 7, Site 10, and Site 15), only two sites were chosen for the animat modeling effort (Site 7 and Site 15). Site 10 and Site 15 are along the same representative track and both correspond to Scenario C. Only one model site was chosen to represent each Scenario in the animat modeling. Further explanation of why Site 15 was chosen over Site 10 to represent Scenario C in the animat modeling study is provided in the *Underwater Sound Transmission Loss Modelling Study* report.
2. Animat modeling of two seismic source types (Conventional and Bluepulse) traversing two separate track lines
    - Include animats representative of pygmy blue whales (female and male) and southern right whales (migrating and foraging animats representing mother & calf pair and an adult with no calf)
3. Provide exposure ranges to auditory injury (AUD INJ) SEL and Peak (PK), temporary threshold shift (TTS) SEL and PK, and SPL (120, 140, 160 dB) thresholds as tables for each modeled marine mammal animat to the two seismic source types along each track line
4. Provide histogram plots showing exposure ranges of modeled animats which experienced a received level above AUD INJ SEL, TTS SEL and SPL (120, 140, 160 dB) thresholds

2 ANIMAT MODELING SCENARIOS

The modeling scenarios run by MAI are outlined in Table 1. Animat modeling was conducted within a model area that extended from 39.774°S to 38.209°S and 141.073°E to 143.870°E (Figure 1). This model area encompassed the area where received SPL sound levels were above 120 dB per the sound fields provided by SLR. The scenarios and representative sites are indicated in Figure 1, overlaid with the area used in the animat modeling.

In all scenarios, 24-hours of track line was modeled assuming the vessel transits at 2.315 m/s. There is a 12.5 m (or 5.4 second) impulse interval for a total of 11,895 shots in Scenario C and 11,891 in Scenario D. In both scenarios, transmissions will occur for 17.84 hours a day, with the turn in the track line taking 6.16 hours to complete. No transmissions occur on the turn.

Table 1. Modeling scenarios used in animat modeling to estimate exposure ranges of marine mammal species of interest.

Scenario	Representative Acoustic Propagation Model Site Used	Airgun Type	Total # of Shots Modeled	Duration of First Transect (hrs)	Turn Time (hrs)	Duration of Second Transect (hrs)
Scenario C	Site 15	Conventional	11,895	10.45	6.16	7.39
		Bluepulse				
Scenario D	Site 7	Conventional	11,891	9.76	6.16	8.08
		Bluepulse				

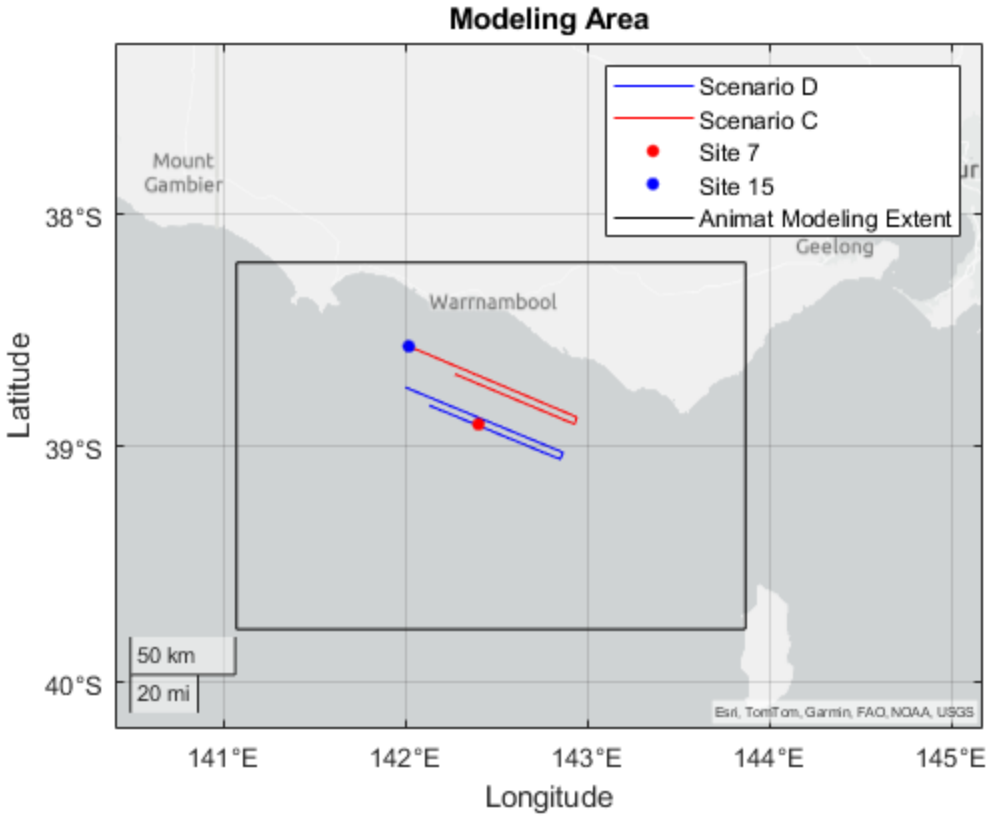

Figure 1. Model scenarios, acoustic propagation modeling sites, and modeling box used in the animat modeling of the seismic surveys in Otway Basin.

3 ACOUSTIC CRITERIA

The National Marine Fisheries Service (NMFS) has provided guidance for assessing the physiological impacts of anthropogenic sound on marine mammals under their regulatory jurisdiction, which includes whales, dolphins, seals, and sea lions (NMFS, 2024).The guidance specifically defines hearing groups, develops auditory weighting functions, and identifies the received levels or acoustic threshold levels, above which individual marine mammals are predicted to experience changes in their hearing sensitivity (permanent threshold shift [PTS] or temporary threshold shift [TTS]) for acute, incidental exposure to underwater sound. The guidance defines thresholds for onset of TTS and auditory injury (AUD INJ), which includes, but is not limited to, PTS. The marine mammals of interest to this study (pygmy blue whales and southern right whales) are part of the low-frequency (LF) cetacean hearing group, which is defined as the mysticetes (baleen whales) with a collective generalized hearing range of 7 Hz to 36 kilohertz (kHz).

Airguns are considered impulsive sources and utilize the acoustic thresholds defined in Table 2. The cumulative SEL metric considers both received level and duration of exposure over the

duration of the activity within a 24-hr period. This threshold is weighted using the LF auditory weighting functions. Peak thresholds are unweighted.

Table 2. Marine mammal physiological (AUD INJ, TTS; NMFS, 2024) thresholds for the low frequency (LF) hearing group for impulsive sounds. SEL thresholds are weighted using the LF auditory weighting function and peak thresholds are unweighted.

Hearing Group	AUD INJ Onset		TTS Onset	
	SEL (dB re 1 μPa^2s)	Peak (dB re 1 µPa)	SEL (dB re 1 μPa^2s)	Peak (dB re 1 µPa)
Low-frequency (LF) cetaceans	183 dB	222 dB	168 dB	216 dB

The behavioral threshold for marine mammals is defined by NMFS to be 160 dB re 1 µPa for impulsive sources, such as airguns (NOAA, 2005). To assess potential for behavioral reactions, sound pressure level thresholds of 120 dB, 140 dB in addition to the 160 dB threshold will be used.

4 EXPOSURE MODELING

4.1.1 METHODOLOGY

MAI conducted animat modeling of the marine mammal species of interest in the Otway Basin to determine their potential level of exposure to the underwater sounds generated during the proposed seismic activity. The animat modeling integrated the predicted received level sound fields of the seismic activity with four-dimensional (4D) movements of marine mammals (pygmy blue whales and southern right whales) to estimate their potential acoustic exposure at which physiological effects, specifically, AUD INJ, TTS and behavioral effects are experienced. The modeling was conducted using the Acoustic Integration Model© (AIM) (Frankel et al., 2002), which is a Monte Carlo based statistical model in which multiple iterations of realistic predictions of acoustic source use as well as animal distribution and movement patterns are conducted to provide statistical predictions of estimated effects from exposure to underwater sound.

In AIM, each acoustic source and sound receiver is modeled via the animat concept. Animats are computationally simulated animals or objects. When an animat represents a marine animal, movement is defined by specifying behavioral variables, such as dive parameters, swimming speed, and course/direction changes. This results in a realistic representation of animal movements that mimic the real-world diving patterns and swimming abilities of marine species. The movements of an animat can also be programmed to respond to environmental factors (e.g., water depth) so that a marine species that normally inhabits a specific environment (e.g., shallow, coastal waters) can be constrained to stay within a specified marine habitat.
AIM simulated the four-dimensional (range, depth, bearing, and time) movements of the marine mammals of interest (pygmy blue whale and southern right whale) during the seismic

survey. Animats were distributed throughout the modeling area (Figure 1) and were constrained within the modeling area by the coastline and the expected occurrence depth relative to each species. These simulated marine mammal movements were integrated with the broadband acoustic received level fields produced by SLR to predict the exposure range for each simulated animal.

Separate AIM simulations were created and run for each marine mammal species and modeling scenario. During each of these modeling iterations or runs, animats were randomly distributed over the modeling area (Figure 1), and the predicted sound received level was estimated every 30 seconds (sec) for each animat, which resulted in a sound exposure history over the modeled duration of the seismic activity. The animat model area was chosen to be the area that encompassed received levels of 120 dB SPL and above in the acoustic propagation modeling, with an additional nominal buffer added to each side of the modeling area. This ensured that the animats were distributed throughout the modeled sound field and would receive sound levels below the lowest acoustic threshold being assessed, which was 120 dB SPL. At each 30-sec time step, every animat was moved according to the programmed rules describing each marine mammal species' behavior, and the received sound level for each animat is recorded (in the same units that were used to specify the source level, e.g., dB rms, SEL or peak). At the end of each time step, the environment of each animat was evaluated, including its three-dimensional (3D) location. If an environmental variable exceeded the user-specified boundary value (e.g., the animat moved into water that is too deep), then the animat altered its course to respond to the environment. There are many ways in which animats can be programmed to depict realistic behavioral reactions to such elements of their physical environment, including bathymetry or geographic boundaries. These programmed behaviors may lead to some animats "reflecting" off the simulation area boundary as no animals are allowed to diffuse outside the model simulation area. Thus, the appropriate density of animats is maintained throughout the simulation.

Marine mammal animats populated the model area with nominal densities. The modeled animat density was higher than the real-world density estimated for a given species. This "over population" ensures that the result of the animat model simulation was not unduly influenced by the initial animat placement and provides statistical robustness. A density of 2 animats/square km was used in the modeling.

4.1.2 ANIMAT MODEL OUTPUT

AIM simulates realistic 4D animal movements (3D space and time) and records each animats received level at each time step to create the animats' exposure history. The output of an AIM simulation is the time history of acoustic exposure for each animat. For this modeling effort, the exposure history provides the received level for each modeled animat every 30 sec for the duration of the seismic survey. Animat exposure histories for metrics of maximum sound pressure level, maximum peak sound pressure level, and sound exposure level were generated and used to estimate the exposure ranges of each species for each modeled scenario.

4.1.3 EXPOSURE RANGE ESTIMATION

Exposure ranges to acoustic thresholds are calculated using the results of the animat movement modeling. As each animat moves through the acoustic sound field during an AIM simulation, the predicted received sound level is recorded, along with the distance of the animat from the sound source. The cumulative SEL, maximum peak SPL and maximum SPL for each animat is calculated over the duration of the seismic survey. The modeled animats that have predicted sound levels that exceed the regulatory thresholds for the modeled taxa are identified, and the range to those animats' closest point of approach (CPA) (i.e., minimum distance between each animat and the acoustic source) is determined, producing a distribution of ranges. The 95th percentile of these distances is defined as the exposure range.

5 SPECIES SPECIFIC BEHAVIOR PROFILES

As explained in Section 4.1.1, animats are based on real-world animal behavior. Therefore, it is necessary to research the swim and dive behavior for all species included in a project. Animats are programmed using maximum and minimum dive depth and duration, surface time, dive angle (ascent and descent), swim speed, water depth preferences, and heading variance and turn time. This section provides swim and dive behavior profiles for the two species of interest in this study—pygmy blue whales and southern right whales.

5.1.1 PYGMY BLUE WHALE BEHAVIOR PROFILES

Pygmy blue whales (*Balaenoptera musculus brevicauda*), a subspecies of blue whales living in the Southern Hemisphere, are listed as Data Deficient (Not Evaluated) on the International Union for Conservation of Nature (IUCN) Red List and Endangered under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Australian Government, 2015; International Whaling Commission, 2025). Pygmy blue whales are found in the Indian Ocean, along the east coast of southern Africa, and around Australia, New Zealand, and Indonesia (McCauley et al., 2018).

Blue whales are the largest animal on Earth, and their diet mainly consists of krill (NOAA, 2025). Like most baleen whales, pygmy blue whales feed during the austral summer and autumn and spend their winters at higher latitudes in warmer waters for breeding (NOAA, 2025). Because the study area overlaps with a known foraging area for pygmy blue whales, only foraging behaviors were considered in this species' profile (Australian Government, 2015).

Foraging behavior data on pygmy blue whales is scarce, so animat behavior is derived from blue (*Balaenoptera musculus*) and pygmy blue whales. A single, tagged migrating pygmy blue whale off the western coast of Australia had a mean maximum feeding depth of 129±183 m (range 13-505 m) and mean dive duration was 7.6 min; however, the individual had deep and shallow feeding bouts and mean dive times were 11.4 min and 5.2 min, respectively (Owen et al., 2016). Bimodal dive times were also recorded in tagged pygmy blue whales in the eastern Indian Ocean—dive times were between 0.2 and 16.8 min, but most were 3 to 5 min or 10 to 12 min (Davenport et al., 2022). Tagged blue whales off southern California's, USA coast had similar

mean maximum nighttime dive depths (between 90 and 130 m) compared to the induvial pygmy blue whale in Owen et al. (2016); however, when separated by sex, female blue whales routinely dove deeper than males (Irvine et al., 2019). Consequently, two animats were created for pygmy blue whales: Male and Female. Mean surface time between dives is approximately 2.5 min (range: 10 s to 6.7 min) (Davenport et al., 2022; de Vos et al., 2013; Goldbogen et al., 2011). Blue whales generally have the same mean body angle during ascent (42°) and descent (-38°) (Goldbogen et al., 2011). Lastly, lunge speeds can reach 18 km/h, but swim speeds are most commonly between 1 and 10 km/h (Goldbogen et al., 2011; Möller et al., 2020; Owen et al., 2016).

Blue whales and pygmy blue whales produce infrasonic signals between 10 and 20 Hz, and up to 200 Hz, and these signals can be heard across ocean basins (Cummings and Thompson, 1972; Ketten, 2000). Consequently, they are sensitive to low-frequency sounds (< 1 kHz) (Goldbogen et al., 2013; Melcon et al., 2012; Southall et al., 2019).

5.1.2 SOUTHERN RIGHT WHALE BEHAVIOR PROFILES

In the U.S., Southern right whales are listed as endangered under the Endangered Species Act and depleted under the Marine Mammal Protection Act; and they are listed as Endangered in Australia under the EPBC Act (WWF-Australia, 2018) and as Least Concern on the IUCN Red List (Cooke and Zerbini, 2018).

Southern right whales are found throughout the Southern Hemisphere and like many baleen whales, they feed during the austral summer in high-latitude feeding grounds in the Southern Ocean and spend their winters in low-latitude breeding grounds (NOAA, 2024). The survey area of this project overlaps with a reproductive Biologically Important Area (BIA) for southern right whales (DCCEEW, 2022; Austin, 2021). Sightings of mother/calf pairs have been documented in the survey area (Stamation et al., 2020) to rest and briefly forage mid-migration. The behavior of mother/calf pairs can be different from solo adults—inhabiting shallower waters, spending more time resting and/or at the surface, slower swim speeds (Payne, 1986; Hain et al., 2013; Cusano et al., 2019; Nielsen et al., 2019a). Consequently, four behavioral profiles were included for this species—foraging adult without calf, foraging adult with calf, migrating adult without calf, and migrating adult with calf.

The four southern right whale animats were created using data from tagged North Atlantic (NARW) and Southern right whales (SRW) due to the plethora of information on NARW and less abundant data on SRW. Baumgartner and Mate (2003) did not observe significant dive depth differences between NARW adults with and without calves in feeding grounds, but Dombroski et al. (2021) observed significant dive depth differences on calving grounds (12.1 vs 7.3m). Feeding dives for NARW were between 80-175m, with the majority (90%) between 113 and 130m (Baumgartner and Mate, 2003) and feeding SRW off Argentina dove to a maximum of 115 m (to the seafloor) and calves were observed with their mothers at depth too (D'Agostino et al., 2024); however, in a breeding ground, feeding dives did not exceed 20 m due to the shallower waters of those areas (Dombroski et al., 2021). Traveling speeds also do not differ

much between a mother/calf pair and solo adult; average travel speed for both is between 2.5 and 3.5 km/h with maximum swim speeds up to 8 km/h (Baumgartner and Mate, 2003; Barendse and Best, 2014; Nielsen et al., 2019b; Mackay et al., 2020). Aggregating and feeding speeds are slightly slower than travel speeds (Dombroski et al., 2021). Though not always significant, adults with calves spend more time at the surface than adults without calves (Baumgartner and Mate, 2003; Dombroski et al., 2021). Surface intervals for foraging calves and females with calves averaged ~5.5 min whereas surface intervals for all other individuals excluding the pregnant female averaged ~3 min (Baumgartner and Mate, 2003), and for 0m,.lactating (adults with calf) versus non-lactating (adults with no calf) adults on a breeding ground, average surface times were 2.5 and 3.5 min, respectively (Dombroski et al., 2021). Lastly, feeding dive times range from 2 to 16 min, but on average last 7 to 12 min (Baumgartner and Mate, 2003; D'Agostino et al., 2024) and no difference in dive times was observed between females with and females without calves (Baumgartner and Mate, 2003).

There is no audiogram for southern right whale hearing; however, like other baleen whales, southern right whales are considered low-frequency hearing specialists (Sprogis et al., 2023). SRW produce a variety of different sounds (e.g. upcalls, downcalls, constant calls, high calls, hybrid calls and pulsive calls), most of which are between 10 and 500 Hz (Cummings et al., 1971; Clark 1982; Ward et al., 2014).

6 ANIMAT EXPOSURE RANGES

The results of the animat movement modeling in the form of exposure ranges to each of acoustic metrics for the two source types for pygmy blue whales (Table 3) and the southern right whales (Table 4) are provided. The results generally show longer ranges to the AUD INJ and TTS SEL and SPL thresholds for Scenario C compared to Scenario D for both species, except for a few cases where the ranges are the same between Scenario C and D. The ranges to the AUD INJ, TTS, and SPL thresholds due to the use of the Conventional source are larger compared to the use of the Bluepulse source.

Table 3. Summary of 95th percentile exposure ranges (km) estimated for pygymy blue whales due to the operation of Conventional and Bluepulse airguns. SEL thresholds have units of dB re 1µPa^{2}s and peak (PK) and SPL thresholds have units of dB re 1µPa.

Modeling Scenario	Airgun Type	Pygmy Blue Whale Animat Type	AUD INJ		TTS		SPL		
			183 dB SEL	222 dB PK	168 dB SEL	216 dB PK	120 dB	140 dB	160 dB
Scenario C	Conventional	Female	0.079	0.071	4.195	0.078	51.773	18.227	4.669
		Male	0.127	0.070	4.322	0.077	51.579	18.224	4.640
	Bluepulse	Female	0.069	0.058	2.124	0.073	48.746	17.391	4.270
		Male	0.069	0.055	2.182	0.073	48.161	17.391	4.255
Scenario D	Conventional	Female	0.071	0.060	2.334	0.071	37.935	11.259	2.463
		Male	0.073	0.059	2.054	0.071	36.406	11.294	2.424
	Bluepulse	Female	0.061	0.046	0.657	0.059	33.326	10.529	2.197
		Male	0.064	0.044	0.815	0.058	30.704	10.446	2.151

Table 4. Summary of 95th percentile exposure ranges (km) estimated for migrating and foraging southern right whales due to the operation of Conventional and Bluepulse airguns. SEL thresholds have units of dB re 1µPa²s and peak (PK) and SPL thresholds have units of dB re 1µPa.

Modeling Scenario	Airgun Type	Southern Right Whale Animat Type	AUD INJ		TTS		SPL		
			183 dB SEL	222 dB PK	168 dB SEL	216 dB PK	120 dB	140 dB	160 dB
Scenario C	Conventional	migrating - mother w/calf	0.077	0.068	3.484	0.077	49.670	18.421	4.606
		migrating - adult w/o calf	0.072	0.069	3.642	0.072	50.027	18.434	4.547
		foraging - mother w/calf	0.059	0.050	2.900	0.054	30.969	12.425	3.149
		foraging – adult w/o calf	0.069	0.057	3.754	0.059	32.364	12.838	3.355
	Bluepulse	migrating - mother w/calf	0.068	0.058	1.770	0.068	46.090	17.758	4.338
		migrating - adult w/o calf	0.069	0.058	2.038	0.069	46.424	17.713	4.256
		foraging - mother w/calf	0.054	0.036	1.087	0.049	27.532	11.326	2.773
		foraging – adult w/o calf	0.059	0.042	1.594	0.057	27.977	11.574	2.863
Scenario D	Conventional	migrating - mother w/calf	0.073	0.064	1.289	0.071	34.593	10.829	2.534
		migrating - adult w/o calf	0.070	0.057	1.488	0.070	34.953	10.865	2.505
		foraging - mother w/calf	0.059	0.043	0.807	0.054	15.543	6.535	1.267
		foraging – adult w/o calf	0.067	0.048	1.192	0.053	16.674	7.158	1.375
	Bluepulse	migrating - mother w/calf	0.065	0.046	0.293	0.064	30.600	10.386	2.320
		migrating - adult w/o calf	0.059	0.044	0.368	0.057	30.537	10.516	2.285
		foraging - mother w/calf	0.046	0.023	0.084	0.038	12.875	5.534	0.953
		foraging – adult w/o calf	0.048	0.027	0.170	0.041	13.491	5.949	1.060

7 EXPOSURE RANGE HISTOGRAMS

The figures in this section show the distribution of ranges of the modeled animats to the source. Each subsection will contain histograms for each species showing the animats above AUD INJ and TTS SEL and SPL thresholds. The closest point of approach of all modeled animats to the source is shown by the grey bars. The red bars show the animats that were above the indicated threshold and the black dashed line indicates the 95th percentile exposure range that was reported for the species.

7.1 SCENARIO C (SITE 15)

7.1.1 PYGMY BLUE WHALES FEMALE

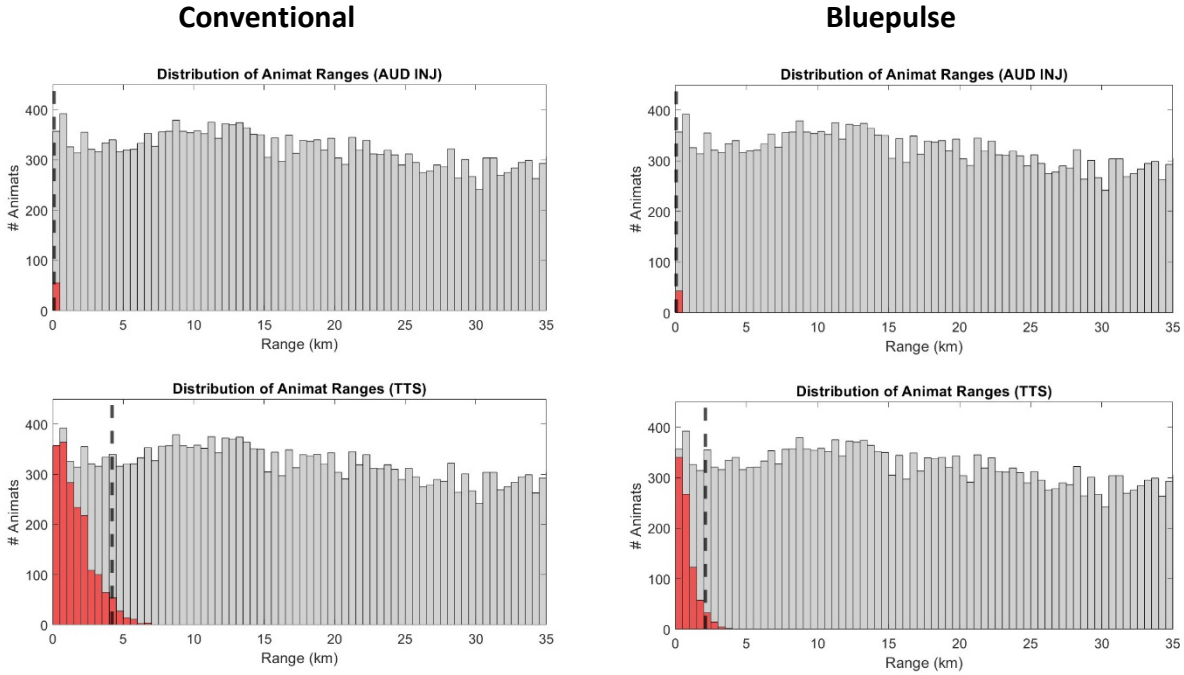

Figure 2. Histograms showing the distribution of ranges (km) of the modeled female pygmy blue whale animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

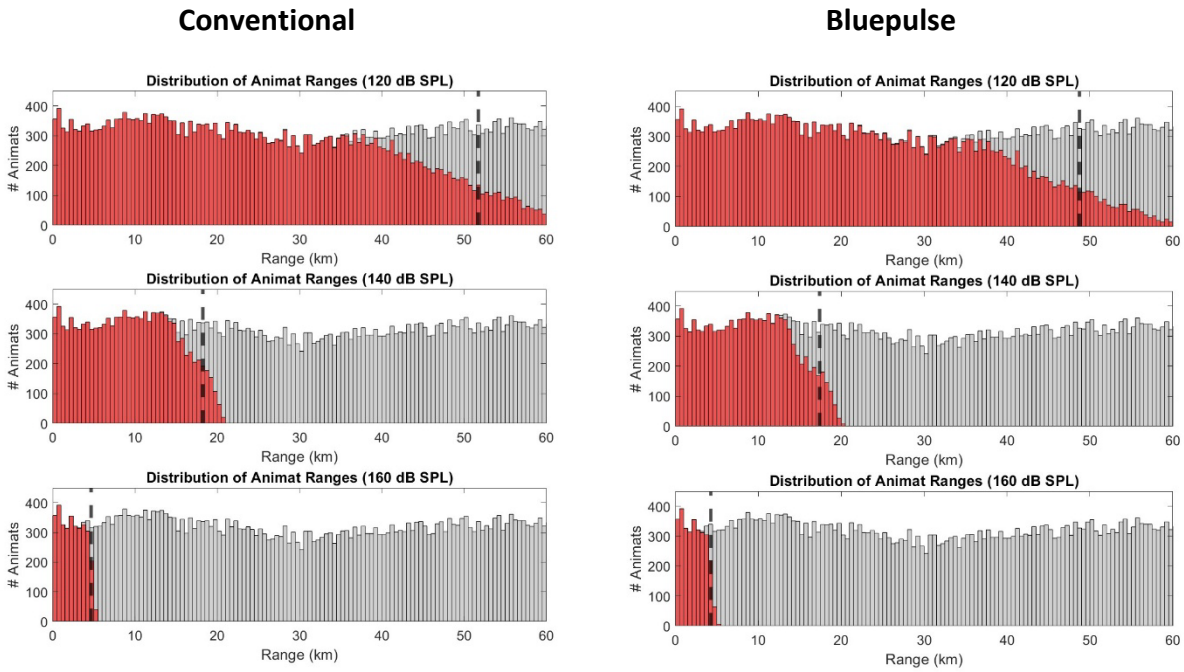

Figure 3. Histograms showing the distribution of ranges (km) of the modeled female pygmy blue whale animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.1.2 PYGMY BLUE WHALES MALE

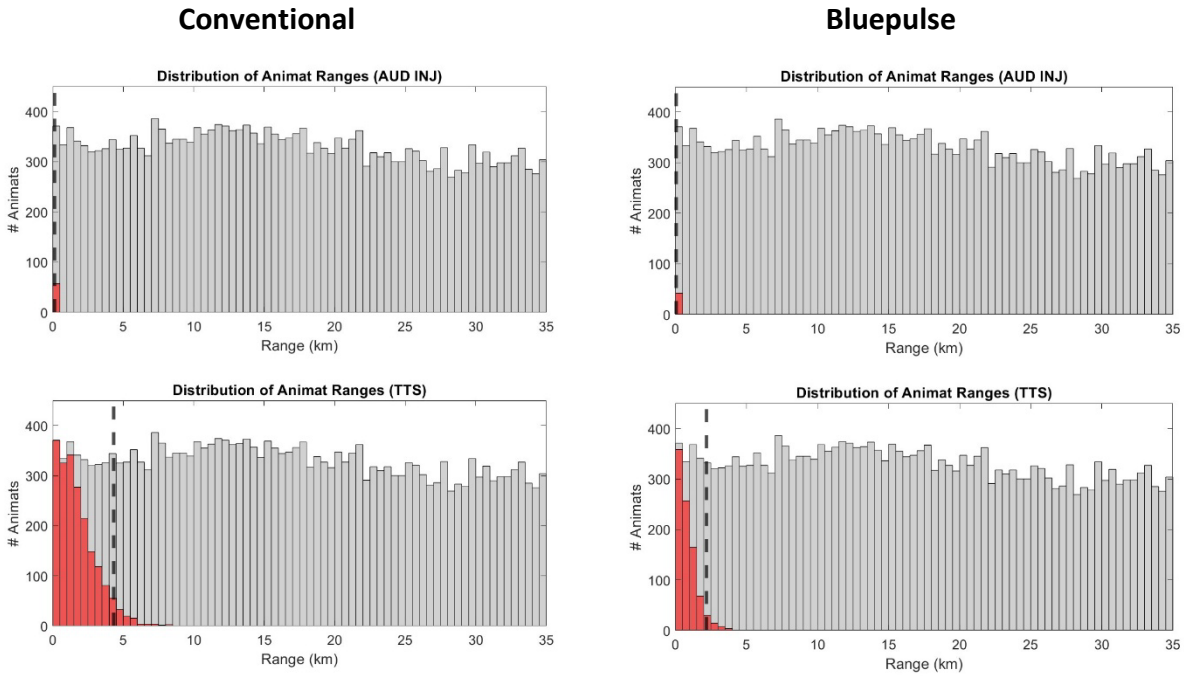

Figure 4. Histograms showing the distribution of ranges (km) of the modeled male pygmy blue whale animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

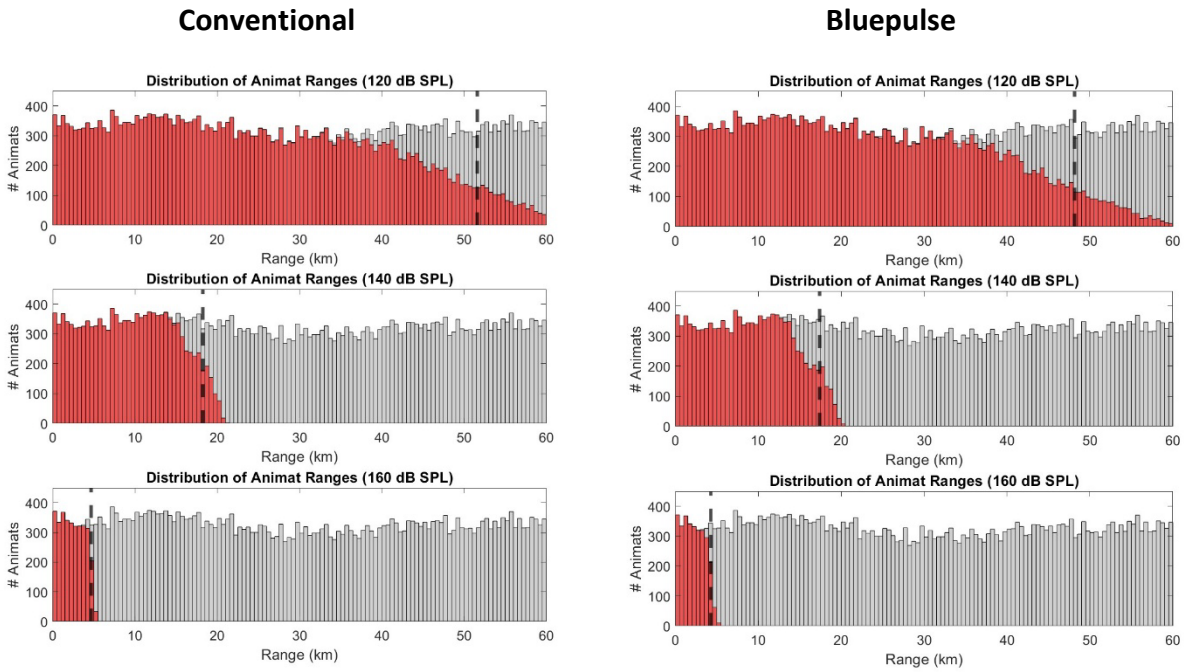

Figure 5. Histograms showing the distribution of ranges (km) of the modeled male pygmy blue whale animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.1.3 SOUTHERN RIGHT WHALES – MIGRATING WITH CALF

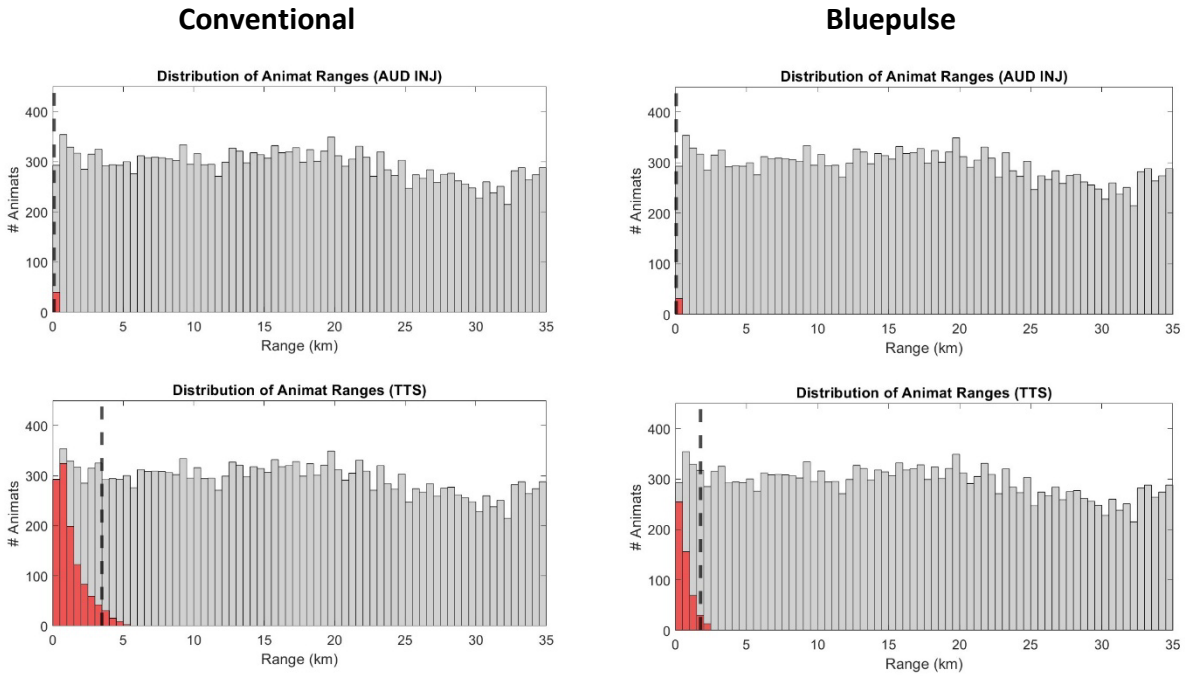

Figure 6. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale mother with calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

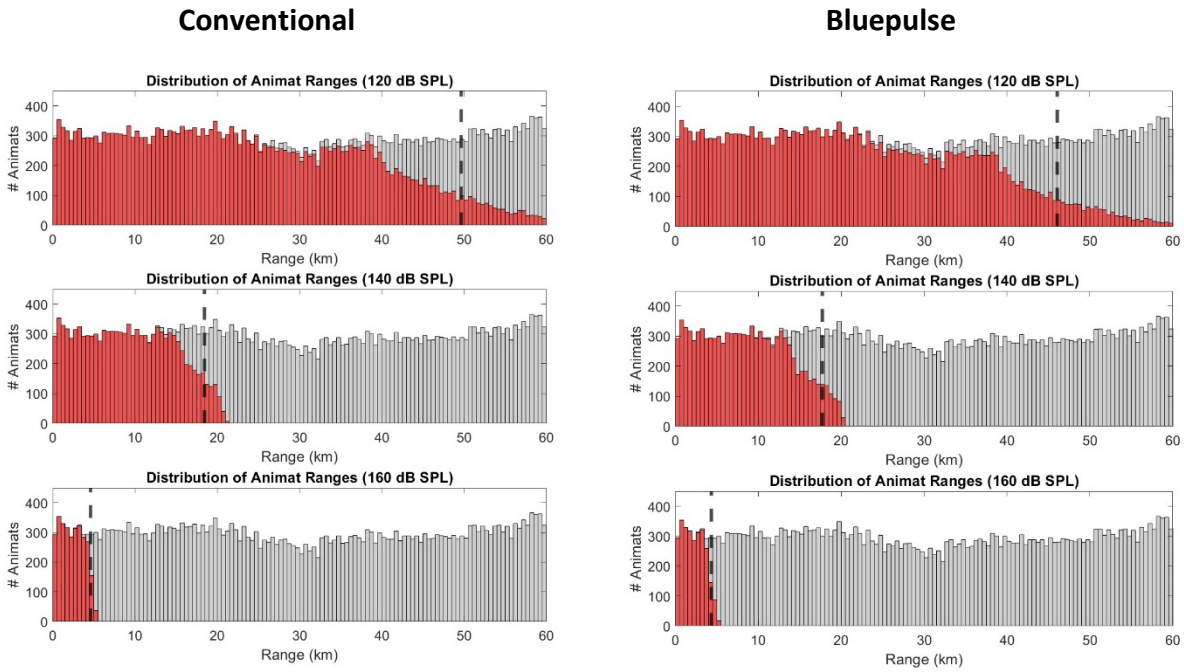

Figure 7. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale mother with calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.1.4 SOUTHERN RIGHT WHALES – MIGRATING WITHOUT CALF

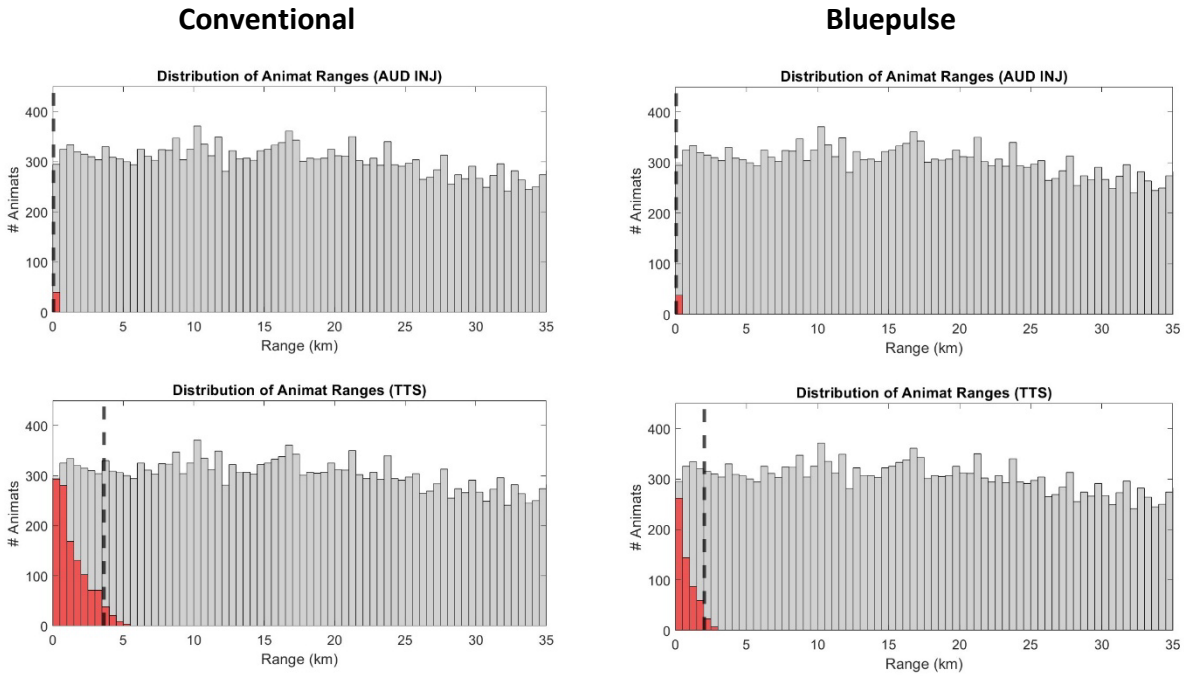

Figure 8. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale adult without calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

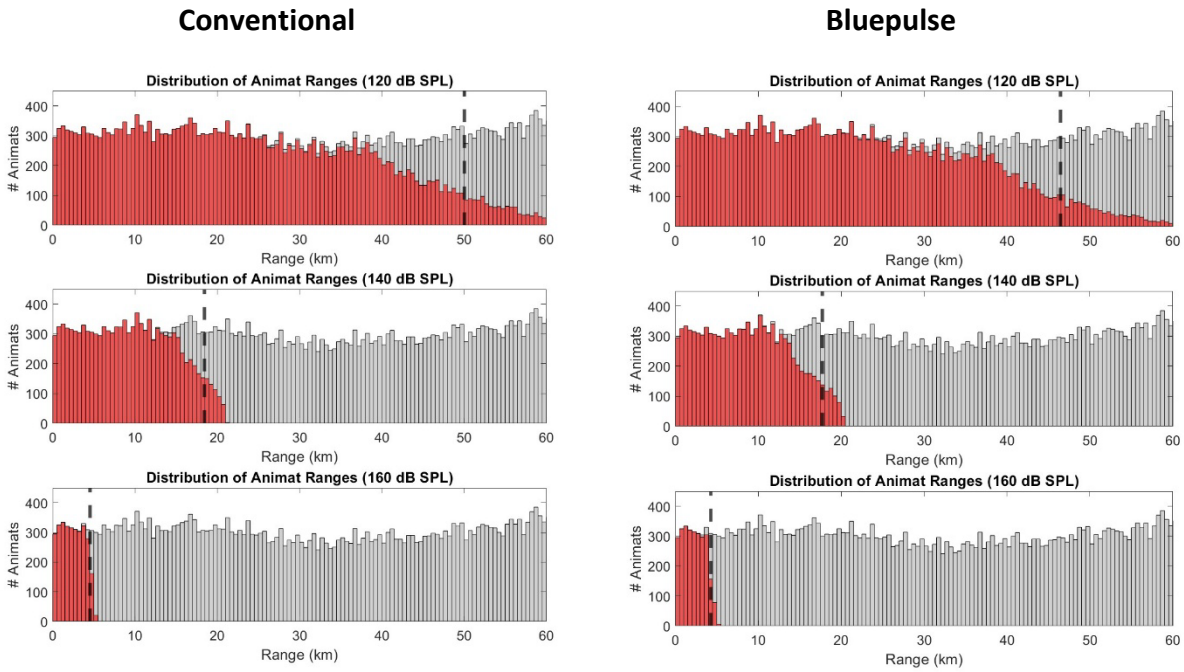

Figure 9. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale adult without calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.1.5 SOUTHERN RIGHT WHALES – FORAGING WITH CALF

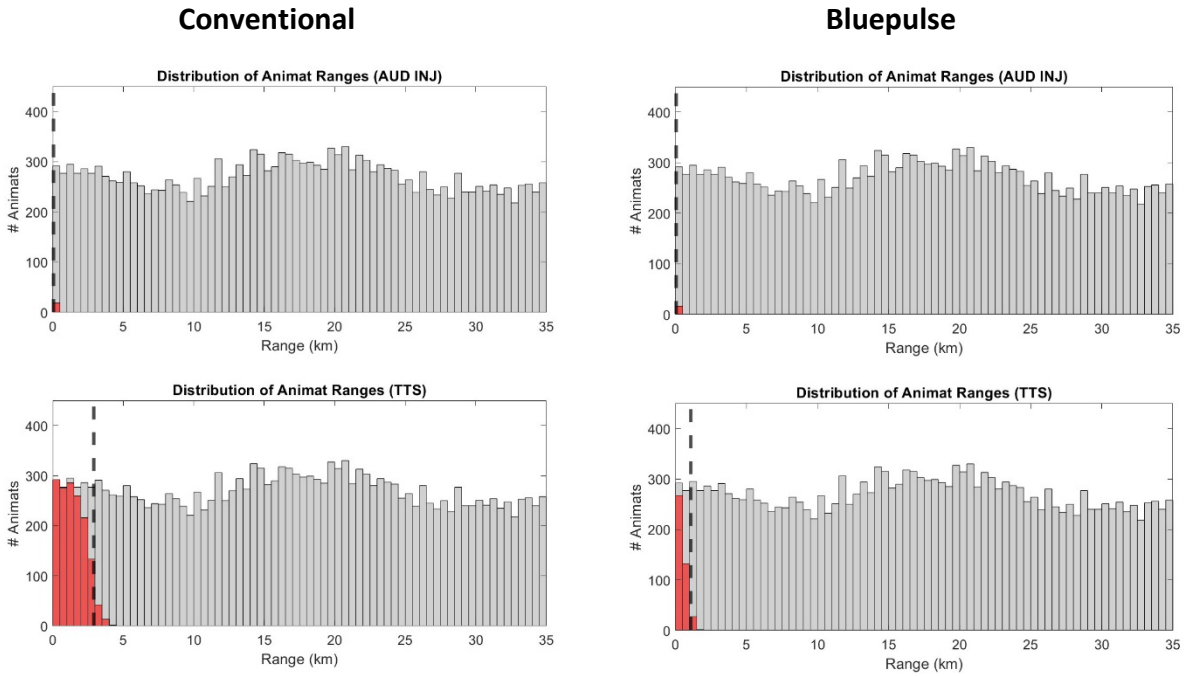

Figure 10.Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale mother with calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

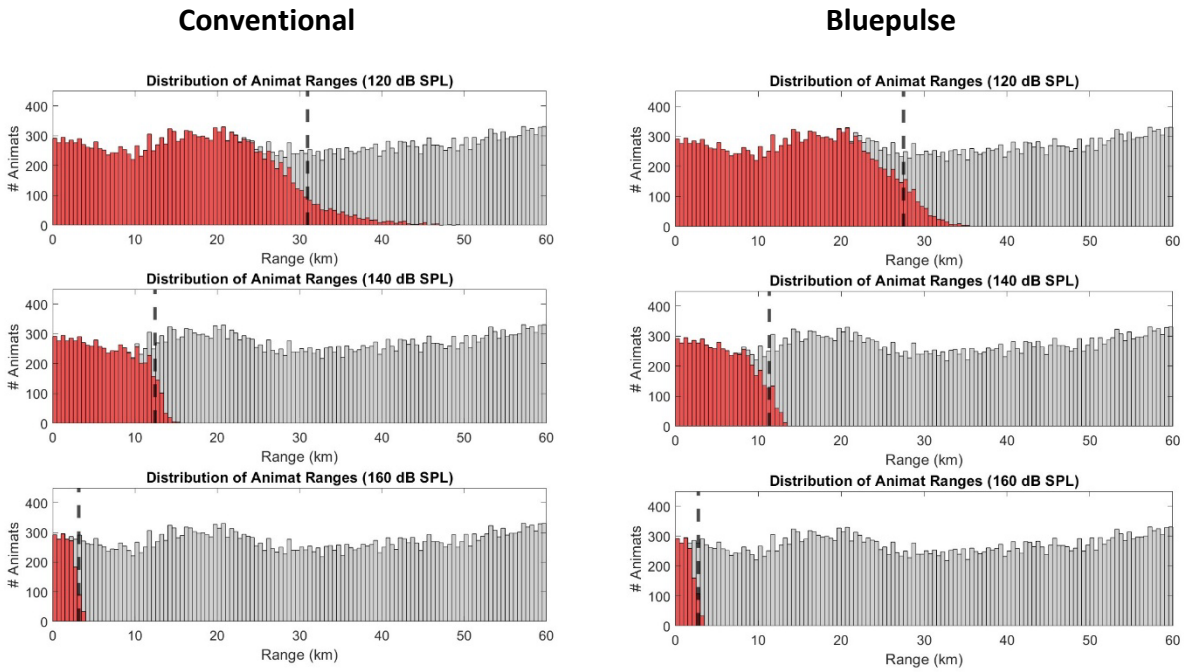

Figure 11. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale mother with calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.1.6 SOUTHERN RIGHT WHALES – FORAGING WITHOUT CALF

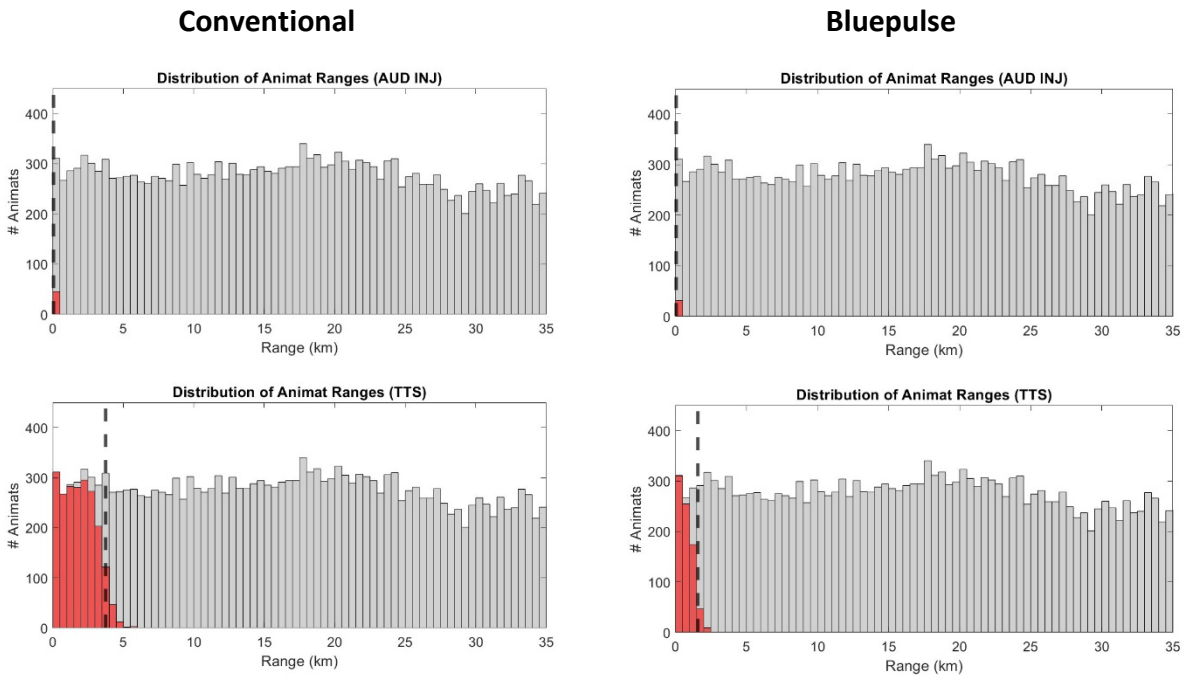

Figure 12. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale adult without calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

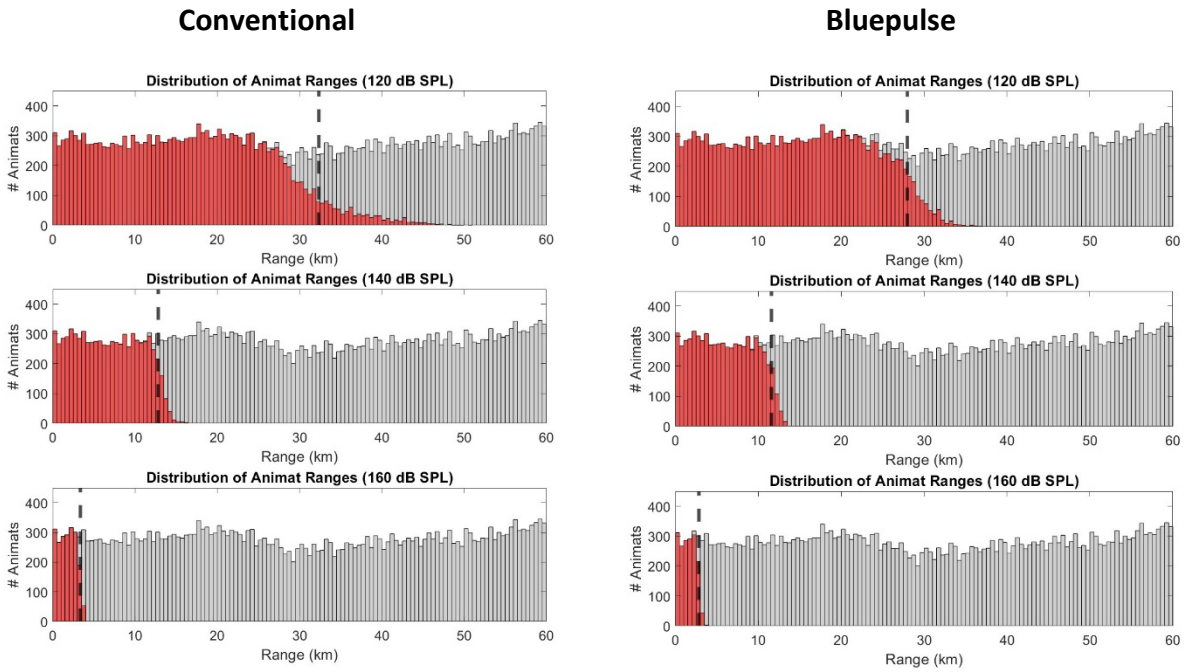

Figure 13. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale adult without calf animats from the source during Scenario C. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.2 SCENARIO D (SITE 7)

7.2.1 PYGMY BLUE WHALES FEMALE

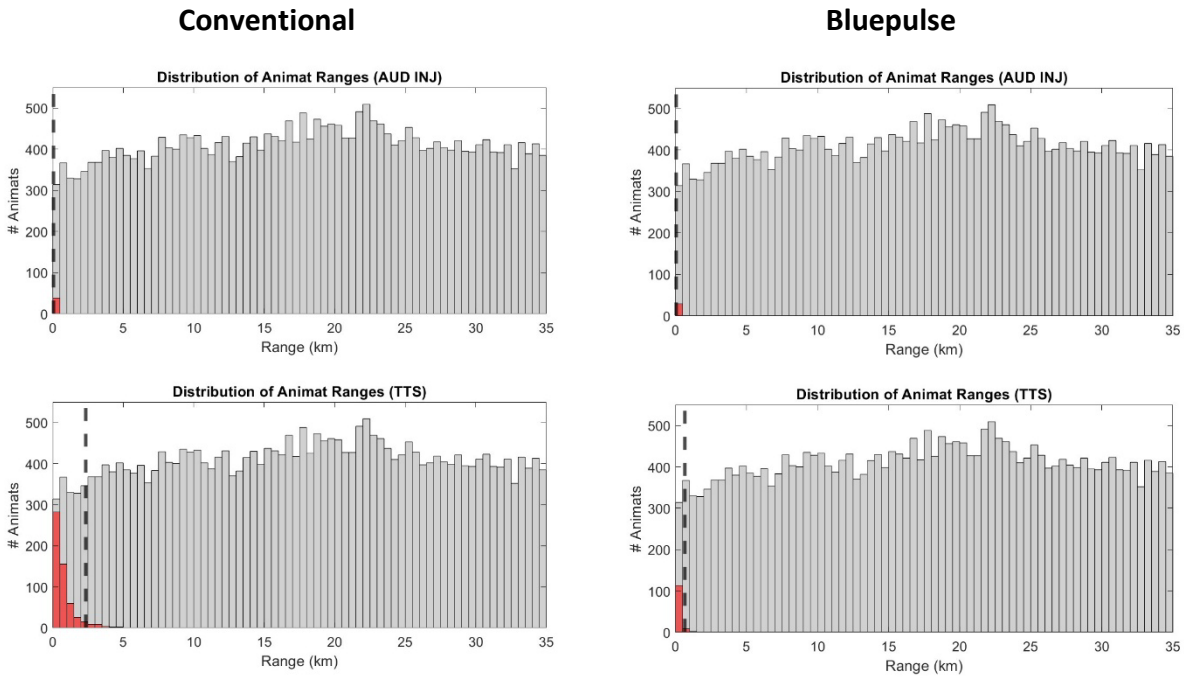

Figure 14. Histograms showing the distribution of ranges (km) of the modeled female pygmy blue whale animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

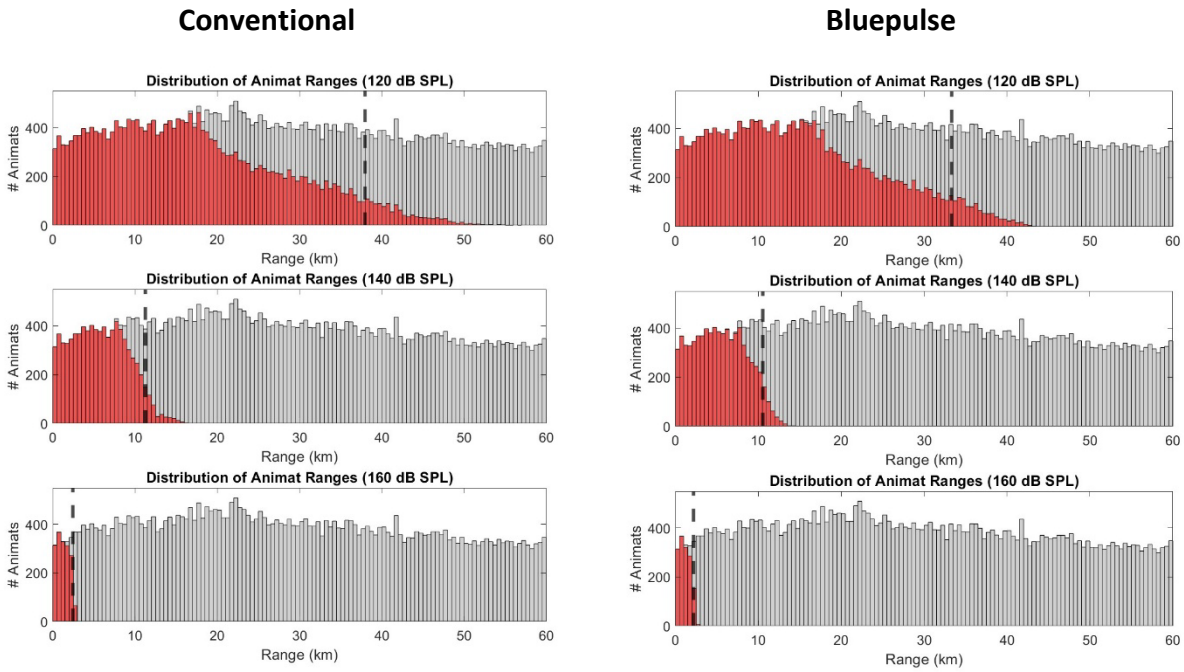

Figure 15. Histograms showing the distribution of ranges (km) of the modeled female pygmy blue whale animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.2.2 PYGMY BLUE WHALES MALE

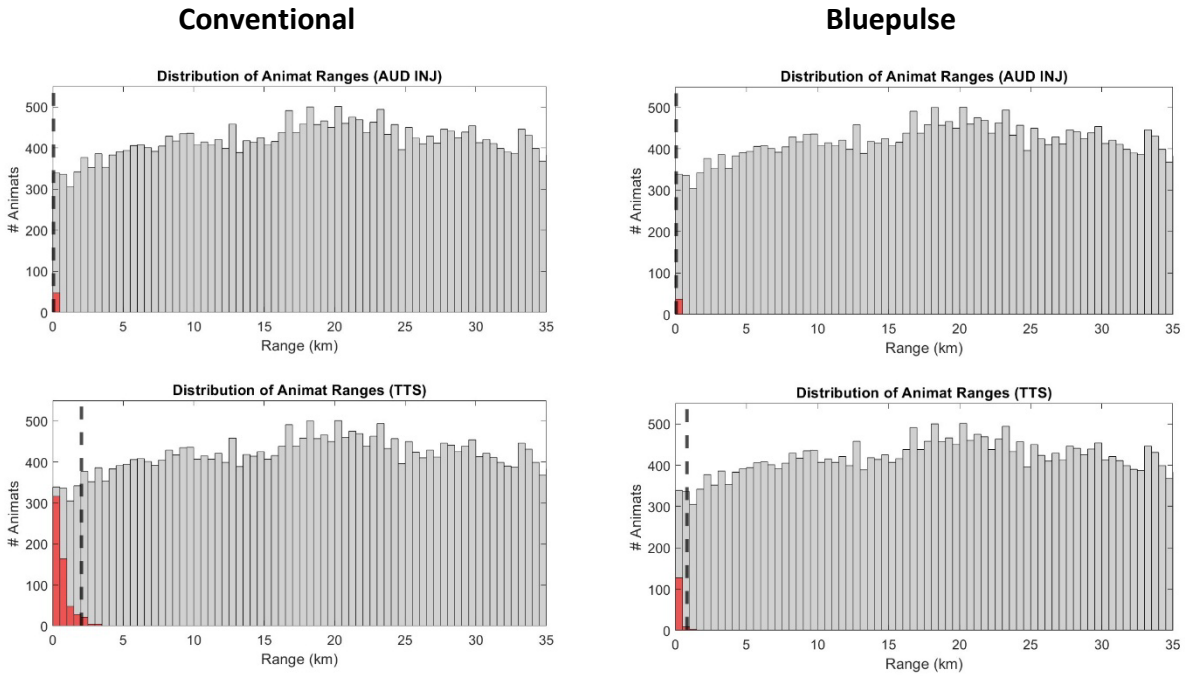

Figure 16. Histograms showing the distribution of ranges (km) of the modeled male pygmy blue whale animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

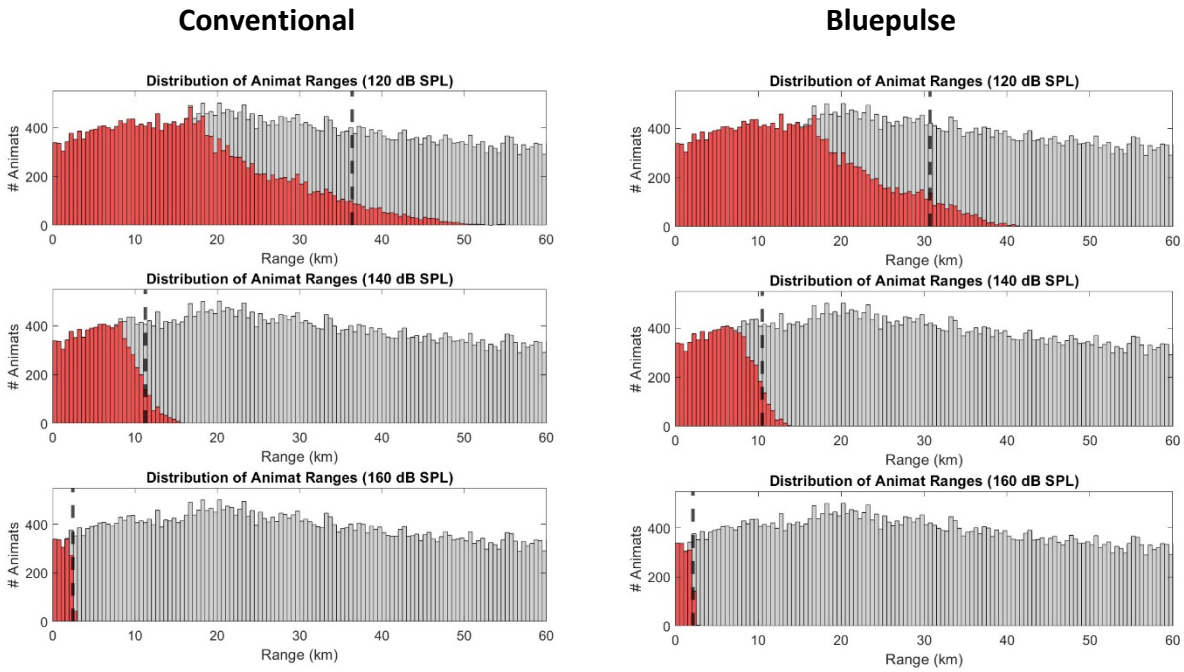

Figure 17. Histograms showing the distribution of ranges (km) of the modeled male pygmy blue whale animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.2.3 SOUTHERN RIGHT WHALES – MIGRATING WITH CALF

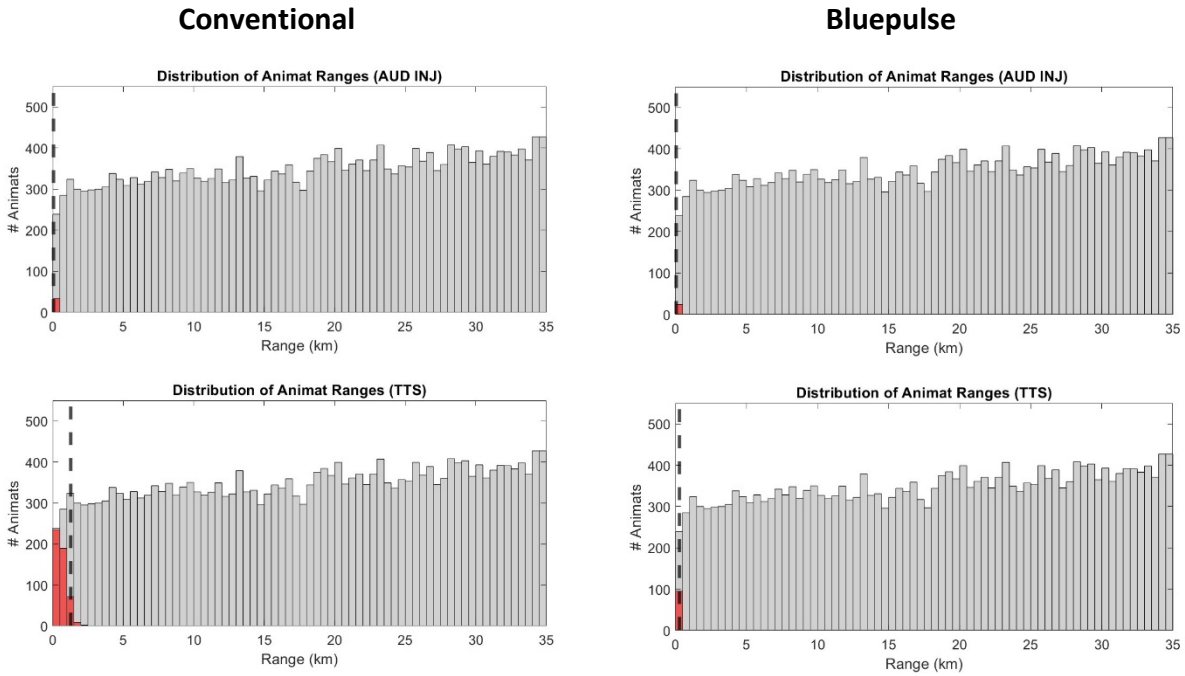

Figure 18. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale mother with calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

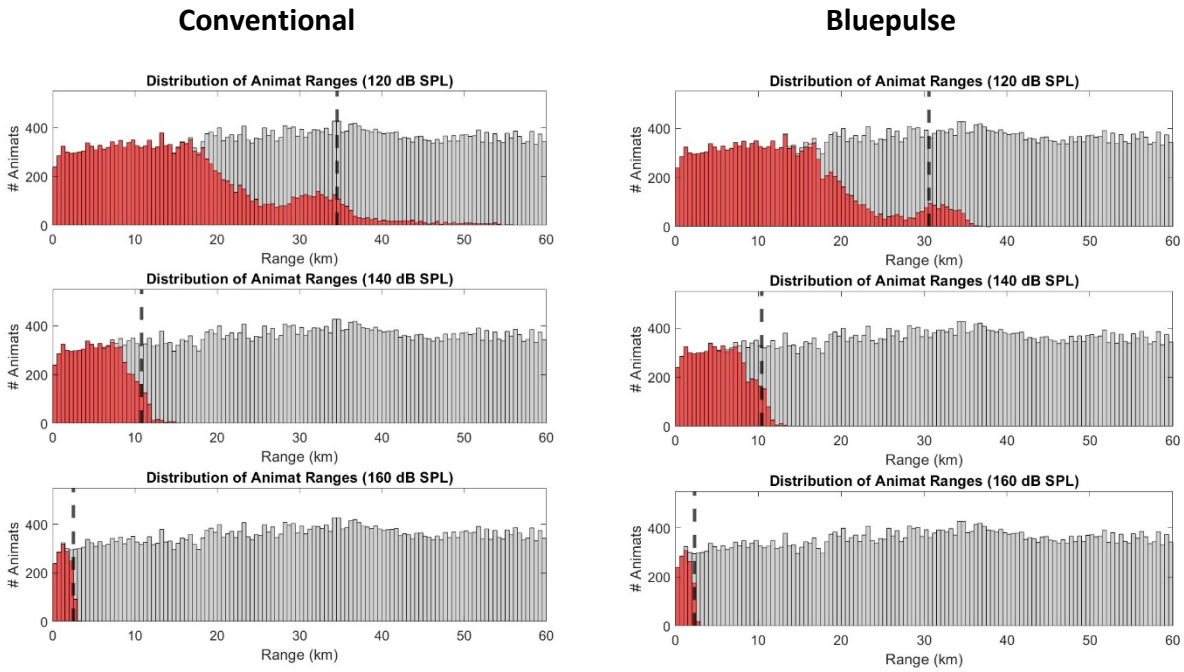

Figure 19. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale mother with calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.2.4 SOUTHERN RIGHT WHALES – MIGRATING WITHOUT CALF

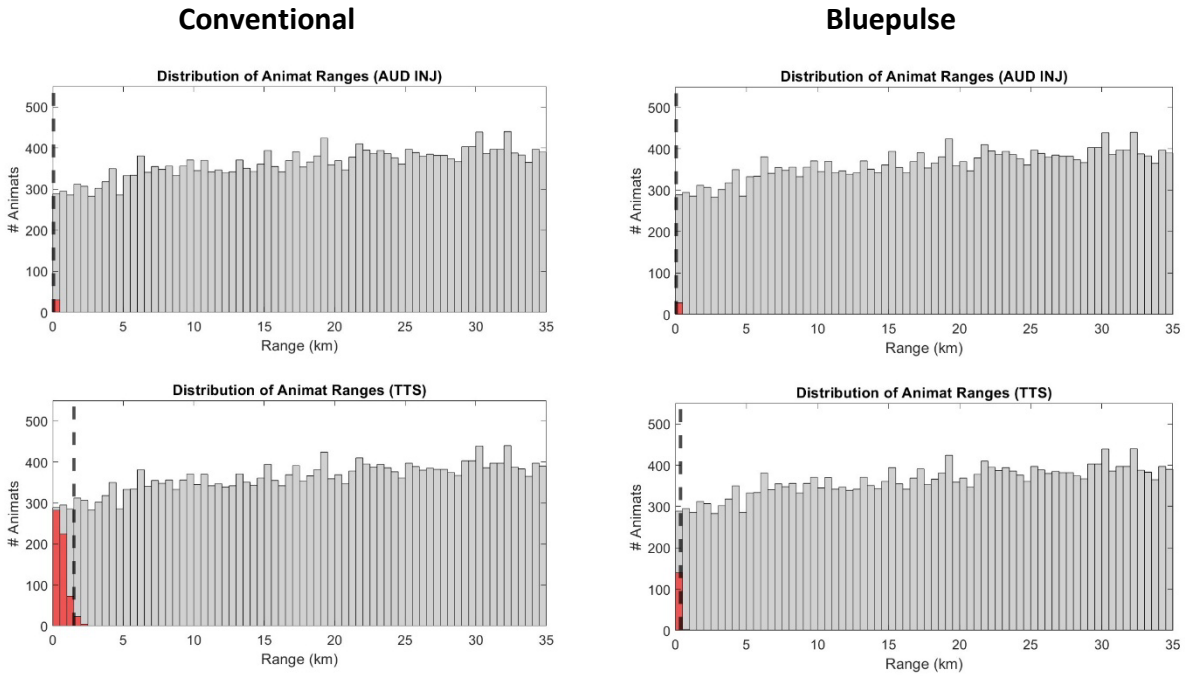

Figure 20. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale adult without calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

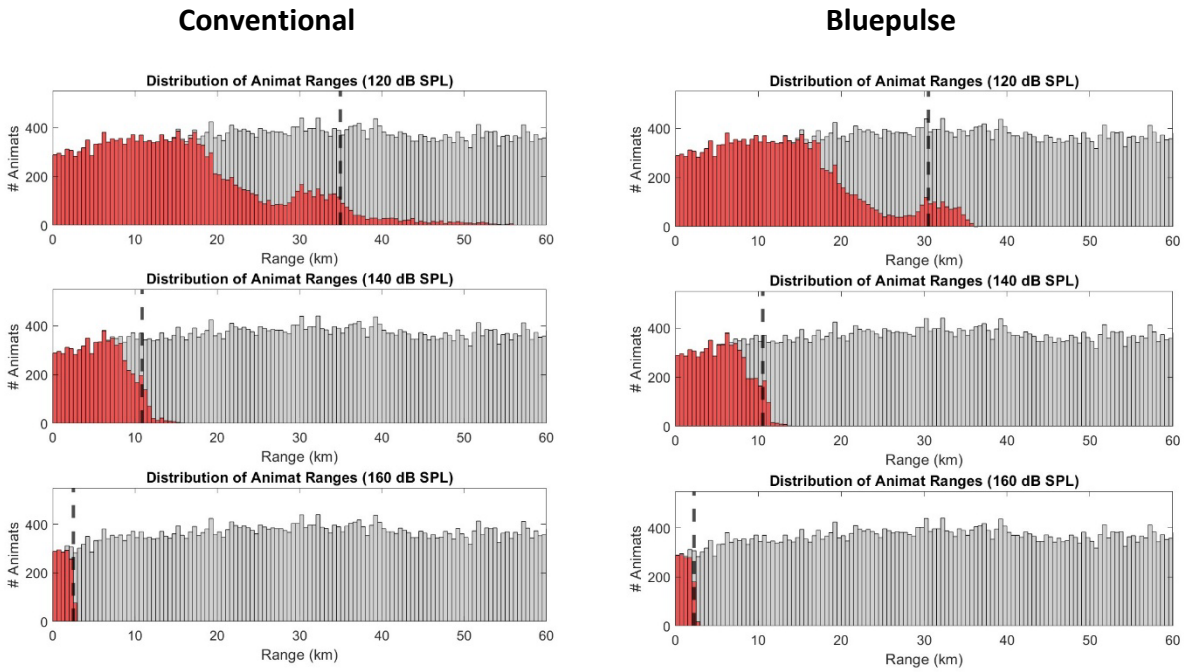

Figure 21. Histograms showing the distribution of ranges (km) of the modeled migrating southern right whale adult without calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.2.5 SOUTHERN RIGHT WHALES – FORAGING WITH CALF

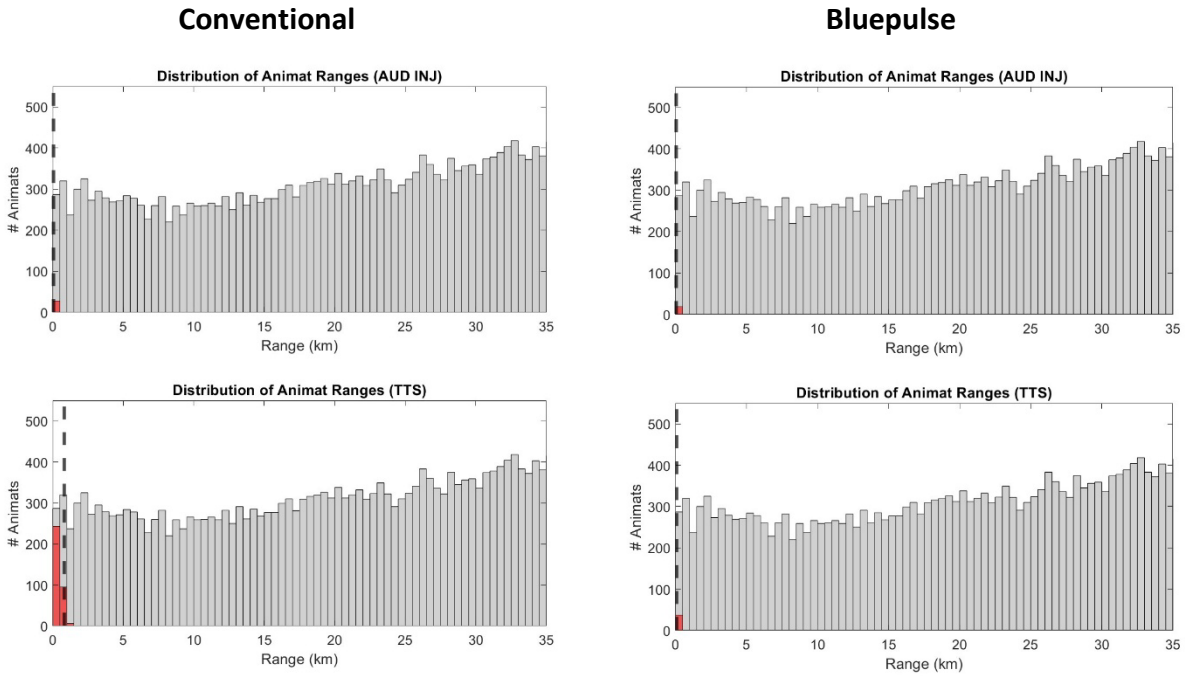

Figure 22.Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale mother with calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

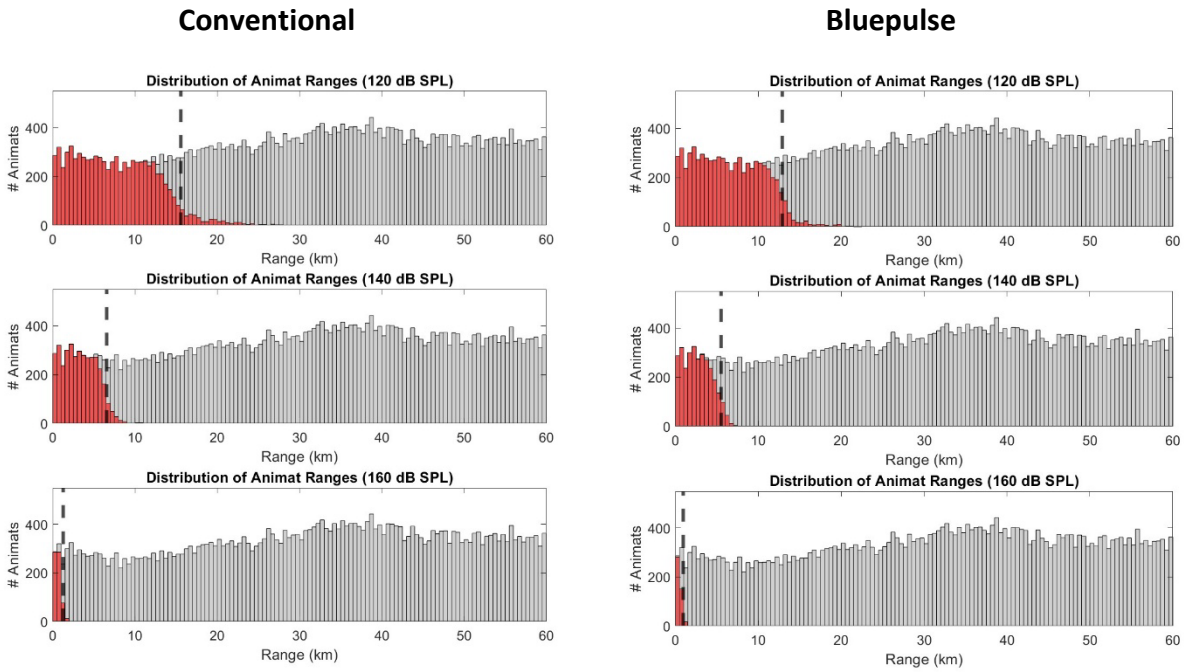

Figure 23. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale mother with calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

7.2.6 SOUTHERN RIGHT WHALES – FORAGING WITHOUT CALF

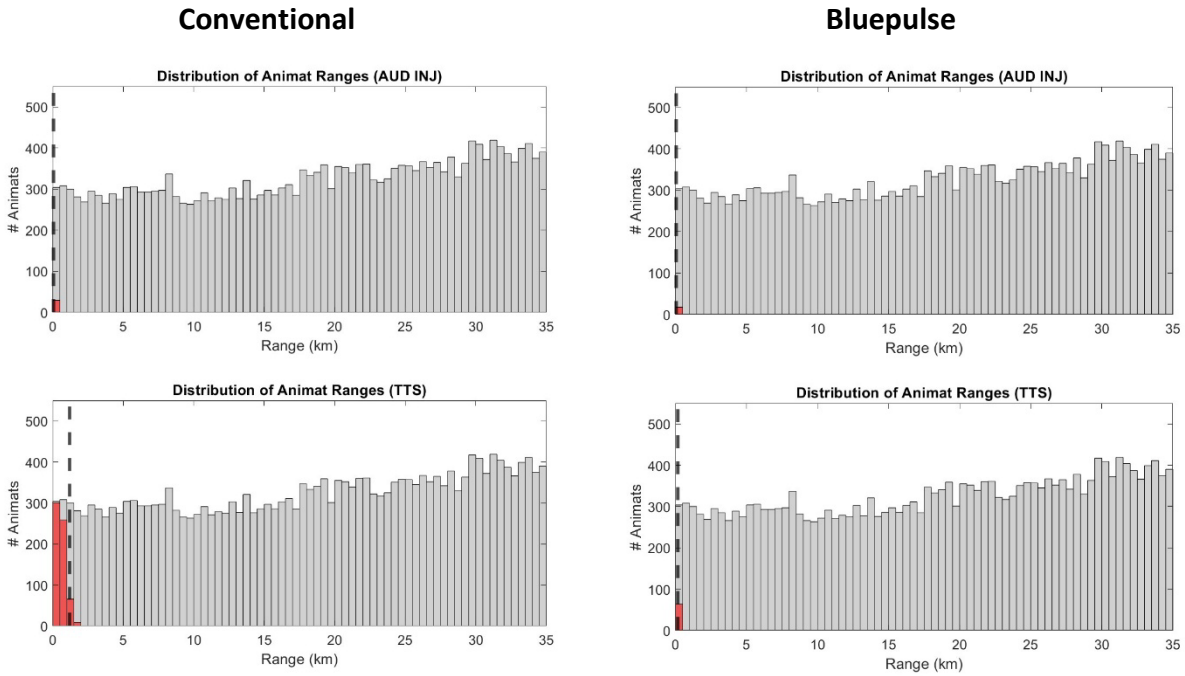

Figure 24. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale adult without calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above AUD INJ (top) and TTS (bottom) SEL thresholds for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

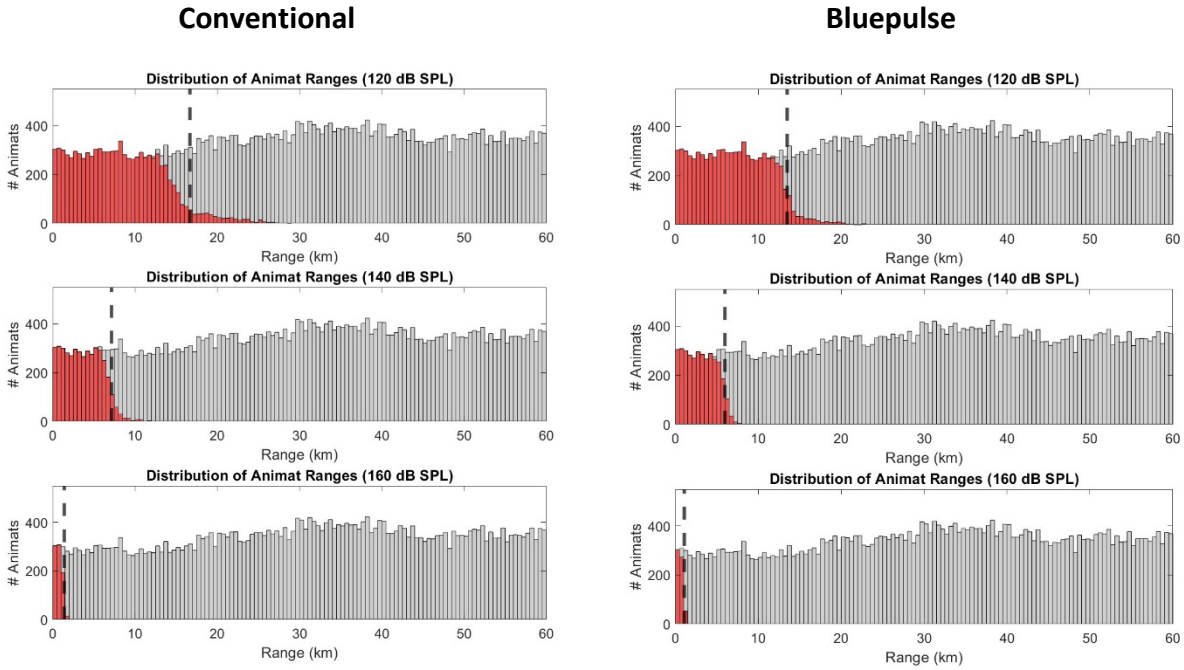

Figure 25. Histograms showing the distribution of ranges (km) of the modeled foraging southern right whale adult without calf animats from the source during Scenario D. Grey bars indicate the closest points of approach of all animats to the source and the red bars indicate the ranges at which the animats were above SPL thresholds of 120 dB (top), 140 dB (middle), and 160 dB (bottom) for the Conventional (left) and Bluepulse (right) airguns. Dotted black line indicates the 95th percentile range reported for this species.

8 DISCUSSION

This study modeled the acoustic impacts of two seismic airgun sources—Conventional and Bluepulse—on two endangered marine mammal species off southeast Australia—pygmy blue and southern right whale—at two different locations (Site 15/ Scenario C and Site 7/ Scenario D). Exposure ranges to AUD INJ SEL and PK, TTS SEL and PK, and SPL (120, 140, 160 dB) thresholds were modeled for each species' animats and for both seismic sources for both scenarios.

For pygmy blue whales, the 95th percentile exposure ranges for AUD INJ SEL and PK, TTS SEL and PK, and the three SPL thresholds were greater when the Conventional airgun was operating than when the Bluepulse airgun was operating for both Scenario C and D. Additionally, as expected, TTS SEL exposure ranges for both scenarios were larger than AUD INJ SEL, AUD INJ PK, and TTS PK ranges (Scenario C: at least 30x greater for Conventional, at least 29x greater for Bluepulse; Scenario D: at least 28x greater for Conventional, at least 10x greater for Bluepulse). The largest TTS SEL exposure ranges for female and male pygmy blue whales were 4.195 km and 4.322 km, respectively, when the Conventional airgun was used for Scenario C. AUD INJ PK and TTS PK exposure ranges were relatively similar (within 20 m of each other) between airgun sources for both Scenarios and for male and female pygmy blue whales. For both Scenarios and

airgun type, the exposure ranges were similar between the male and female pygmy blue whale animats (< 600 m difference), except for the SPL 120 dB exposure ranges for Scenario D (> 1.5 km difference for Conventional; > 2.5 km difference for Bluepulse). Lastly, AUD INJ and TTS PK and SEL exposure ranges for male and female pygmy blue whales exposed to either airgun type for both Scenarios were substantially smaller than the exposure ranges to SPL 120 and 140 dB thresholds (120 dB threshold range: 30.704 to 51.773 km; 140 dB threshold range: 10.446 to 18.227 km) and usually smaller than the SPL 160 dB threshold (range: 2.151 to 4.669 km).

Similar 95th percentile exposure range patterns were observed in southern right whales. AUD INJ SEL and PK, TTS SEL and PK, and the three SPL threshold exposure ranges were larger when animats were exposed to the Conventional airgun than the Bluepulse airgun for Scenario C and D. AUD INJ SEL, AUD INJ PK, and TTS PK exposure ranges were similar for all scenarios regardless of southern right whale animat type, airgun type, or Scenario (i.e. site) (ranges were 46 to 77 m for AUD INJ SEL, 23 to 69 m for AUD INJ PK, and 38 to 77 m for TTS PK). Unsurprisingly, AUD INJ SEL and TTS SEL exposure ranges were larger than AUD INJ PK and TTS PK exposure ranges for all animat types; however, AUD INJ SEL exposure ranges were only slightly larger than AUD INJ PK exposure ranges (< 25 m difference). The largest exposure ranges were TTS SEL exposure ranges for Scenario C, which ranged from 1.087 to 3.754 km. Additionally, AUD INJ SEL, TTS SEL, and all three SPL threshold exposure ranges were larger for migrators than foragers likely because they're spending more time at depth than the foragers. Lastly, the SPL 120 dB threshold exposure ranges were at least 10x greater than the SPL 160 dB exposure ranges for each animat scenario.

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APPENDIX A: ANIMAT MODELING PARAMETERS

A-1. Parameters that Define Animat Movement in AIM

Animals move through four dimensions: three-dimensional space and time. Several parameters are used in AIM to produce simulated movements that accurately represent expected real animal movement patterns. This section provides short descriptions of the various parameters, with nominal values as examples of how the parameters are implemented in AIM. When scientific papers or reports contain numeric descriptions of movement behaviors (e.g., dive times), these numeric values are added to the MAI Animat Movement Library. This compendium of movement values for each marine mammal species is then interpreted by a MAI subject matter expert to derive a set of summary values that represent each species/modeling group/behavioral state.

A-2. Marine Mammal Diving Patterns

Diving parameters, such as time limits, depth limits, heading variance, and speed, are specified for each animat in the AIM model (Figure A-1). As an example, a dive pattern is presented that consists of a shallow, respiratory sequence (Figure A-1) followed by a deeper, longer dive (bottom row of Figure A-1). The horizontal component of the dive is handled with the "heading variance" term, which allows the animal to change course up to a certain number of degrees at each movement step. For this example, the animal can change course 20° during a shallow dive and 10° during a deep dive (Figure A-1). Using the defined diving parameters, AIM generates realistic dive patterns (Figure A-2).

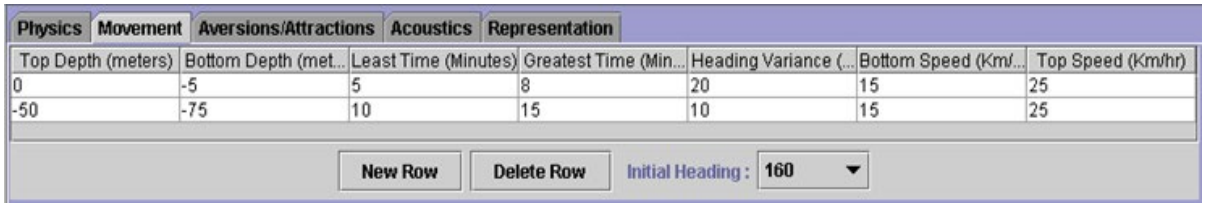

Figure A-1. Example of AIM marine mammal movement parameters, with the top row showing the parameters of a shallow, respiratory dive (diving from surface to 5 m for 5 to 8 min) and the bottom row showing a deeper, longer dive (diving between 50 and 75 m for 10 to 15 min).

A-3. Aversions

In addition to movement patterns, animats can be programmed to avoid certain environmental characteristics (Figure A-3). For example, aversions can be used to constrain an animal to a particular depth regime. (e.g., an animat can be constrained to waters between 2,000 and 5,000 m deep). An animat will continue to turn until the aversion is satisfied. In this example,

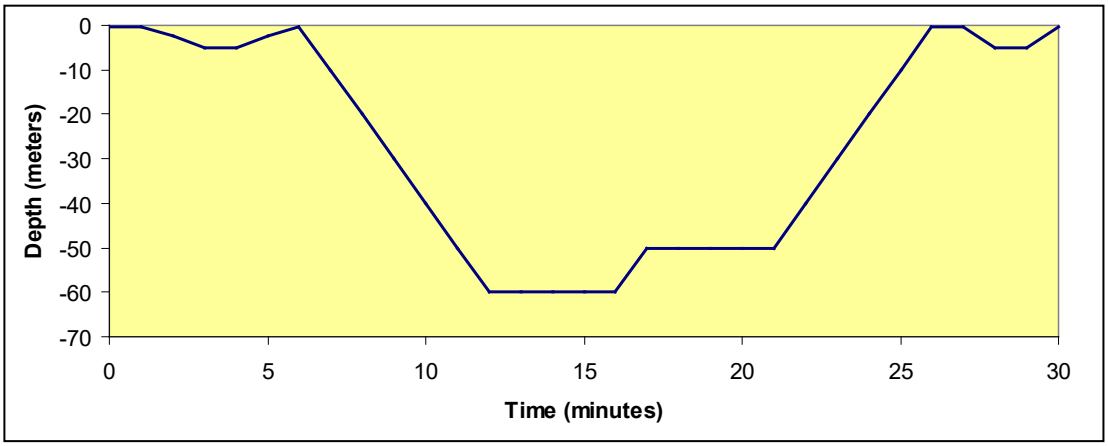

Figure A-2. Marine mammal dive pattern based on animat data in Figure A-1. The animat makes a shallow dive from the surface to 5 m for approximately 6 min, surfaces, and then makes a deep dive to 60 m for about 5 min, changes depth to 50 m for another 5 min, and then surfaces.

animat makes 20° turns in water depths shallower than 2,000 m or deeper than 5,000 m to remain within that depth range.

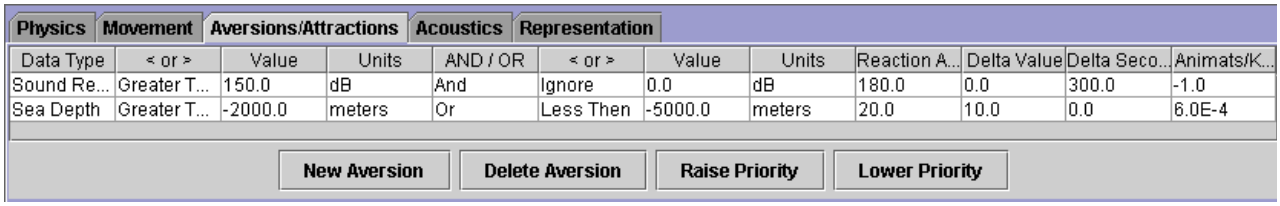

Figure A-3. Example of depth aversion parameters for modeling of marine mammal movements.

A-4. Heading Variance

There is little data that summarizes movement in terms of heading variance, or the amount the course of the animal changes per unit time. Therefore, the default value used in the modeling is 30 degrees. Exceptions are made for migratory animals, which tend to have more linear travel; therefore, these animals typically are assigned a value of 10 degrees. Foraging animals tend to have less linear travel, as they may be trying to remain within a food patch. Therefore, foraging animals are assigned a higher heading variance value, typically 45 to 60 degrees.

These types of data have been reported in the literature as “linearity”, “tortuosity” and “meander” (Soule and Wilcock, 2013). “Meander” is defined as the ratio of the total distance along the smoothed path to the net distance traveled; a value of 1 would indicate a straight path.

A-5. Residency

The amount of time that an animal spends in an area can have a tremendous influence on how the animal samples an acoustic field. For example, individuals displaying high residency in the area of a localized noise source will experience higher exposures than animals that transit once

through that area. However, since the animat exposure models are run for a 24-hour period, in accordance with the NMFS 24-hour reset rule, the effect of residency in animat modeling is minimized.

A-6. Parameters of Marine Mammal Movement Behaviors Used in Impact Analysis

Dive and swim speed information for each marine mammal or marine mammal group is a critical component of accurately and realistically modeling marine mammal movements when assessing potential exposure to underwater acoustic sound. All parameters except speed use a uniform distribution between the minimum and maximum values. Speed parameters include the minimum and maximum as well as the statistical distribution used to select speed values. Options include a normal distribution and a gamma distribution. When gamma distributions are specified, they are typically the result of fitting to an existing dataset. The mean of the normal distribution is also the mean of the minimum and maximum speed. The minimum and maximum values are four standard deviations below or above the distribution mean.

A-7. References

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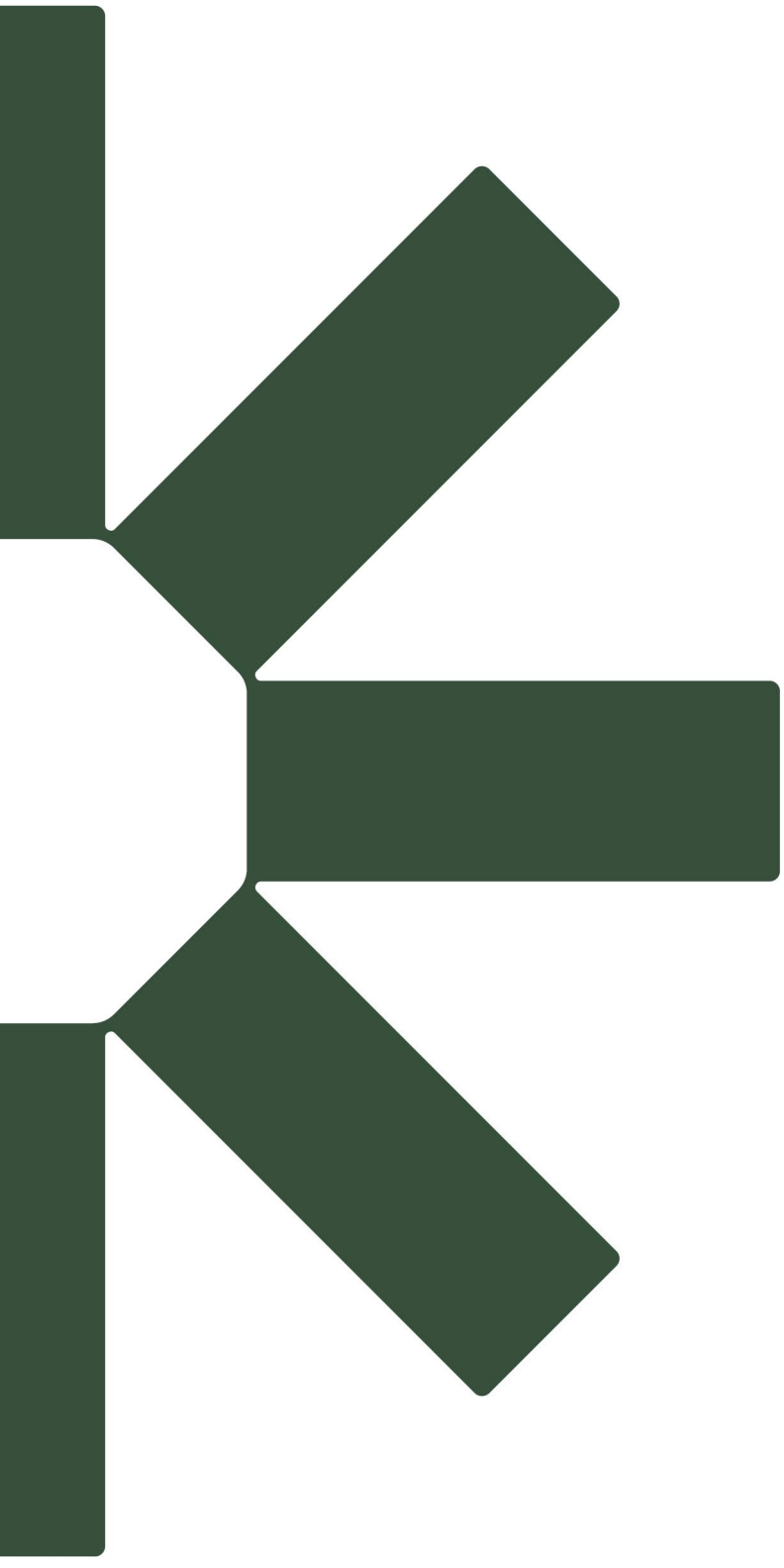

Making Sustainability Happen

REGIA
Marine Seismic Survey

Seismic Studies Summary

Appendix B8: REG-EP-011-B8

Rev 4

December 2025

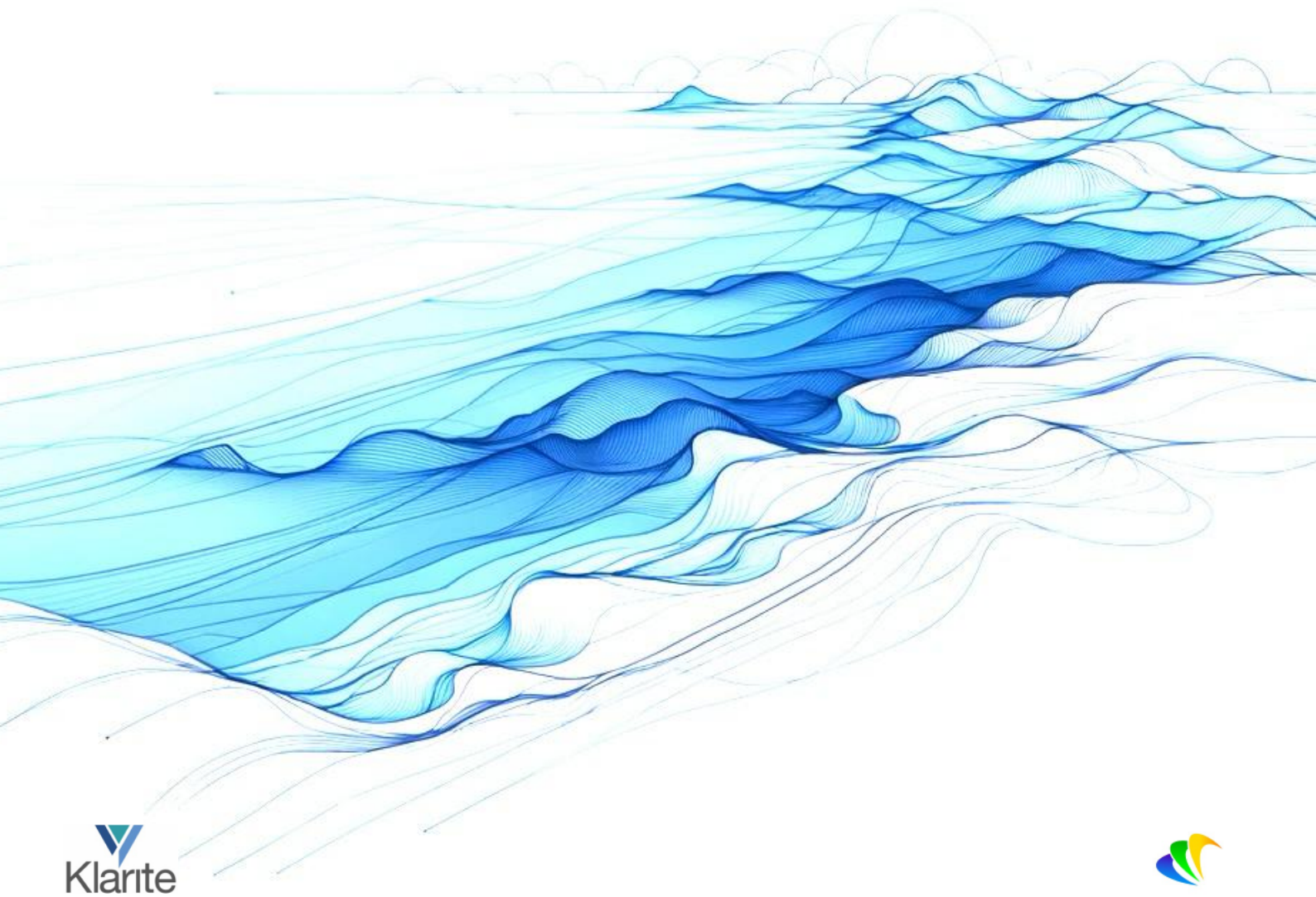

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Table of Contents

1 Introduction ***3***

1.1 Baseline Soundscape in the Otway **3**

1.1.1 Regia MSS Operational Area Soundscape 4

1.2 Overview of Seismic Acoustic Emissions **5**

2 Assessment Input ***8***

2.1 Public Comment **8**

3 Zooplankton (including Fish and Invertebrate Eggs and Larvae) ***8***

4 Invertebrates ***15***

4.1 Crustaceans **15**

4.2 Molluscs **20**

4.3 Corals **24**

5 Fishes ***26***

5.1 Sharks **35**

6 Marine Turtles ***37***

7 Birds ***38***

8 Marine Mammals ***39***

9 Commercial Fishing Catch and Abundance Effect Studies ***47***

10 Scuba Divers and Snorkelers ***50***

11 Acronyms and Abbreviations ***52***

12 References ***53***

Annex 1 ***71***

Objections and Claims Raised from Consultation **71**

1 Introduction

Marine fauna use sound in a variety of functions, including social interactions, foraging, orientation, and responding to predators. The type and scale of effect of seismic sound emissions on receptors depends on several factors including the level of exposure, the physical environment, the location of the receptor in relation to the seismic source, how long the receptor is exposed to the sound, the exposure history, how often the sound repeats (repetition period) and the ambient sound level.

This document provides a summary of the available information that will be used to inform the acoustic impact assessment for the Regia Marine Seismic Survey (Regia MSS).

1.1 Baseline Soundscape in the Otway

Ambient noise in the ocean is the background sound that incorporates the broad range of individual sources, some identified and others not. There are three frequency bands under which different noise sources are generally categorised: low (10 to 500 Hz), medium (500 Hz to 25 kHz) and high (>25 kHz). The low-frequency band is dominated by manmade (anthropogenic) noise sources, with the primary source of low-frequency anthropogenic noise coming from commercial shipping. Seismic exploration also falls under this low-frequency band. Both commercial shipping and seismic sources contribute to ambient noise across ocean basins, as low-frequency sound experiences little attenuation, allowing for long-range propagation. The highest levels of ocean ambient noise within the band of interest (10 Hz to 100 kHz) are seen at low frequencies (Hildebrand 2009) For context and visualisation, Figure B8-1 below provides a general comparison of various sound sources as per their frequency and sound-type (natural, impulsive or continuous).

Because of greater attenuation, medium frequency sound cannot propagate over long distances, and only regional (10s of km distant) sound sources contribute to the ambient soundscape. Breaking waves, sea-surface agitation, spray, bubble formation and collapse, and rainfall are some of the main natural factors contributing to the makeup of ambient noise in the mid-frequency band. Other sources such as military sonars and small vessels also contribute anthropogenic noise at mid-frequencies. At high frequencies, acoustic attenuation becomes extreme so that all noise sources are confined to a localised region in close proximity to a receiver. Thermal noise is the dominant noise source above about 60 kHz (Hildebrand 2009). Other sources that significantly contribute to the natural marine ambient soundscape across all frequency bands include cetaceans, fish, and snapping shrimp.

Ambient sound sources and levels in the Otway Basin have been studied and measured as part of previous impact assessment activities for the petroleum industry. We describe these assessments below.

In a desktop review conducted by McCauley and Duncan (2001) to investigate the underwater sound sources likely to be prevalent in the Otway Basin, they concluded that natural noise sources are dominated by wind, rain, biological sources, and sporadic noise from earthquakes. Anthropogenic noise was found to be mainly derived from vessel traffic, both commercial and small, petroleum production, exploration drilling activities, and sporadic seismic surveys.

Erbe et al. (2016) present some key detections by the Integrated Marine Observing System (IMOS), where underwater sound was recorded in a region south of Portland, Victoria. Leading sound sources identified in these recordings included Antarctic and pygmy blue whales, fin whales, ship noise (at 20-200 Hz), and fish noise (at 1-2 kHz).

A sound monitoring study in the Gippsland Basin, Bass Strait indicated that the primary sources of background noise were wind, rain, and current and wave-associated sound. Considerable variation in background sound was observed at these study locations, but low frequencies reportedly dominated (Przeslawski et al. 2016a).

As part of a study to gain an understanding of the soundscape in the marine environment for a petroleum development project in the Otway, Woodside Petroleum Limited placed a noise logger in a shipping lane approximately 60 km south of Port Fairy, Victoria (Woodside 2003 cited in Beach 2024). This part of the study was conducted between November 2001 and March 2002 with the following results observed:

- Regular transiting of boats.
- Regular fish choruses throughout the dawn, day, and evening.
- Persistent blue whale calling that spanned several hours.
- Whale-calls from at least three other whale species.
- Baseline broadband underwater noise for the duration of the test was between 93 and 97 dB 1 µPa. Shipping increased the average noise level to above 105 dB re 1 µPa for 6% of the duration during which the logger was deployed.

JASCO Applied Sciences (Australia) recently conducted a study for Beach Energy Ltd with the aim of providing an acoustic characterisation of the offshore petroleum activity (drilling) and associated vessel activity within the Otway Basin. Results from a recorder stationed farthest from the rig (25 km) indicated median broadband ambient noise was 104.5 dB re 1 μ Pa, with a mean of 118.3 dB re 1 μ Pa, Noise levels ranged between 86.6 dB re 1 μ Pa, and 153.6 dB re 1 μ Pa (Beach 2024).

1.1.1 Regia MSS Operational Area Soundscape

In addition to natural sources of ambient sound as described previously, there are also anthropogenic activities that are expected to emit sound in the Regia MSS Operational Area. Sources of anthropogenic sound known to occur in this region of the Otway Basin include both permanent and temporary activities such as shipping traffic, commercial fishing and recreational activities, petroleum development/production and exploration-drilling activities and sporadic petroleum seismic surveys.

The nearest point sources of industrial noise are associated with existing offshore gas fields. These include the Beach Energy Otway Development which comprises subsea infrastructure and the Thylacine-A unmanned platform. and also, the Cooper Energy Casino Henry Netherby Development consisting of subsea infrastructure (Appendix B12 MAP-REG-EPM-082). Across an entire gas exploration program of which the Regia MSS is one component, there is the potential for sound-emitting exploration and development activities such as infrastructure maintenance and repairs, seabed surveys, seismic surveys, drilling, and installation of infrastructure using vessels and drill rigs, all in support of ongoing energy supply of gas and potentially renewables within the Otway Basin.

The main shore-based sources of industrial noise are at Portland (Victoria), where the Alcoa Aluminium Smelter operates, and the Port of Portland which handles the import and export of bulk commodities.

Noise will be generated from two primary sources during the Regia MSS: the survey vessel, and the active sound source. The active sound source typically generates much higher noise levels than the survey vessels and is predicted to dominate overall underwater sound emissions at times when data acquisition is occurring. The frequency of the sound produced from each seismic pulse is primarily less than 2 kHz, with the highest levels at frequencies in the range of 10-500 Hz (McCauley 1994). This frequency band is notably comparable with that described by Erbe et al. (2016) to have been related to ship noise at the IMOS site at Portland, Victoria.

While the soundscape will be altered during the Regia MSS, this effect is transient and will cease once the MSS is completed. Sound levels will return to natural levels with no expected lasting or long-term changes. While the change to ambient sound has been assessed as minor and, temporary, a change to the ambient soundscape nevertheless has the potential to impact several biological receptors. Impacts to these biological receptors from underwater sound have been assessed independently in appendices E2-E7.

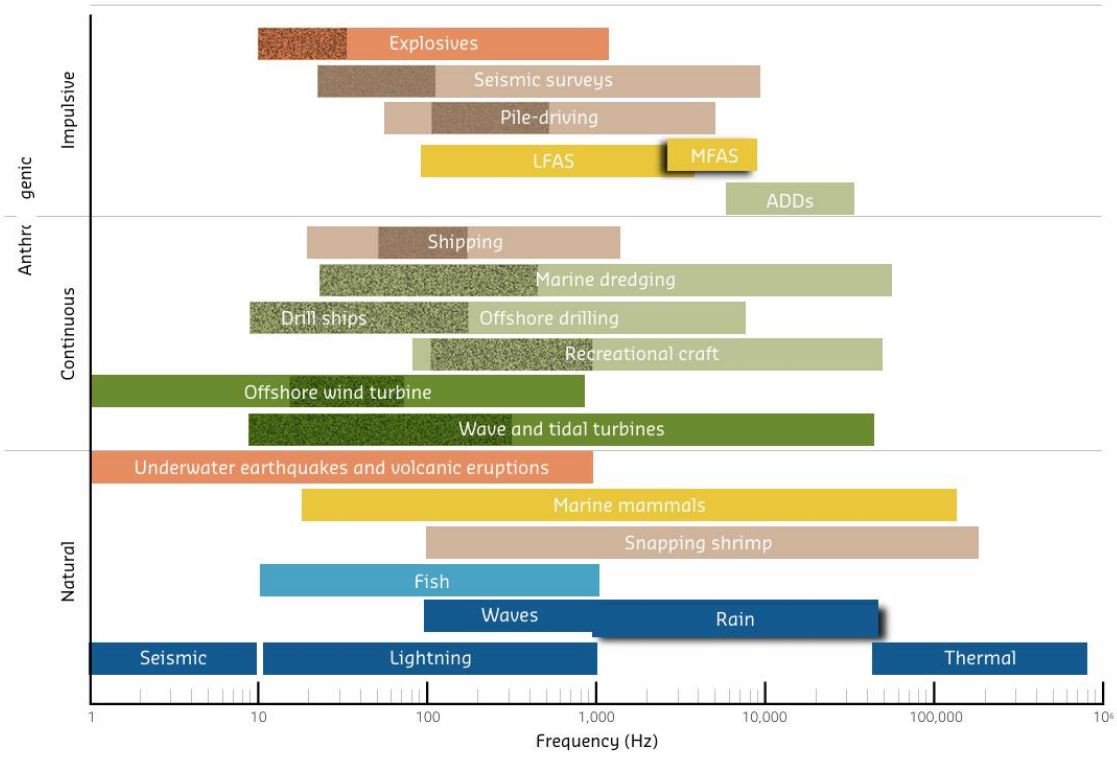

Figure B8-1: Comparison of sound sources, where the order shows the relative sound pressure levels (dB) of the noise sources and the colour code allows comparison of the levels between categories: orange (represents the highest dB level) to dark blue (represents lowest dB level). The areas with hatching indicate the frequency range with most energy. MFAS = medium frequency active sonar, LFAS = low frequency active sonar, ADD = acoustic deterrent device (Thomsen et al. 2021).

1.2 Overview of Seismic Acoustic Emissions

When underwater objects vibrate, they create sound-pressure waves that alternately compress and decompress the water molecules as the sound wave travels through the sea. Sound waves radiate in all directions away from the source like ripples on the surface of a pond. The compressions and decompressions associated with sound waves are detected as changes in pressure by the receiver.

Sound moves at a faster speed in water than in air because the mechanical properties of water differ from air. The reference level used in air (20µPa @ 1m) was selected to match human hearing sensitivity. A different reference level is used for underwater sound (1µPa @ 1m). Because of these differences in reference standards, noise levels cited in air do not equal underwater levels.

The energy, or intensity (loudness) of a sound is measured on the decibel (dB) scale. It takes about 61.5 times more energy to transmit a sound through air than through water. Because of this energy difference, there is a 61.5 dB difference between sounds transmitted through air and water, such that a sound intensity of 120 dB in water would be equivalent to an intensity of about 60 dB in air (Webb 2023).

Impulsive underwater acoustic emissions will result from the seismic source releasing compressed air (seismic pulse) that creates a sound wave that is directed downwards into the seabed.

Underwater acoustic emissions from a seismic source are characterised by high energy pulses of low frequency sound. The frequency of the sound produced from each seismic pulse is primarily less than 2 kHz, with the highest levels at frequencies in the range of 10-500 Hz (McCauley 1994).

The rate of sound attenuation from the seismic source is dependent on local sound propagation characteristics, including seawater temperature and salinity profiles, water depth, bathymetry and the geoacoustic properties of the seabed (McCauley 1994). While the seismic pulses are directed downwards, horizontal propagation may be detected over long distances due to the high intensity and low frequency properties of the sound.

Sound travels as a wave with the amplitude of the wave related to the amount of acoustic energy it carries. Figure B8-2 shows a representative sound wave and the sound metrics used in this studies summary. Table B8-1 provides definitions of the sound metrics and other sound related terms used in this studies summary.

The particle motion component of sound is also relevant to the assessment of potential impacts to marine fauna. Acoustic particle motion refers to the physical motion caused by a sound wave within the water, seafloor or other medium. Unlike pressure, particle motion is directional in nature, although the actual to-and-fro particle displacements that constitute sound are extremely small, in the order of nanometres (Popper & Hawkins 2018). Particle motion can be described in terms of particle displacement (m), velocity (m/s), or acceleration (m/s-2) (Popper et al. 2014; Carroll et al. 2017). Alternatively, it is sometimes expressed in dB with respect to a reference value of displacement (dB re 1 pm), velocity (dB re 1 nm/s) or acceleration (dB re 1 $\mu m/s^2$) (Nedelec et al. 2016).

Particle motion is important because marine invertebrates and most fishes are primarily sensitive to particle motion rather than sound pressure and, therefore, particle motion is the most relevant metric for perceiving underwater sound by invertebrates and most fish species (Popper & Hawkins 2019). It is of less importance to marine mammals as evolution of the mammalian ear operating in air has led to a greater dependence on pressure for hearing sound (Finneran et al. 2002). There is currently limited information available to quantify the particle motion sensitivity of fishes and invertebrates. It is complex and challenging to directly measure particle motion compared to sound pressure, hence most research is presented in the context of sound pressure or exposure levels instead of particle motion (Carroll et al. 2017; Popper & Hawkins 2018).

It should be noted that particle motion is most relevant close to the source where it is the dominant component of a sound wave (i.e., in the near field), while pressure will dominate a sound wave propagating over distance (i.e., in the far field) (Radford et al. 2012; Morley et al. 2014; Nedelec et al. 2016; Popper & Hawkins 2018). Sound pressure levels received at increasing distance from a source do not, therefore, provide a reliable representation of particle motion. Organisms that are sensitive only to particle motion have typically been found to be sensitive only at close range where these particle motions are greatest (Popper et al. 2014; Edmonds et al. 2016; Popper & Hawkins 2018).

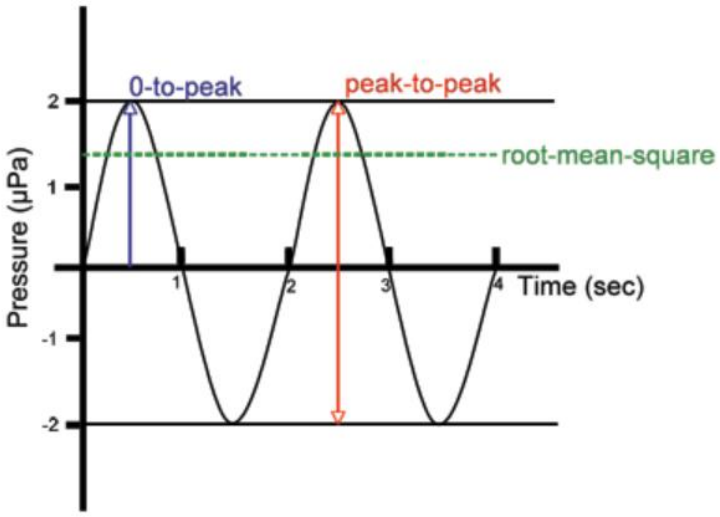

Figure B8-2 - Simplified Sound Wave and Sound Pressure Metrics (DOSITS 2023)

Table B8-1 - Underwater Sound Terminology

Term	Definition
0-to-peak or Peak sound pressure level (PK)	The peak pressure, also called the 0-to-peak pressure, is the range in pressure between zero and the greatest pressure of the signal. It is represented by PK and the unit dB re 1 µPa and summarised as dB PK.
Peak-to-peak sound pressure level (PK-PK)	The peak-to-peak pressure is the range in pressure between the most negative pressure and the most positive pressure of the signal. It is represented by PK-PK and the unit dB re 1 µPa or dB re 1 µPa2m2 and summarised as dB PK-PK.
Permanent threshold shift (PTS)	Permanent loss of hearing sensitivity at certain frequencies caused by excessive sound exposure.
Received sound level	The sound level measured at a receiver.
Root mean square sound pressure level (RMS)	The root-mean-square pressure is the square root of the average of the square of the pressure of the sound signal over a given duration. It is represented by sound pressure level (SPL) and the unit dB re 1 µPa and summarised as dB SPL.
Sound exposure level (SEL)	A measure of the sound energy that considers both received level and duration of exposure. SEL is specified in terms of either single pulse (SEL) or a defined accumulation period (SEL_{cum}). For this assessment 24 hrs is used for the accumulation period and is shown as SEL24h. Units are dB re 1 µPa2 s or dB re 1 µPa2m2s.
Source sound level	The sound pressure level or sound exposure level measured 1 metre from a theoretical point source that radiates the same total sound power as the actual source.
Temporary threshold shift (TTS)	Temporary loss of hearing sensitivity at certain frequencies caused by excessive sound exposure.

2 Assessment Input

2.1 Public Comment

The completed EP was published for public comment on the NOPSEMA website on 25 Jan 2024 for a 30-day period, closing 26 February 2024. Table B8-2 shows how this feedback has been incorporated into the environmental assessments.

Table B8-2 - Public comment input into the preparation of the EP

Matter	Matter ID	Changes made arising from public comment
Matter: Research on impacts of anthropogenic noise on marine mammals.	M11	CGG has considered these claims and has updated the EP Seismic Studies Report (Appendix B8) Section 8.

3 Zooplankton (including Fish and Invertebrate Eggs and Larvae)

This section summarises the published studies in relation to seismic acoustic emission studies on plankton and fish and invertebrate eggs and larvae. Plankton is a collective term for all marine organisms that are unable to swim against a current. This group is diverse and includes phytoplankton (plants) and zooplankton (animals), as well as fish and invertebrate eggs and larvae.

Some zooplankton can sense pressure changes to some degree. Swim bladders may also develop during the larval stages of some fish species, rendering larvae susceptible to pressure-related injuries such as barotrauma (Popper et al. 2014). Data on the effects of sound upon eggs and larvae containing gas bubbles is, therefore, largely focused on barotrauma rather than actual hearing. Very few publications have considered the effects of particle motion or vibration on plankton (Popper et al. 2014).

Few studies have found significant negative impacts on zooplankton, fish eggs, larvae, or fry, and most have reported that impacts occur within a few metres or tens of metres from the source (Kostyuchenko 1973; Dalen & Knutsen 1987; Holliday et al. 1987; Kosheleva 1992; as cited in Parry et al. 2002; Pearson et al. 1994; Turnpenny & Nedwell 1994; Booman et al. 1996; Payne et al. 2004; Payne et al. 2009). These studies included exposures to sound pressures up to approximately 242 dB SPL. Larval stages of fish are often perceived to be more sensitive to stressors than adult stages, but exposure to seismic sound does not appear to result in any differences in larval mortality or abundance for fishes, crabs, or scallops (Carroll et al. 2017).

Kostyuchenko (1973) found up to a 17% increase in mortality of fish eggs of various species exposed to a seismic source, but no effect beyond 10 m. Kosheleva (1992; as cited in Turnpenny & Nedwell 1994) also reported that eggs and larvae died within 1 m of a seismic source producing sound pressures of 220-240 dB SPL, but no injuries were reported at greater distances. Dalen and Knutsen (1987) exposed eggs, larvae and post-larval stages of cod exposed to seismic source elements with source levels of 222 – 231 dB SPL at 1 m. At ranges of 1 – 10 m from the source, some specimens indicated temporarily impaired balance following exposure but with rapid recovery. Mortality was only observed in just one of the three exposure experiments, with 90% mortality when exposed at 2 m from the seismic source, but no significant impacts at 6 m from the seismic source. Overall, there was no significant change in the survival of eggs.

Holliday et al. (1987) obtained mixed results during studies undertaken over a two-year period, with eggs and larvae exposed to sound pressures of 221 – 235 dB SPL at 1.5 m from a seismic source. Either no significant impact was observed or a 9% reduction in the survival of eggs. Pearson et al. (1994)

reported no effects to crab larvae exposed to sound pressures up to 231 dB SPL at 1 m from a seismic source. Booman et al. (1996) exposed fish eggs and larvae to sound pressures of 220 – 242 dB SPL. High rates of mortality were observed at distances of 1.4 m from the seismic source, but low or no mortality rates at distances of 5 m.

In a review of the above studies, Payne et al. (2004) noted that injury and mortality to eggs and larvae is likely to be limited to within 5 m of the seismic source. Payne et al. (2009) found no statistical differences between controls and exposed larvae following exposure to mean sound pressure levels of 205 dB PK-PK, positioned 0.5 m from the seismic source element.

Parry et al. (2002) undertook studies on the effects of a marine seismic survey on scallop fisheries in Bass Strait, including on larvae. This study was undertaken in December 2001 and February 2002 during a 3D marine seismic survey undertaken by Esso Australia in the Gippsland Basin, which used a 3,542 m^3 source towed 6 m below the sea surface. Plankton samples (impact and duplicate) were collected from five sites located 500 m apart in water depths of 55 m in a Before-After-Control-Impact (BACI) experimental study. The study results found few bivalve larvae in the live plankton samples and there was no significant difference in the number of bivalve larvae found in samples collected before and after passage of the seismic vessel (the same was true for all planktonic taxa). Parry et al. (2002) postulated that invertebrates that do not contain gas spaces (like swim bladders in fish) appear to be very resilient to seismic pulses. The research also notes that while the study does not exclude the possibility that some changes to planktonic communities resulted from the seismic survey, the failure to detect any impacts occurred because impacts were small. Parry et al. (2002) also indicated there is no evidence of mortality-associated population effects such as reduced abundance in plankton a few hours after exposure.

Pearson et al. (1994) exposed crab larvae to single pulses from a seismic source array (840 m^3) with a measured sound pressure level of 231 PK-PK at 1 m. For immediate and long-term survival and time to moult, this study did not reveal any statistically significant differences between the exposed and unexposed larvae, even those exposed within 1 m of the seismic source.

Impacts to scallop larvae have been identified following intense and lengthy periods of exposure to low-frequency sound. Tank experiments by Aguilar de Soto et al. ((2013)) showed evidence of morphological abnormalities in early-stage scallop larvae from simulated seismic signals for a 6,920 in^3 seismic source. However, the lengthy exposure period of 3 second pulse intervals for an exposure duration of 90 hours and at 1 m distance from sound source is not realistic of an actual survey. Christian et al. (2003) found major developmental differences between control and treatment groups of snow crab eggs exposed to a peak pressure level of 216 dB SPL every 10 seconds for 33 minutes. Again, the exposure to a constant peak pressure level for a prolonged period is not realistic of an actual survey where the source is moving and so does not remain in one place.

Hawkins (2014) used continuous sonar to record zooplankton layers, comprising copepods, cladocerans, decapod larvae, gastropod larvae, and bivalve larvae, exposed to playback of pile driving sound (pile driving sound typically has a more rapid rise time, more frequent strike rates and therefore a greater sound exposure regime than a seismic survey). Zooplankton layers responded to sound by showing a 'dent' in the top of the layer at the onset of the sound sequence, although the change in depth often did not persist for the whole duration of the sound exposure and zooplankton distribution quickly returned to normal.

Day et al. (2016a) found no effects on the mortality, abnormality, competency, or energy content of lobster larvae after exposure of early embryonic stages to seismic exposure. In this study, egg-bearing female southern rock lobsters (*Jasus edwardsii*) were exposed to signals from three air gun configurations, all of which exceeded sound exposure levels (SEL) of 185 dB re 1 $\mu Pa^2 \cdot s$ (209-212 dB PK-PK). Lobsters were maintained until their eggs hatched and the larvae were then counted for fecundity, assessed for abnormal morphology using measurements of larval length and width, tested for larval competency using an established activity test and measured for energy content. Overall, there were no differences in the quantity or quality of hatched larvae, indicating that the

condition and development of spiny lobster embryos were not adversely affected by air gun exposure. Day et al. (2016a) detailed that the results suggest that embryonic spiny lobster are resilient to air gun signals and highlight the caution necessary in extrapolating results from the laboratory to real world scenarios or across life history stages.

Based on the studies discussed above, physical impacts to planktonic organisms have typically been found to be limited to within approximately 10 m of the seismic source. Using this 10 m impact range, a study by McCauley (1994) calculated the impact in a seismic survey area, assuming plankton mortality of 100% within 10 m of a seismic source. This suggested that the total mortality due to seismic testing would impact less than 1% of plankton in the survey area. DNV Energy (2007) and Hawkins & Popper (2012) conducted comprehensive reviews of a number of scientific studies, including those by Kostyuchenko (1973), Dalen & Knutsen (1987), Booman et al. (1996) and Saetre & Ona (1996); the effects of seismic activities on eggs and larvae were predicted to result in average and worst-case mortality rates of 0.0012% and 0.45% per day respectively, which were not deemed significant when compared to a natural mortality rate of 5-15% per day, as applicable to most species during early life stages. Natural mortality rates in larvae can be much higher than this—exceeding 50% per day in some species and commonly exceeding 10% per day (Tang et al. 2014). For example, in a review of mortality estimates (Houde & Zastrow 1993), the mean mortality rate for marine fish larvae was M = 0.24, a rate equivalent to a loss of 21.3% per day.

In 2014, noise effect criteria for fish eggs and larvae were established by the American National Standards Institute (ANSI) accredited report of sound exposure guidelines for fishes and sea turtles (Popper et al. 2014). The criteria from Popper et al. (2014) are from an offshore pile driving study by Bolle et al. (2012) that indicated no damage was caused by simulated repeated pile driving (100 strikes at 100 m) of 210 dB SEL_{cum}. Popper et al. (2014) also detailed that other studies suggest that eggs and larvae in proximity (<5 m) to a seismic source are likely to suffer mortality and tissue damage (Kostyuchenko 1973; Booman et al. 1996). Sætre and Ona (1996) concluded that mortality rates caused by exposure to seismic source sounds are so low compared to natural mortality that the impact from seismic surveys must be regarded as insignificant.

However, a study by McCauley et al. (2017) received notable attention for suggesting the potential for zooplankton mortality to increase two- to three-fold out to 1.2 km from a single seismic source element, with an estimated decline in zooplankton abundance of up to 64% and a “hole” in the zooplankton backscatter observed via acoustic detection methods. The 1.2 km range corresponded with pressure levels of 178 dB PK-PK (McCauley et al. 2017). However, the extent of such impacts is inconsistent with previously and subsequently documented effects to plankton.

The findings of this study have been questioned by several reviews (Richardson et al. 2017; IAGC 2017; Fields et al. 2019) particularly in relation to:

- There was no evidence of attenuation of impacts with distance from the source with no consistent decline in the proportion of zooplankton that were killed with increasing distance from the source.
- Sonar backscatter data indicated an immediate decline in zooplankton abundance (the “hole” in the data). However, if the zooplankton had been killed, they would not have sunk from the surface layers of the water column immediately, suggesting that some zooplankton may have moved, or they may have simply reorientated themselves to the sonar in response to the seismic pulses, which raises questions over the occurrence, magnitude, and extent of mortal impacts.
- The study was based on a relatively small number of tow samples on two separate days. On the second day, even before the use of the seismic source element, the zooplankton net tow abundance counts were significantly lower than the first day and, therefore, it is difficult to draw reliable conclusions from these data. On the second day almost all values at 80 m range presented greater plankton abundance from exposed samples and lower

abundance of control samples, indicative of a potential flaw in the sampling scheme and analysis protocol.

The McCauley et al. (2017) study was undertaken in early March 2015, using two replicated experiments in Storm Bay in southeast Tasmania. It involved the deployment of acoustic noise loggers to measure air gun signals and used an acoustic source volume of 150 in^3 and operating pressure of 2,000 psi. The study measured zooplankton abundance and the proportion of the population that was dead at three distances from the acoustic source - 0, 200 and 800 m. The experiment estimated the proportion of the zooplankton that was dead, both before and after exposure to acoustic source sound, using net samples to measure zooplankton abundance, and bioacoustics to identify the distribution of zooplankton. In this study, copepods dominated the mesozooplankton (0.2-20 mm), and impacts were not assessed on microzooplankton (0.02-0.2 mm) or macrozooplankton (>20 mm). There was movement of water through the experimental area, which made interpreting their results more difficult (Richardson et al. 2017).

The results of the experiment found that zooplankton exposure to acoustic sources increased the mortality rate from a natural level of 19% per day to 45% per day (on the day of exposure), with this mortality rate observed out to 1.2 km. This is more than two orders of magnitude greater than the 10 m previously assumed (McCauley et al. 2017). These results escalated the concerns that some stakeholders had about the effects of marine seismic surveys on plankton, particularly fishers and conservation groups.

This study postulates that the external sensory hairs that zooplankton possess may be extremely sensitive and in response to seismic sound, may 'shake' to the point where damage could accrue to sensory hairs or tissue. Importantly, the study notes that for anthropogenic sources to have significant impacts to plankton at an ecological scale, the spatial or temporal scale of the impact (i.e., the seismic survey) must also be large when compared to the impacted ecosystem.

In response to this research, the Australian Petroleum Production and Exploration Association (APPEA) commissioned the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to assess the potential local and regional impacts on zooplankton of a typical marine seismic survey. A large-scale marine seismic survey conducted on the North West Shelf of Australia was modelled in a hydrodynamic model using the McCauley et al. (2017) results, as reported in Richardson et al. (2017). The modelled survey parameters include a survey area of 2,900 km^2, 60 survey lines, waters 300 - 800 m deep, an acoustic source of 3,000-3,200 m^3 and operating pressure of 2,000 psi. This paper reports that impact is recorded within the survey area and within 15 km of it, but that these impacts are not discernible at the bioregional scale and barely discernible within 150 km of the survey area. Zooplankton populations recovered quickly after seismic exposure due to their fast growth rates and due to the dispersal and mixing of zooplankton from both inside and outside of the impacted region. The modelling undertaken by Richardson et al. (2017) found that while there was a maximum decline of 22% in zooplankton populations in the survey and a 14% decline within 15 km of the survey area, it took only three days following the completion of the survey for zooplankton biomass to recover to pre-seismic survey levels within the survey area and within an area of 15 km around the survey area. The study notes that because zooplankton growth rates are slower in colder regions (e.g., Bass Strait), the recovery rate of zooplankton populations following exposure to a seismic survey is likely to be slower in colder waters. It is important to note that Fields et al. (2019) and IAGC (2017) noted that the findings of McCauley et al. (2017) (which were used in Richardson et al. 2017) may provide an overly conservative estimate of the potential effects of seismic pulses to zooplankton.

Independently of the APPEA/CSIRO study, the International Association of Geophysical Contractors (IAGC) conducted its own review of the McCauley et al. (2017) study. This review came to the following conclusion: "*While we found the study interesting, we are also troubled by the small sample sizes, the large day-to-day variability in both the baseline and experimental data, and the large number of speculative conclusions that appear inconsistent with the data collected over a two-day period.*

Both statistically and methodologically, this project falls short of what would be needed to provide a convincing case for adverse effects from geophysical survey operations." (IAGC 2017).

An assessment of zooplankton was undertaken to determine pre- and post-seismic survey abundance of zooplankton at sites within CarbonNet's Pelican Marine Seismic Survey area in the Gippsland Basin and at reference sites during January and February 2018. Pre-seismic survey plankton samples collected were dominated by copepods, cladocerans and salps while post-seismic survey plankton samples were dominated by the dinoflagellate *Noctiluca scintillans*. Other groups present included siphonophores, fish larvae, fish eggs, polychaetes, ghost shrimps and cnidarians. There was variance between and within assessments, with samples exhibiting levels of diversity and abundance typical of healthy temperate coastal waters. Neither lobster nor scallop larvae were present in any of the samples assessed (CarbonNet 2018).

A study by Fields et al. (2019) exposed the copepod (*Calanus finmarchicus*) to seismic pulses at various distances up to 25 m from a seismic source. The source levels produced were estimated to be 221 dB SEL comparable to the far-field source levels associated with some commercial scale seismic surveys. The study observed an increase in immediate mortality rates of up to 30% of copepods in samples compared to controls at distances of 5 m or less from the seismic source. Mortality one week after exposure was significantly higher by 9% relative to controls in the copepods placed 10 m from the seismic source. Fields et al. (2019) also reported that no sublethal effects occurred at any distance greater than 5 m from the seismic source. The findings of the study are consistent with numerous other field studies, as referenced previously, indicating that the potential effects of seismic pulses to zooplankton are limited to within approximately 10 m from the seismic source. Fields et al. (2019) detailed that it is difficult to reconcile the high mortality reported by McCauley et al. (2017) with the low mortalities reported in the body of earlier studies and in the experiment they undertook. Fields et al. (2019) details that it is possible that their results can be attributed to *C. finmarchicus* having a high tolerance to air gun impulses and that other species would be more sensitive. Other possible causes for the high mortality observed by McCauley et al. (2017) could be bubbles because of cavitation or small-scale shear produced by the sampling boat, unrelated to the air gun impulses.

Day et al. (2021, 2022) undertook a study to determine whether early development and recruitment of southern rock lobsters puerulus and juveniles might be affected by exposure to seismic sound by assessing mortality rates following exposure; impairment of the righting reflex, and development through assessment of progression through the moult cycle. This study also undertook to respond to the finding by McCauley et al. (2017) of increased mortality in zooplankton following exposure to air gun signals that suggests that planktonic, early life stages of marine invertebrates may be more vulnerable than adults or developing embryos. Outcomes of this study are detailed in the section below on crustaceans.

Vereide et al. (2023) conducted a field experiment to assess mortality and naupliar body length of the calanoid copepod (*Acartia tonsa*) when exposed to an air gun array discharge. The air gun array treatment consisted of two 40 in^3 air guns fired at a pressure of 110 bar every 10 seconds for three hours. The air gun array was towed at 2 knots at a depth of 3–4 m along an oval transect (3 nm in total) by the research vessel *H.U. Sverdrup II*. The vessel sailed between 50 m and 1,220 m from the line holding the bags. During the boat control treatment, *H.U. Sverdrup II* followed the same transect without discharging the air guns. The boat control treatment was included to control for the sound generated by the vessel itself.

The sound exposure level (SEL) was 152 dB re 1 μPa^2 s furthest away and 183 dB re 1 μPa^2 s at the closest distance. Nauplii were placed in plastic bags and attached to a line at a depth of 6 m. For each treatment, three bags of nauplii were exposed to one of three treatments for 2.5-hours: Air gun array discharge, a boat control, or a silent control. After exposure, nauplii were kept in filtered seawater in the laboratory without food. The immediate mortality was significantly higher in the air gun array treatment than in the silent and boat control treatments. On average, 13.5 ± 3.8% of the nauplii in the air gun array exposed treatment died immediately after exposure, compared to 3.4 ±

1.3% in the silent control and 2.6 ± 1.7% (mean ± SD) in the boat control. There was a significant difference in delayed mortality between the treatments. On days 1 and 2 after exposure, nearly all of the nauplii from the control groups were alive, while 27.0 ± 14.2% and 14.8 ± 14.2% of the air gun array exposed nauplii had died in the aliquots from day 1 and day 2, respectively. Mortality started occurring from day 3 (5.7 ± 10.1%, boat control) and 4 (9.4 ± 14.4%, silent control) in the control treatments but with lower mortality than in the air gun array exposed treatment (day 3, 47.5 ± 19.2% dead nauplii). In the aliquots from days 5 and 6 after the treatments, almost all of the air gun array exposed nauplii were dead, in contrast to the control groups, in which the proportion of dead nauplii was 49.2 ± 12.0% on day 5, and 72.6 ± 21.8% day 6 in the silent control and 4.0 ± 10.1% on day 5 and 48.4 ± 17.9% on day 6 in the boat control.

There was a significant interaction between treatment and time (days) on the body length (µm) of the nauplii, with lower growth from day 1–4 in the air gun array exposed treatment than in the control treatments. On day 1 after treatment, the average body length was 125 ± 10 µm. After four days, the average body length in the air gun array exposed nauplii was 128 ± 7 µm, which differed from the silent control (144 ± 8 µm) and the boat control (146 ± 7 µm). Over the first four days after exposure, the growth rates were 1.7 (4.1% in total), 5.4 (12.5%), and 6.1 per day (18.7%) in the air gun array exposed, silent control, and boat control, respectively. Naupliar development stages (NI–NIV) were positively correlated with body length (µm). In all treatments, >50% of the nauplii reached stage NII one day after exposure. By day 4, 43 ± 26.9% of the air gun array exposed nauplii were still in NI, compared with 11 ± 12.7% in the silent control and 1 ± 3.6% in the boat control. Only four individuals reached stage NIV: 3 in the silent control and 1 in the boat control.

Immediate mortality in the air gun array exposed nauplii was approximately 14% compared to less than 4% in the silent and boat control. Similarly, there was higher mortality in the air gun array exposed nauplii up to six days after exposure compared to the control treatments. Nearly all of the air gun exposed nauplii were dead after four days, while >50% of the nauplii in the control treatments were alive at six days post-exposure. There was an interaction between treatment and time on naupliar body length, indicating lower growth in the nauplii exposed to the air gun discharge. These experiments indicate that the output of two small air guns affected mortality and growth of the naupliar stages of *Acartia tonsa* in close vicinity to the array.

Vereide et al. (2023) concluded:

- The results of this study suggest that air gun array discharges affected the growth and mortality of *Acartia tonsa* in early naupliar stages. However, the degree of impact is likely to be stage- and species-specific and may be difficult to separate from background mortality.
- The results observed are consistent with many previous studies that show small effects of air gun discharges on zooplankton mortality. For example, no effects were detected in bivalve larvae sampled 2 km away from the source after exposure to air gun discharges (Parry et al. 2002) or in adult scallops sampled up to 1 km from the source shortly after exposure (Harrington et al. 2010). Similarly, Fields et al. (2019) reported that the mortality of the copepod *Calanus finmarchicus* adults to a two air gun array discharge increased (<5%) compared to that of the control groups, but only at <10 m from the air guns and no effects at distances from 10 to 50 m.
- There were notable differences in these results from previous studies. For example, in contrast to Fields et al. (2019), this study found significantly higher mortality in the exposed animals compared to the controls at distances of 50–~1,200 m. Although the sound exposure levels were higher in Fields et al. (2019) than those in this study, the animals in this study were exposed to multiple air gun discharges that resulted in a cumulative exposure that lasted much longer. The cumulative exposure of multiple blasts coupled with the younger stage used in this study may help to explain the higher mortality.

- Despite the higher mortality, the immediate mortality observed in this study is much lower than the 50% mortality in zooplankton at >1 km from the source (McCauley et al. 2017). Even though the absolute immediate mortality was lower than that reported by McCauley et al. (2017), the relative increase in mortality compared to the controls was somewhat greater in this study (greater than three-fold increase) than in McCauley et al. (2017) (two-to three-fold increase). However, in McCauley et al. (2017), the mortality in the controls was ~20% compared to less than 4% in this study.
- In this study, the mortality rate in nauplii directly after exposure was lower than the natural mortality rates observed in *Acartia* nauplii (up to 0.35 per day), although this is dependent on temperature, season, and region (Elliott & Tang 2011). This indicates that the population-level effect of air gun exposure might not be detectable from the background mortality.
- The air gun array exposed nauplii grew less and developed slower over four days than the boat and silent control groups. The slower development in the air gun array treatment nauplii was correlated with decreased growth. The progression through developmental stages and increase in body length observed in the control groups in our study is more similar to the development of naturally observed in *Acartia tonsa* nauplii cultured in 10–15° C water than is the development in the air gun array exposed nauplii. Slowed or arrested development at naupliar stages can reduce fitness or cause death. Thus, mortality could be affected long after seismic exposure. The population-level effects that this might have are uncertain.

4 Invertebrates

Research is ongoing into the relationship between sound and potential effects on benthic invertebrates, including the relevant metrics for both effect and impact. Marine invertebrates lack a gas-filled bladder and are unable to detect the pressure component of sound waves (Parry & Gason 2006; Carroll et al. 2017) or "hear" sound in the way that mammals and fish can. Instead, invertebrates detect sound by sensing the particle motion component of sound in water and seabed sediments through physiological structures such as sensory hairs, statocysts and muscles, and therefore detect sound at close range (McCauley 1994; Parry & Gason 2006; André et al. 2016: Roberts et al. 2016: Edmonds et al. 2016: Carroll et al. 2017: Popper & Hawkins 2018). Statocysts, found in a wide range of invertebrates, are utilised by animals to maintain their orientation, direct their movements through the water and may play a key role in controlling the behaviour responses of invertebrates to a wide range of stimuli. Although directly sensitive to particle motion and not to sound pressure, most available research on seismic impacts to invertebrates characterises received sound levels in terms of the sound pressure. Therefore, available literature suggests particle motion, rather than sound pressure, is a more important factor for benthic invertebrates such as crustacean and molluscs.

A range of physiological responses have been identified in some studies; however, the received sound levels are typically at levels that would be received within tens or a few hundred metres from the sound source or have been from repeated exposure at the same sound levels, which is not typical of an actual seismic survey (Carroll et al. 2017; Edmonds et al. 2016; Salgado Kent et al. 2016; Webster et al. 2018).

The most recent critical review of the potential impacts of marine seismic surveys on fish and invertebrates by Carroll et al. (2017) summarised the impacts of seismic sound emissions on marine invertebrates based on a literature review of 70 studies, which comprised a total of 68 species of fish and 35 species of invertebrates, including several studies that were not differentiated. Carroll et al. (2017) concluded that:

> *"Our review has identified scientific evidence for high-intensity and low-frequency sound-induced physical trauma and other negative effects on some fish and invertebrates; however, the sound exposure scenarios in some cases are not realistic to those encountered by marine organisms during routine seismic operations. Indeed, there has been no evidence of reduced catch or abundance following seismic activities for invertebrates, and there is conflicting evidence for fish with catch observed to increase, decrease or remain the same."*

4.1 Crustaceans

Specific studies examining the effect of seismic survey signals on crustaceans, including larval stages, are relatively rare, though recent Australian studies (e.g., Day et al. 2016b; Przeslawski et al. 2016b; Carroll et al. 2017; Day et al. 2019; Day et al. 2021, 2022), have aimed to narrow the knowledge gap. A recent study was undertaken to specifically investigate seismic survey impacts on Western Rock Lobster off the central WA coast (de Lestang et al 2024). These are being supplemented by global research, including ongoing projects such as Canadian Healthy Oceans Network Project 2.1.4 (Anthropogenic Noise in The Ocean Soundscape: Effects on Fishes and Invertebrates).

To understand interactions between marine seismic surveys and marine invertebrates, the Commonwealth Government's Fisheries Research Development Corporation (FRDC), Origin Energy Ltd and the CarbonNet Project contributed funding to a research program assessing the impact of marine seismic surveys on southern rock lobsters and commercial scallops. This program study was undertaken by researchers from the Institute for Marine and Antarctic Studies (IMAS) at the University of Tasmania (Day et al. 2016b).

The research program involved exposure of cohorts of southern rock lobsters to multiple seismic acoustic source pulses at two sites (sandy substrate and limestone rock platform), both in 10–12 m water depths off the southern Tasmanian coast. The exposed lobsters were captive and control

lobsters (no exposure) were also examined during subsequent analyses undertaken at 0-, 14-, and 120 -days post-exposure. Exposure experiments were undertaken in July 2013 (45 in^3 acoustic source, 2,000 psi), July 2014 (150 in^3 acoustic source, 1,300 psi and 2,000 psi) and February 2015 (150 in^3 acoustic source, 2,000 psi). The acoustic source was towed at approximately 5 m depth from 1 km away and at a speed of approximately 5.5–7.4 km/hr with a shot interval of 11.6 seconds. The seismic source circled near the lobster pots. The maximum calculated exposures were 212 dB re 1 µPa PK-PK, a per-pulse SEL of 190 dB re 1 μPa^2.s, an accumulated SEL of 199 dB re 1 μPa^2.s and maximum peak magnitude of ground acceleration of 68 ms^{-2}, though Day et al. (2016b) note this was an outlier.

Conclusions from the study are:

- Exposure to seismic sound did not result in any mortality from any of the experiments comprising this study.
- There was no difference in fecundity between control and exposed lobsters.
- The ability of exposed lobsters, and one cohort of control lobsters, to right themselves, a complex reflex, was compromised in the long-term (120 days post-exposure) in three of the four experiments. This response was linked to damage to sensory hairs of the statocyst, the primary mechano-sensory and balance organ in lobsters.
- Tail extension, a simple behavioural reflex response, showed reduction in exposed lobsters in one of the four experiments. The authors noted it is unclear how significant this finding is, as the warm summer water conditions during this experiment may have been a contributing factor.
- Haemolymph (blood) biochemistry showed little effects on metabolic and respiratory stress, or vitality following exposure.
- Haemocyte count (indicative of immune response function) in exposed lobsters showed a long-term decline to 120 days post-exposure. However, haemocyte counts subsequently recovered to double the number of haemocytes in control lobsters at 365 days post-exposure, which may indicate a possible immune response to pathogens.
- Seismic exposure did not cause any mass mortality. Not considering when both the control and exposed groups suffered mass mortality, the experimental mortality rates at 120 days' post-seismic acoustic source exposure were between 9.4% and 20%. These fall towards the low end of what might be expected from natural mortality rates. Even the highest levels of mortality recorded, 17.5% and 20% suffered by 4-pass treatments from the 2014 and 2015 experiments, were assessed by the authors to be modest compared to naturally occurring mortality rates.

Overall, no direct lethal effects to adult lobsters were observed and impacts were limited to statocyst condition, behavioural reflexes, and immune response functions in adult lobsters. Day et al. (2016b) note that these could have some effect on longer-term survivability.

Subsequent to the Day et al. (2016b) study, Day et al. (2020) undertook additional work to determine whether southern rock lobsters with pre-existing damage to their mechanosensory statocyst organs as a result of exposure to anthropogenic sound, incur further damage from exposure to marine seismic surveys. For this study, southern rock lobsters collected from a site subject to high levels of anthropogenic noise (a high shipping traffic lane used by cargo vessels and cruise ships, as well as pumping stations) were exposed to an equivalent seismic air gun signal regime as the Day et al. (2016b) study of lobsters, which was from an area of minimal anthropogenic sound ('noise-naïve' lobsters). Following exposure, both control and exposed treatments were found to have damage to the statocyst equivalent to that of noise-naïve lobsters following seismic exposure, leading to the conclusion that the damage was both pre-existing and not exacerbated by seismic exposure. Additional to the lack of further damage following marine seismic survey exposure, no disruption to

the righting reflex was observed, demonstrating the lobster's ability to cope with or adapt to the mechanosensory damage (Day et al. 2020).

The lobsters from the high shipping site showed a pre-existing level of statocyst damage equivalent to that of lobsters exposed to the seismic signals. These lobsters also demonstrated a resilience to further damage, with exposure to seismic sound not increasing the level of cell loss in the statocyst hairs (Day et al. 2020). There were also no significant differences in the time taken to right themselves (from 'belly up' to 'belly down') between the control and exposed lobsters from the shipping site, though righting time was slower and more variable than the lobsters at the control site.

Day et al. (2021, 2022) undertook a study to determine whether early development and recruitment of southern rock lobsters puerulus and juveniles might be affected by exposure to seismic sound by assessing mortality rates following exposure; impairment of the righting reflex, and development through assessment of progression through the moult cycle. This study also undertook to respond to the finding by McCauley et al. (2017) of increased mortality in zooplankton following exposure to air gun signals that suggests that planktonic, early life stages of marine invertebrates may be more vulnerable than adults or developing embryos.

The Day et al. (2021, 2022) study involved exposing puerulus and juvenile southern rock lobsters within oyster baskets on the seabed to a full-scale array (three 2,820 in^3 seismic sources at 2,000 psi at a depth of 8 m) during a commercial seismic survey in 51-58 m of water. Day et al. (2021, 2022) identified that:

- Exposure did not result in any elevated mortality for puerulus or juveniles and thus, seismic surveys are unlikely to produce significantly increased mortality in puerulus and juvenile southern rock lobsters.
- An impact to righting reflex occurred in the immediate vicinity (directly below the sound source) for puerulus and out to at least 500 m for juvenile southern rock lobsters. However, juveniles exposed at 500 m recovered after the first moult, indicating that the impact range extended to at least 500 m from the source, the maximum range tested in the study. The results from the combined puerulus and juvenile treatments indicated that puerulus and juveniles below the sound source did not show the capacity for recovery whereas juvenile lobsters at 500 m from the source recovered from impairment after the first moult, providing evidence of a range threshold for recovery.
- The intermoult period was significantly increased in juvenile lobsters directly below the sound source and appeared to be increased in puerulus, though the latter could not be statistically analysed.
- Juveniles at 500 m showed a moderate, non-significant increase in moult duration.
- Increased intermoult duration suggested impacted development and potentially slowed growth, though the proximate cause was not identified.

In another study focusing on southern rock lobster, Fitzgibbon et al. (2017) examined the impact of seismic acoustic exposure on the haemolymph physiology and nutritional condition of this species and found no effect of seismic exposure on 24 haemolymph biochemical parameters, hepatopancreas index or survival. However, this study did report evidence of:

- A chronic negative impact on immune competency for up to 120 days post-exposure.
- A potential immune response to infection after 365 days post-exposure.
- Chronic impairment of nutritional condition 120 days post-exposure.

These authors concluded that the biochemical hematological homeostasis of rock lobster is reasonably resilient to seismic acoustic signals; however, exposure may negatively influence the rock lobster's nutritional condition and immunological capacity. The impact of these results at an ecological level is not known.

The recently published study by de Lestang et al (2024) used cages to assess seismic effects on Western Rock Lobster (*Panulirus cygnus*) in shallow reef habitat adjacent to Dongera on the central WA coast. Juvenile lobsters were confined to cages and subject to seismic pulses from very close quarters (2-5m metres) after which they were released. A recapture program was followed to determine what effects seismic might have on catches. Results indicated a short-term reduction in catchability for the first month of the recapture program which subsequently disappeared. The recapture rates after the first month were very low (e.g. max of 1-3 animals per treatment) and not appropriate to draw any further conclusions from, as highlighted by the breadth of the 95% CI's associated with the analysis (6-68%). Treatment was not reflective of normal seismic activity nor were lobsters exposed while in their typical habitat such as a ledge or hole on the reef. It was not possible to draw any firm conclusions beyond a temporary reduction in catch levels.

Payne et al. (2007) conducted a pilot study of the effects of exposure to seismic sound on various health endpoints of the American lobster *(Homarus americanus*). Adult lobsters were exposed either 20 to 200 times to 202 dB re 1µPa PK-PK or 50 times to 227 dB re 1µPa PK-PK, and then monitored for changes to survival, food consumption, turnover rate, serum protein, enzyme and calcium levels. Lobsters were exposed to seismic pulses at very close range to the source (~2 m). The SEL that the lobsters were exposed to was not described in the report but can be estimated to be up to 207 dB re 1 μPa^2.s. Observations were made over a period of a few days to several months and found that:

- Results indicated no effects on delayed mortality or damage to the mechanosensory systems associated with animal equilibrium and posture (as assessed by turnover rate).
- There was a decrease in the levels of serum protein, enzymes, and calcium in the haemolymph of animals exposed to seismic sound. Statistically significant differences were noted in serum protein at 12 days post-exposure, serum enzymes at five days post-exposure, and serum calcium at 12 days post-exposure. Serum enzymes are valuable in detecting major organ damage whereby enzymes leak into the blood upon cellular rupture. Within this study two enzymes, aspartate transaminase and creatine kinase, were not elevated in seismic-exposed animals, reflecting the absence of major cellular rupture or necrosis being affected by seismic sound, including high exposure conditions. Similar results were obtained in studies with snow crabs (Christian et al. 2003). However, there was evidence of decreased serum enzymes in some trials, indicating the possibility of haemodilution or uptake of excess water by the animals. A similar decrease in serum protein and calcium was noted in some trials indicating a potential for disturbance to osmoregulation (i.e., the process by which the body regulates the osmotic pressure of any organisms' fluids to keep the homeostasis of the organisms' water level constant). Altogether, the results suggest a potential for osmo-regulatory disturbance in lobsters exposed to seismic sound. This study did not provide evidence for delayed mortality in lobsters several months after exposure, with some observations extending to nine months.
- During the histological analysis conducted four months post-exposure, no structural differences in hepatopancreatic tissues were noted, which would denote cell or tissue rupture, necrosis, or inflammation. There was also no evidence of tissue necrosis or inflammation in the ovaries. However, histology identified elevated deposits of carbohydrates, thought to be glycogen, in the hepatopancreas of seismic-exposed animals. Such abnormal accumulations are believed to be due to disturbance in cellular processes connected with synthesis and secretion; however, the report concludes that further research is required to assess whether this observation is due to organ stress. These

studies are noted as being exploratory in nature, with the authors cautioning against over-interpretation.

In 2018, the CarbonNet Project undertook the Pelican 3D marine seismic survey in waters 15 m to 35 m deep located between 1 km and 13 km from the Gippsland shoreline in Victoria. Underwater sound and its potential impact on the marine environment was a key issue raised by stakeholders, particularly the commercial fishing industry. In response, and among other actions, CarbonNet undertook southern rock lobster surveys before and after the marine seismic survey to ascertain whether any differences in abundance could be attributed to the marine seismic survey. The design of the survey was overseen by an independent advisory panel to provide advice on the survey methodology and interpretation of the survey results and its implications.

Ten sites (in areas of reef) were monitored, including six sites within the survey acquisition area and four reference sites located more than 15 km to the northeast. At all sites, more southern rock lobsters were retrieved during the post-survey assessment (four months after the survey), with 81 individuals trapped during the pre-survey assessment compared to 122 trapped post-survey. This increase in numbers post-survey was most likely due to seasonal effects rather than any impact of the survey (CarbonNet 2018). These results indicate no effect of the marine seismic survey on lobster abundance.

Morris et al. (2018) and Cote et al. (2020) undertook field studies in from 2015 – 2017 into the effects of marine seismic surveys on the behaviour of the snow crab (*Chionoecetes opilio*) on the shelf and slope habitats of Atlantic Canada using a BACI study design to assess the behavioural responses of snow crab to seismic exposure. A 4,880 in^3 seismic source operated at 2,000 psi, 9 m depth and fired at a frequency of 10 seconds (approximately 25 m apart). Animal movements were tracked using an acoustic positioning array consisting of 50 acoustic receivers. The study concluded that while effects of seismic exposure on snow crab movement could not be ruled out completely, effects were at most quite small relative to natural variation. In contrast, snow crab exhibited much clearer responses to handling, temperature, and time of day. Overall, the results suggested that seismic effects, specific to the behaviour of adult male snow crab, were at most subtle and are not likely to be a prominent threat to the fishery.

A pilot study on snow crabs (*C. opilio*) (Christian et al. 2003, 2004) exposed captive adult males, egg-carrying females, and fertilised eggs to variable SPLs (191–221 dB re 1 µPa PK) and SELs (<130–187 dB re 1 $\mu Pa^2.s$) under controlled field experimental conditions. The crabs were exposed to 200 discharges over 33 minutes and found that:

- Neither acute nor chronic (12 weeks post-exposure) mortality was observed for the adult crabs.
- There was a significant difference in the development rate noted between the exposed and unexposed fertilised eggs/embryos in this study with the egg mass exposed to seismic energy demonstrating a higher proportion of less-developed eggs than the unexposed mass. However, this experiment was performed on eggs stripped from a single berried female and cultured in a laboratory for six weeks prior to exposure and 18 weeks following exposure.
- Stress indicators in the haemolymph of adult males were monitored immediately after exposure of the animals to seismic survey sound (Christian et al. 2003, 2004) and at various intervals after exposure. No significant acute or chronic differences between exposed and unexposed animals in terms of the stress indicators (e.g., proteins, enzymes, cell type count) were observed.

Christian et al. (2003) also investigated the behavioural effects of exposure to seismic survey sound on snow crabs. Caged animals on the ocean bottom at a depth of 50 m were monitored with a remote video camera during exposure to seismic sound and did not exhibit any overt startle response during the exposure period. Eight animals were equipped with ultrasonic tags, released,

and monitored for multiple days prior to exposure and after exposure. None of the tagged animals left the immediate area after exposure to the seismic survey sound. Five animals were captured in the snow crab commercial fishery the following year, one at the release location, one 35 km from the release location, and three at intermediate distances from the release location.

In 2003, a collaborative study was conducted in the southern Gulf of St. Lawrence, Canada, to investigate the effects of exposure to sound from a commercial seismic survey on egg-bearing female snow crabs (DFO 2004). Caged animals were placed on the ocean bottom at a location within the survey area and at a location outside of the survey area. The maximum received SPL was ~195 dB re 1 µPa PK. The crabs were exposed for 132 hours of the survey, equivalent to thousands of seismic shots of varying received SPLs. The animals were retrieved and transferred to laboratories for analyses. Neither acute nor chronic lethal or sub-lethal injury to the female crabs or crab embryos was indicated. DFO (2004) reported that some exposed individuals had short-term soiling of gills, antennules and statocysts, bruising of the hepatopancreas and ovary, and detached outer membranes of oocytes. However, they were found to be completely cleaned of sediment when sampled five months later and any differences could not be conclusively linked to exposure to seismic survey sound.

In a field study, Pearson et al. (1994) exposed Stage II larvae of the Dungeness crab (*Cancer magister*) to single discharges from a seven-source air gun array and compared their mortality and development rates with those of unexposed larvae. For immediate and long-term survival and time to moult, this study did not reveal any statistically significant differences between the exposed and unexposed larvae, even those exposed within 1 m of the seismic source (with a mean peak pressure as high as 231 dB re 1 µPa).

4.2 Molluscs

Molluscs include benthic invertebrates such as marine bivalves (e.g., scallops, oysters, mussels and clams), gastropods (e.g. sea snails/trochus, sea slugs and nudibranchs) and cephalopods (e.g. octopi and squid). Like crustaceans, the mechanism of impacts for molluscs are unlikely to be from sound pressure, but rather from particle motion. The physiology and sensory structures of different marine bivalves and gastropods is similar and so results of studies on the effects of seismic sound are broadly representative for species other than those studied.

Wardle et al. (2001) monitored molluscs and echinoderms on a shallow water reef exposed to seismic sound with peak SPLs of 218, 210 and 195 dB re 1 µPa at distances of 5 m, 16 m and 109 m respectively. Video observations made over two weeks indicated that the sound did not result in invertebrates moving away from the reef and there was little effect on their day-to-day behaviour.

Kosheleva (1992; as cited in Parry & Gason 2006) identified no detectable effects to marine bivalves and gastropods (mussels and periwinkles) after exposure to a single seismic source element of source level 233 dB re 1µPa at 0.5 m or greater from the source. Conversely, Matishov (1992; as cited in Parry & Gason 2006) reported a single scallop shell splitting in a sample of three scallops, but this was located 2 m beneath a seismic source and therefore exposed to maximum sources levels.

Recent Australian studies (Harrington et al. 2010; Przeslawski et al. 2016a, 2016b, 2018; Day et al. 2016b, 2017) have focussed on commercial scallops (*Pecten fumatus*).

Harrington et al. (2010) conducted a BACI study of the short-term effects of seismic surveying on adult commercial scallops within the Bass Strait Central Zone Scallop Fishery between February and June 2010. The study aimed to determine the survival and health of adult scallops within impacted (directly below seismic survey transects), semi-impacted (within the seismic survey transect grid) and control (outside of the seismic survey transect grid) strata two months after seismic surveying. A before-seismic impact scallop dredge survey was conducted in February 2010 at both impact and control sites. In total, 45 sample dredge tows were conducted, with 15 sample tows being completed within each survey stratum. Between February 2010 and April 2010, the seismic survey vessel *M/V Aquila Explorer* completed 8,000 line kilometres of 2D seismic transects within eastern Bass Strait,

including areas within the Bass Strait Central Zone Scallop Fishery with high densities of adult scallops. The seismic source, 4,130 in^3 with an operating pressure of 2,000 psi was towed at a depth of ~6 m, with seismic discharges occurring at intervals of approximately every five seconds. The after seismic impact scallop dredge survey was conducted on the 2nd and 3rd June 2010, approximately eight weeks after the seismic survey had been completed within the vicinity of the dredge survey location.
Data on the abundance of live and dead scallops within the impacted and control sites were examined to assess whether any changes were evident and whether they may be attributable to effects of the seismic survey. Animals collected in surveys were separated into one of four shell categories; live scallops, clappers (very new dead scallops with two shell halves still joined together), new dead shell and old dead shell. Sub-lethal impacts were investigated by examining changes in roe and meat condition within each of the areas sampled.

No change in the abundance of live scallops (or related change in dead scallop categories) or macroscopic gonad and meat condition was detected after seismic surveying within either the control, impacted or semi-impacted strata. There was also no observable change in the size frequency distribution of scallops in the impacted and semi-impacted strata following seismic surveying. The conclusion was that no short-term (<2 months) impacts on the survival or health of adult commercial scallops (*Pecten fumatus*) were detected following the seismic survey.

Przeslawski et al. (2016a, 2016b, 2018) examined the short-term impacts on scallops and other marine invertebrates from a 2,530 in^3 seismic array and found no evidence of mortality or change in condition following exposure to a seismic survey. Analysis of images and samples revealed some site-specific differences in scallop abundance, size, condition, and assemblages, but these were not related to seismic operations.

From 2013-2015, a long-term study evaluated the acoustic impacts from seismic exposure on scallops in Australia (Day et al. 2016b, 2017). The experimental field research maintained the scallops in mesh enclosures while a vessel with the acoustic source passed close to the animals. Day et al. (2016b, 2017) exposed scallops to maximum received sound exposures of up to 213 dB re 1µPa PK-PK, 181 to 188 dB re 1 $\mu Pa^2.s$ per-pulse SEL, and SEL_{cum} of 188 to 198 dB re 1$\mu Pa^2.s$. The study also predicted ground acceleration of up to 37.57 m/s^2.

Day et al. (2016b, 2017) concluded that exposures did not result in any immediate mass mortalities; however, repeated exposures, not representative of typical survey conditions, resulted in a chronic increase in mortality over timeframes of approximately four months post-exposure, though not beyond naturally occurring rates of mortality. Separate experiments undertaken in 2013 and 2014 yielded mortalities of 3.6-3.8% in control scallops (no seismic exposure), 9.4-11.3% mortality in scallops exposed to a single pass of the seismic source, 11.3-16.1% mortality in scallops exposed to two passes of the seismic source, and 14.8-17.5% mortality in scallops exposed to four passes of the seismic source. The mortality rates were at the low end of the range of naturally occurring mortality rates documented in the wild, which range from 11-51% with a six year mean of 38% (Day et al. 2017). A third experiment in 2015 resulted in 100% mortality to both control scallops and exposed scallops, and accordingly was attributed to other causes and not to seismic exposure (Day et al. 2016b, 2017).

Sub-lethal effects to exposed scallops were also observed by Day et al. (2016b, 2017) indicating a compromised capacity for homeostasis and potential immunodeficiency over acute (hours to days) and chronic (months) timescales post exposure. Exposures did not elicit energetically expensive behaviours (i.e., extensive swimming or long periods of valve closure), but scallops showed significant changes in behavioural patterns during exposure, through a reduction in classic behaviours and demonstration of a non-classic “flinch” response to seismic signals. Furthermore, following exposure scallops showed an increase in recessing into sediment following exposure (Day et al. 2017).

Though Day et al. (2016b) recorded increased mortality with repeated exposure to a seismic source, it has not been established as to whether this was due to exposure to the seismic source or other mechanism related to the study design (Przeslawski et al. 2016). Using a precautionary approach, if

the increased mortality was due to exposure to the seismic source, then the increased mortality identified translates to an annual increase of between 9.4% and 20%. These fall towards the low end of what might be expected when compared with natural mortality rates in wild scallop populations, which range from 11-51% with a six year mean of 38% (Day et al. 2016b).

Scallops exposed to repeated seismic sound suffered physiological damage with no signs of recovery over the four month period, suggesting potentially reduced tolerance to subsequent stressors. In addition, changes in behaviour and reflexes during and following seismic exposure were observed. However, Day et al. (2016a, 2016b) cautioned that it was unclear from the study whether the observed physiological (and behavioural) impairments would result in mortality beyond the timeframes considered in their study.

Przeslawski et al. (2018) concluded that there was no evidence of increased scallop mortality, or effects on scallop shell size, adductor muscle diameter, gonad size, or gonad stage due to the seismic sound from an actual seismic survey. The authors concluded that the study provided no clear evidence of adverse effects on scallops, fish, or commercial catch rates due to the 2015 seismic survey undertaken in the Gippsland Basin. Przeslawski et al. (2018) further concluded that the study provided a robust and evidence-based assessment of the potential effects of a seismic survey on some fish and scallops.

Studies by Mooney et al. (2010) showed squid use their statocysts to detect low frequency, particle motion stimuli with a frequency response similar to the accelerometer ears of most elasmobranch and teleost fishes. Evoked potential response characteristics also parallel those found in many fish species that lack auditory specializations.

Laboratory studies that exposed two species of squid to seismic sound showed that *Alloteuthis sublata* was tolerant to a sound level up to 260 dB re 1 µPa (SPL) and *Loglio vulgaris* was fatally injured at levels of 246 – 252 dB re 1 µPa (SPL) within 3 – 11 minutes of exposure (Norris & Mohl 1983). However, received sound levels from a typical seismic survey do not reach these levels.

Fewtrell & McCauley (2012) assessed the effects of air gun noise on caged squid (*Sepioteuthis australis*). No sub-lethal injury or mortality as a result of exposures in this study was observed. Several squid showed alarm responses to the start-up of an air gun by firing their ink sacs and/or jetting away from the source, but this was not observed for similar or greater levels if the signal was ramped up. General habituation was observed with a decrease in alarm responses with subsequent exposures. During the trial the squid showed avoidance to the air gun by keeping close to the water surface at the end of the cage furthest from the air gun (within the sound shadow). Fewtrell & McCauley (2012) suggested a threshold of 166 dB re 1 µPa (SPL) would give an indication of the extent of disruption of a seismic survey by significant alteration in swimming patterns. They found that in one trial, where the received level of the first airgun impulse was 162 dB re 1 $\mu Pa^2 \cdot s$, the squid inked. This response was not observed again within this trial; however, the authors stated that it was unknown if this was due to depleted ink reserves or habituation. In two other trials, the initial received levels were lower (132 and 146 dB re 1 $\mu Pa^2 \cdot s$ per–pulse SEL), and although the cumulative received levels did exceed 162 dB re 1 µPa2 s, no inking behaviour was observed. The authors hypothesised that the results also suggest that a gradual increase in received levels and prior exposure to air gun impulses decreases the severity of the alarm responses in this species. This aligns with findings of general habituation in response to predators in squid (Long et al. 1989). Recent work (Jones et al. 2020) supports these findings as well, indicating potential rapid, short–term habituation by squid to impulsive noise, however, similar response rates were seen 24-hours later, which indicated that squid might re–sensitise to the noise.

The results presented in by Fewtrell and McCauley (2012) were stated by the authors to be preliminary, and while they stated that while it is possible that noise levels greater than 147 dB re 1 $\mu Pa^2 \cdot s$ are required to induce avoidance behaviour, the level associated with inking, of 162 dB re 1 $\mu Pa^2 \cdot s$ per–pulse SEL, has been considered as a startle response level for squid. In the absence of

additional studies and thresholds this level may be considered for other cephalopods; however, it may be limited when applied to other species.

André et al. (2011) exposed cephalopods (squid, cuttlefish, and octopus) to low-frequency sounds, 50–400 Hz sinusoidal wave sweeps with 100% duty cycle and one second sweep period for two hours in either a 2 L fiberglass reinforced plastic tank or a 200 L glass-walled tank, filled with natural seawater. The sweep was produced and amplified through an in-air loudspeaker, with measured received SPL of 157 ± 5 dB 1 µPa, with peak levels at 175 dB re 1 µPa. Following exposure, the individuals were decapitated at different intervals, ranging from immediately afterward to 12, 24, 48, 72, and 96 hours after exposure, respectively. All exposed individuals from presented the same lesions and the same incremental effects over time. The most pronounced lesions were visible in specimens observed 96 hours after sound exposure. In these individuals, the sensory epithelium was severely damaged, with very few hair cells remaining; most of the hair cells had been extruded. The epithelium only presented supporting cells, creating a holed mosaic, where residual hair cells showed either very few bent, flaccid, or fused kinocilia, or none at all. André et al. (2011) detailed that the lesions described in the study were new to cephalopod pathology and that their presence in all the noise-exposed individuals (versus their absence in controls) and their clear progression over time are consistent with the effects observed in other species that have been exposed to much higher intensities of sound.

Mooney et al. (2016) detailed that squid responded to sounds from 80 to 1,000 Hz, with response rates diminishing at the higher and lower ends of this frequency range. Animals responded to the lowest sound levels in the 200-400 Hz range. These results demonstrate that squid can exhibit a range of behavioural responses to sound include fleeing, startle, and protean behaviours, all of which are associated with predator evasion. Response types were frequency and sound level dependent, reflecting a relative loudness concept to sound perception in squid.

Solé et al. (2017) conducted offshore noise controlled exposure experiments on common cuttlefish (*Sepia officinalis*), at three different depths and distances from the source and particle motion and sound pressure measurements were performed at each location. Scanning electron microscopy revealed injuries in statocysts, which severity was quantified and found to be proportional to the distance to the transducer. These findings are the first evidence of cephalopods sensitivity to anthropogenic noise sources in their natural habitat. From the measured received power spectrum of the sweep, it was possible to determine that the animals were exposed at levels ranging from 139 to 142dB re 1µPa^2 and from 139 to 141 dB re 1µPa^2, at 1/3 octave bands centred at 315 Hz and 400 Hz, respectively. These results could therefore be considered a coherent threshold estimation of noise levels that can trigger acoustic trauma in cephalopods.

Dead beached squids have been documented in the vicinity of seismic surveys (Guerra et al. 2004) and from a seismic survey vessel (Leite et al. 2016).

Guerra et al. (2004) detailed that five giant squids were stranded between the end of September and the middle of October and four giant squid were found floating or stranded along the Asturian coast during a single week in September 2003. Guerra et al. (2004) examined seven of the nine animals, and did not find an obvious cause of death in any of these giant squid; however, internal examinations showed that two of the squids suffered extensive damage to internal muscle fibres, stomachs and digestive tracts were mangled. Some of the squids had also suffered severe damage to their statocysts that would have effectively disorientated them. Coincidentally, at the time of both mass strandings, vessels had been conducting seismic geophysical surveys in the vicinity, using ten compressed air guns that produced sound waves of low frequency (below 100 Hz) and high intensity (source level of 240 dB re 1 µPa at 1m per air gun) (Guerra et al. 2011).

Leite et al. (2016) reported that a squid, ~2 m long and identified as *Architeuthis dux,* was sighted as dead from a seismic survey vessel that had been operating in the area using a 5,085 in^3 seismic source with an operating pressure of 2,000 psi. Leite et al. (2016) detailed that while there is no

definite proof to link the death of this specimen to the seismic activity, its occurrence in an area of active surveys is suggestive of a possible link.

Given the similarities in physiology between squid and octopus, octopus are not thought to be at risk of physical injury even if individuals are exposed to several passes as noted by Fewtrell and McCauley (2012). There is limited information on the hearing sensitivity of octopus to sound stimuli. Kaifu (2008) studied *Octopus ocellatus* and concluded that the statocyst was responsible for the observed responses kinetic sound energy (particle motion). It is unknown how octopuses will respond behaviourally, but since they are benthic and territorial it is thought more likely that they will retreat into their lair as they normally do to perceived threats. They may also freeze and camouflage themselves if out in the open. Octopus are not expected to move very far from their territory and therefore will not be exposed to repeat close passes in short period of time since subsequent survey lines are about 4 km apart. If they remain in the same area, they may be exposed to sounds shown to elicit strong responses two to three times throughout the survey period and these events will be several days apart allowing the individual animals to recover.

4.3 Corals

A literature review by Dr Mardi Hastings stated that the primary mechanisms for injury of hermatypic corals from seismic sound emissions are: (1) breaking of the external coral skeleton which could also damage the polyp tissue, and (2) rupture or tearing of polyp tissues inside the corallites (Hastings 2008).

Although injury to corals is theoretically possible as described by Hastings (2008), studies on the actual impacts were limited prior to the Maxima 3D and Gigas 2D studies at Scott Reef (see below). A survey of coral reefs in Brunei that were subjected to seismic noise did not detect any damage to hard or soft corals, sponges, or other sessile benthic organisms (IEC 2003).

The most relevant data currently available are results from exposure studies that Woodside conducted during the Maxima 3D and Gigas 2D Pilot Ocean Bottom Cable (OBC) marine seismic surveys at Scott Reef offshore northern Western Australia.

In the Maxima 3D experiments corals in and around the lagoon were exposed to seismic signals (both experimental seismic lines and a full seismic survey) using a 2,055 in^3 source over a 59-day period. The experimental lines passed directly over the coral communities (source at 7 m depth, corals at ~60 m depth) whereas the full seismic survey passed within tens to hundreds of metres (horizontal offset). The maximum estimated received seismic signal levels at coral impact sites were 226–232 dB PK-PK, 214–220 dB SPL, 197–203 dB SEL, and a maximum cumulative SEL of 197–203 dB (Salgado Kent et al. 2016).

For plate corals, *Lobophytum* spp., and various soft corals including *Sarcophytum* spp., the proportion of dead and bare coral cover and the percent cover of red algae were documented, and no detectable effect was found from one or multiple passes of the seismic source (Battershill et al. 2008). Further, there was no evidence of coral breakage, no signs of physiological impairment in the corals (polyp withdrawal or reduction in soft coral rigidity) and no long-term change in coral community structure related to the experimental or full seismic survey activities (Battershill et al. 2008).

The Gigas 2D Pilot OBC coral monitoring study (SKM 2008) examined the potential for physical damage to a range of shallow water corals in North Scott Reef lagoon from seismic source emissions. This study used several sub-lethal indicators of stress and mortality (partial and whole colony mortality) to determine the effects of seismic source emissions on corals. The conclusion from this study was that emissions from the seismic source did not cause significant injury, tissue damage, sublethal stress or mortality to coral colonies, even when colonies were within a few metres of the seismic source (SKM 2008). This survey had a measured at source SEL of 206 dB (McCauley 2008).

Heyward et al. (2018) reviewed the research undertaken at Scott Reef and the analyses detected no effect of seismic activity measured as coral mortality, skeletal damage, or visible signs of stress immediately after and up to four months following the 3D marine seismic survey. Maximum received levels were 226 dB PK.

5 Fishes

Although hearing ranges and sensitivities vary substantially between species (e.g., Ladich & Fay 2013), all fish species tested to date can detect sound and vibration to some degree (Dale et al. 2015). Fish produce sounds in a wide range of context such as feeding, mating or fighting, and as a result anything that inhibits the detection of these sounds can have a negative effect on their fitness and survival (Popper & Hawkins 2019). The majority of fish species detect sounds from <50 Hz up to 500-1500 Hz (Popper & Hawkins 2019). A smaller number of species can detect sounds over 3 kHz, while very few species can detect ultrasound over 100 kHz (Ladich & Fay 2013). The critical issue for understanding whether an anthropogenic sound will affect the hearing of a fish is whether it is within the hearing frequency range of the fish and loud enough to be detectable above background ambient noise.

The hearing sensitivity of fish varies depending upon the auditory structures in the inner ear (otoliths surrounded by an epithelium of hair cells) and, if present, the swim bladder (Finneran & Hastings 2000; Nedwell et al. 2004). Otoliths are sensitive only to particle motion, while the swim bladder may provide an indirect route for sound pressure to reach the inner ear. The other main mechano-reception system in fish is the lateral line system, which runs along the side of the body and is more pronounced in some groups of fish than others. The lateral line system responds to particle motion produced in the near-field of a sound source, as well as to tiny water currents set up by the motions of the fish (Nedwell et al. 2004); therefore, all fish are sensitive to the particle motion component of sound at close range from a sound source. Particle motion is the most relevant metric for perceiving underwater sound for most species, but with the exception of a few species (Popper & Fay 2011; Popper et al. 2014), there is an almost complete lack of relevant data on particle motion sensitivity in fish (Popper & Hawkins 2018). Some more specialised fish with a swim bladder that they use for hearing are sensitive to sound pressure and are capable of detecting less intense noise and a wider range of frequencies, compared to less-specialised groups of fish (Popper et al. 2014; Carroll et al. 2017; Hawkins & Popper 2017). The susceptibility of fish to injury from noise exposure varies depending on the species and the presence and possible role of a swim bladder in hearing. Inter-specific variations in hearing range and sensitivity result from the different adaptations in these systems for perceiving sound pressure and particle motion information (Popper & Fay 2011).

Based on their morphology, Popper et al. (2014) classified fishes into three categories comprising:

- Fishes with swim bladders whose hearing does not directly involve the swim bladder or other gas volumes.
- Fishes whose hearing does directly involve a swim bladder or other gas volume.
- Fishes without a swim bladder that can sink and settle on the substrate when inactive.

The Popper et al. (2014) classifications can be assigned to the following families or species of commercial fish species, common in Australian waters:

- Fishes with swim bladders or other gas volumes, but whose hearing does not directly involve the swim bladder, e.g., snappers, emperors, groupers and rock cods (lutjanids and lethrinids such as *Pristipomoides* spp., *Lethrinus* spp., *Lutjanus* spp., and Family Serranidae), and some species of tuna (*Thunnus* sp.) (Tavolga & Wodinsky 1963; Higgs et al. 2006; Braun & Grande 2008; Engineering-Environmental Management, Inc. 2008; United States Department of the Navy 2008; Caiger et al. 2012; Bertrand & Josse 2000; Song et al. 2006).
- Fishes whose hearing does directly involve a swim bladder or other gas volume e.g., Family Clupeidae (herrings, sardines, pilchards, and shads) and some Haemulidae (grunters and sweetlips) (Nedwell et al. 2004; Braun & Grande 2008; Popper et al. 2014).

- Fishes without a swim bladder (e.g., mackerel, *Scomberomorus* spp., some species of tuna, *Thunnus* sp. and sharks) (Casper et al. 2012; Popper et al. 2014; Carroll et al. 2017).

Underwater noise levels significantly higher than ambient levels can have a negative impact on fishes, ranging from physical injury or mortality to temporary effects on hearing and behavioural disturbance effects.

The effects of underwater sound on fishes within the vicinity of a seismic sound source array will vary depending on the size, age, sex, and condition of the receptor among other physiological aspects, and the topography of the benthos, water depth, sound intensity and sound duration. The effect of noise on a receptor may be either physiological (e.g., injury or mortality) or behavioural, as described in the following sub-sections.

Mortality/Potential Mortal Injury

It is noted that while thresholds for fish mortality have been included for consideration in this assessment based on the Popper et al. (2014) guidelines, no studies to date have demonstrated direct mortality of free-swimming adult fish in response to seismic source emissions, even when at close proximity (within 1–7 m) (DFO 2004; Boeger et al. 2006; Popper et al. 2016; Carroll et al. 2017). Although some fish deaths have been reported during cage experiments, these were more likely caused by experimental artefacts of handling fish or confinement stress (Hassel et al. 2004). For free swimming fishes that can move away from seismic sources as they approach, the potential for lethal physical damage from air gun emissions is even further nullified. However, reef or bottom-dwelling fishes that show greater site attachment may be less inclined to flee from a seismic sound source and experience greater effects.

Despite mortality being a theoretical possibility for fish exposed to seismic source emissions, Popper et al. (2014) did not reference an actual occurrence of this effect. At the time of developing the guidelines, no quantified data on injury and mortality from seismic sources on fishes had been reviewed by the Working Group. Therefore, the Popper et al. (2014) exposure guidelines for mortality/potential mortal injury and recoverable injury for fishes exposed to seismic source emissions are based solely on data from pile driving conducted on predominantly temperate, freshwater fish species. Although seismic surveys and pile driving both produce impulsive sound, their sound characteristics are markedly different; pile driving impulses result in a more rapid rise time in sound pressure than seismic pulses and it is this rapid rise time that has the greatest potential for trauma (Caltrans 2001, 2004; Hastings & Popper 2005; Popper et al. 2006). Also, pile driving sound effects are usually more significant due to the fact that they usually involve a static source and static receivers (e.g., site-attached fishes).

Environmental Resources Management Australia (ERM) undertook a detailed literature review of potential fish mortality and physical injury because of exposure to seismic sources (ERM 2017). Of the 28 studies reviewed, only three observed direct mortality and in each case, mortalities occurred to fish that were caged at very close proximity to the seismic source (<2 m). This is clearly not representative of real-life exposures from seismic surveys given fish are free-swimming and therefore capable of moving away from a sound source if needed. The received sound levels that resulted in mortality ranged from 220 to 241 dB re 1 µPa PK; however, other studies reported no mortality or injury at levels as high as 246 dB re 1 µPa PK. Therefore, the sound exposure criteria proposed by Popper et al. (2014) for mortality and mortal injury are considered to be highly conservative.

Other than physiological stress responses or hearing loss, no other physical damage to adult fish or invertebrates have been directly attributed to exposure to seismic source emissions, even at close proximity (NSW DPI 2014). It should be noted that some reports of physical damage arise from studies undertaken using explosions and other high-pressure sound waves, and not from seismic source emissions that generate lower maximum pressures and pressure change (Popper & Hastings 2009).

There is some evidence that bony fishes can regenerate the sensory cells in their hearing system to a fully functional state within weeks after a detrimental exposure. The processes involved in the recovery are not fully understood, and there is conflicting evidence from sound exposure studies, such as McCauley et al. (2003). These findings could also suggest that the process of sensory hair cell death and regeneration is species-specific.

Recovery processes take a few days to a few weeks (Scholik & Yan 2001; Mackenzie & Raible 2012), and the time course for recovering from hearing loss likely depends on the species, its normal hearing sensitivity, the sound exposure intensity and duration, and the amount of sensory epithelial damage (Smith & Monroe 2016). Noise-induced PTS has not been reported for fishes yet, which may be explained by their apparent ability to regenerate hair cells.

Injurious effects caused by rapid pressure changes within the body are called 'barotrauma' (Stephenson et al. 2010; Halvorsen et al. 2011, 2012b). The range of barotrauma effects in fishes mostly depends on the temporal pattern of the pressure changes and the physiological state of the exposed fishes (Stephenson et al. 2010; Halvorsen et al. 2012a, 2012b); they range in severity from damage with full recovery to lethal injury (McKinstry et al. 2007).

Casper et al. (2012) showed that fishes can recover from less severe injuries under laboratory conditions, suggesting that minor injuries do not inevitably lead to mortality. Nevertheless, in open waters, they have the potential to reduce the animal's fitness to the extent that its ability to find food decreases and its risk of being predated increases (Halvorsen et al. 2011, 2012b).

Mortality is either a direct effect of barotrauma (in the case of severe injury) or indirect if an animal is moderately injured. Data on sound-induced mortality in fishes are scarce and mainly related to underwater explosions (see review by Popper & Hastings 2009). Caltrans (2001) documented fish mortality near underwater pile driving. There is no evidence for fish mortality caused by exposure to other sound sources such seismic source emissions, dredging, or vessel noise (Normandeau Associates, Inc. 2012).

Temporary Threshold Shift

The following is sourced from Popper et al. (2014):

> *"Temporary threshold shift (TTS) is a temporary reduction in hearing sensitivity caused by exposure to intense sound. TTS has been demonstrated in some fishes, and its extent is of variable duration and magnitude. TTS results from temporary changes in sensory hair cells of the inner ear and/or damage to auditory nerves innervating the ear (Smith et al. 2006; Liberman 2015). However, sensory hair cells are constantly added in fishes (e.g., Corwin 1981, 1983; Popper and Hoxter 1984; Lombarte and Popper 1994) and also replaced when damaged (Lombarte et al. 1993; Smith et al. 2006; Schuck and Smith 2009), unlike in the auditory receptors of mammals. When sound-induced hair cell death occurs in fishes, its effects may be mitigated over time by the addition of new hair cells (Smith et al. 2006, 2011; Smith 2012, 2015).*
>
> *After termination of a sound that causes TTS, normal hearing ability returns over a period that is variable, depending on many factors, including the intensity and duration of sound exposure (e.g., Popper and Clarke 1976; Scholik and Yan 2001, 2002a, b; Amoser and Ladich 2003; Smith et al. 2004a, b, 2006, 2011; Popper et al. 2005, 2007). While experiencing TTS, fishes may have a decrease in fitness in terms of communication, detecting predators or prey, and/or assessing their environment."*

McCauley et al. (2003) demonstrated that exposure to repeated emissions of a single air gun (source level of 222.6 dB re 1µPa PK-PK) from 5 to 15 m at the closest approach caused extensive damage to the sensory hair cells in the inner ear of caged pink snapper (*Pagrus auratus*). Although no mortality was observed, the damage was severe with no evidence of repair or replacement of damaged sensory cells up to 58 days post-exposure. However, the study did not investigate the effects on fish hearing. The study acknowledged that the fish were caged and therefore not able to swim away from sound source, and that the monitoring video suggested the fish would have fled the sound

source if possible. The authors of the study also acknowledged that the impact of exposure on ultimate survival of the fish was not clear.

As part of Woodside's Maxima 3D marine seismic survey, an extensive field study was undertaken at Scott Reef. A component of this study investigated the potential physical, physiological, and behavioural noise-induced effects on fish assemblages. The results showed statistically more damage to the hearing in blue-stripe sea perch (*Lutjanus kasmira*) exposed to the seismic impulses than in control fishes. However, the damage found in these fishes was marginal, and—assuming a direct relationship between hair cell density and hearing capability—a negligible effect on the fishes' hearing capability. The damage was monitored through time out to 58 days post seismic exposure and did not increase significantly through time, with almost zero damage detected by 58 days (McCauley 2008).

A study of auditory sensitivity in four species of tropical reef fishes following exposure to emissions from the 2,055 in^3 array showed that none of the four species, including the pinecone soldierfish (a species with expected to have good hearing sensitivity) experienced any hearing sensitivity loss (i.e. TTS) following exposure to SEL_{cum} up to 190 dB re 1 $\mu Pa^2 \cdot s$ (Hastings et al. 2008; Hastings & Miksis-Olds 2012). No detectable gross physiological damage was found in individuals from any of the seven species (McCauley & Kent 2012). The results of the hearing tests are consistent with the sound exposure guidelines proposed in Popper et al. (2014), which indicated that TTS may occur at SEL_{cum} levels >186 dB re 1 $\mu Pa^2 \cdot s$ while other studies (Popper & Hastings 2009; Song et al. 2008) indicate that TTS may occur at levels as high as SPL 205-210 dB re 1µPa (PK).

Behavioural Effects

The sound-related factors influencing behavioural reactions in fishes can include its frequency content, intensity above background noise and temporal sound characteristics. If exposed to the same stimulus over a prolonged period, an initial behavioural reaction might fade as the fishes habituate to the sound. Behavioural reactions that are usually observed in fishes in response to sound are dispersion, directed movements away from the sound source (leaving the area of the noise source, aggregation and descending closer to the bottom), startle response (fast start escapes, C-start response) at sound onset (Wardle et al. 2001; Slotte et al. 2004). Effects can be acute (such as acoustic masking), or chronic (including altered distribution), lasting from the immediate duration of sound exposure to several days or weeks if fishes are displaced from their preferred areas during a survey (Engås et al. 1996; Slotte et al. 2004; Løkkeborg et al. 2012; Streever et al. 2016).

The onset level of behavioural responses in fishes varies greatly between and within species, including between fishes of different ages and sizes, the behavioural and social context, and the motivation of the fishes. Existing data on behavioural responses do not provide a clear dose-response relationship and, consequently, it is currently impossible to determine single value thresholds for the onset of behavioural reactions. Instead, broad response and effect categories such as those proposed by Popper et al. (2014) seem most reasonable and may guide regulatory decisions in this context.

Strong 'startle' responses have been observed in some fish species at received sound levels of 200-205 dB re 1 µPa, indicating that sounds at or above this level may cause more severe behavioural reaction such as avoidance. Sound levels of this intensity are likely to occur 100 to 300 m from an acoustic array. Based on this, an approximate range of 200 m was estimated as the minimum distance at which fishes may start avoiding the approaching seismic source (McCauley 1994). Wardle et al. (2001) documented that schooling reef fishes swam past a seismic source array at received levels that would be received at about 20 m below a survey array consisting of 30 air guns.

Pearson et al. (1992) showed that exposure to air gun sound can cause changes in schooling patterns and distribution. Løkkeborg et al. (2012) found changes in catch rates of fish species in Norwegian waters, indicating that these species all responded to seismic sound emissions. However, they also showed that gillnet catches were doubled for some fish species during seismic surveying and only longline catch rates fell slightly. Except for one species, they did not find any changes in abundance

or displacement from fishing grounds. Hawkins et al. (2014) used synthetic impulsive signals in a behavioural response study; they documented that sprat and mackerel reacted to the impulsive sound exposure generally by dispersal and depth changes (which would make it difficult to detect the true scope of effects in a study relying on fisheries technology).

Other studies looking at the behavioural response of sound pressure-sensitive Gadidae and Clupeidae species, such as whiting, Atlantic cod and herring, have reported changes in vertical position in the water column, potential avoidance responses and short-term changes in distribution. Chapman & Hawkins (1969) observed that the depth distribution of free-ranging whiting changed in response to an intermittently discharging stationary seismic source, which resulted in fish being exposed to an estimated SPL of 178 dB re 1 µPa. The fish school responded to the sound by shifting downward, forming a more compact layer at greater depth although temporary habituation was observed after one hour of continual sound exposure (Chapman & Hawkins, 1969).

Hawkins et al. (2014) exposed free-swimming sprat (a sound pressure-sensitive Clupeidae species with a swim bladder connected to the inner ear) and Atlantic mackerel (a particle motion detecting species without a swim bladder) to playback of impulsive sound. Sprat schools were more likely to disperse laterally in response to received sound levels of approximately 135 dB re 1 μPa^2.s SEL. Mackerel schools were more likely to alter their depth in the water column in response to approximately 142 dB re 1 μPa^2.s SEL. Hawkins et al. (2014) note how the two different species seemed to respond to the sound playback at similar sound levels despite the differences in sound sensitivity of the two species, but suggested that mackerel were simply more “flighty” than sprat and therefore more likely to react. The tests were also undertaken using low sound level playback in very close proximity to the schools of fish and it is not clear how relevant the sound pressure and sound exposure levels are in relation to mackerel given that their response was likely driven by particle motion. The study location, a very small, enclosed, quiet, coastal sea lough, where fish were not accustomed to heavy disturbance from shipping and other intense sound sources is also very different from an open ocean location.

Slotte et al. (2004) monitored the effects of a 3,090 in^3 seismic array on migrating herring (Clupeidae) and whiting (Gadidae), mapping their distribution and abundance in relation to the seismic survey lines. There was no significant evidence of immediate, near-field scaring reactions on the horizontal scale in response to acquiring survey lines, but there was some evidence that fish changed position in the water column, moving closer to the seabed. Some short-term changes in distribution were observed but weren’t statistically significant; fish consistently remained within the immediate vicinity of the survey area, but in a limited number of measurements there was an indication that fish abundance was lower near to the survey area and increased with distance out to a maximum range of 37 km. However, results were inconsistent, and clear trends were not observed in all cases. Slotte et al. (2004) concluded that it was not possible to determine how much abundance and distribution were attributed to the seismic survey or to the natural migration patterns and food availability of the fish, or other natural factors. Herring and whiting were found to be abundant in the survey area again after a pause in seismic acquisition and monitoring of fishes for three to four days, indicating that if any displacement did occur as a result of seismic sound exposure, the displacement was temporary (i.e. less than 3-4 days) (Slotte et al. 2004).

In similar studies, Engås et al. (1996) and Engås & Løkkeborg (2002) reported on the effects of seismic surveys on Atlantic cod and haddock (Gadidae) and found that the abundance of fish were lower in the survey area compared with areas outside of the survey area, which the authors hypothesize may be the result of an avoidance response. Some differences in abundance were still detectable within the survey area five days after the survey was completed (Engås et al. 1996; Engås & Løkkeborg 2002).

Santulli et al. (1999) exposed caged European sea bass (a demersal species) to a 2,500 in^3 seismic source. Limited response was observed at 2.5 km distance, a startle response was observed when the array was at a distance of approximately 800 m, but after passing within 180 m, fish behaviour appeared to return to normal within one hour. Increased biochemical stress levels were measured in some fish following exposure, returning to normal levels within 72 hours of exposure. It is noted

that exposures of fish in the wild would likely result in avoidance of high sound levels prior to the seismic source approaching to as close a range and to as high sound levels as the captive fish in the experiment were exposed to.

The behavioural observations of free-swimming fishes in Woodside's Maxima 3D survey at Scott Reef (Miller & Cripps 2013) show that seismic source emissions did not cause lethal or sub-lethal effects on fish near the operating array. At close range, the vessel approach caused fishes to cease their behaviours and move towards the seabed, but the effect was short-lived, and fishes began to feed and behave normally again within 20 minutes after the passage of the seismic survey vessel. Caged fishes displayed startle responses too infrequently to analyse. However, agitation levels increased with increasing received sound exposure level for the three holocentrid species (squirrelfishes and soldierfishes, suborder Holocentroidei) but were not detectable for the blue-stripe sea perch. Sonar observations of free-swimming fishes indicated that individual animals tended to move towards the seabed on approach of the operating seismic source, consistently out to 400 m either side of the survey test line. Schools of fishes moved towards the seabed within 200 m of the survey test line in response to the passage of the operating seismic source and stayed significantly closer to the seabed up to 63 minutes post-exposure. The vocal behaviour of fishes was unaffected from the seismic activity; fish choruses remained unchanged with regards to timing and chorus level (at daily, lunar and seasonal scales); these findings suggest that in the long-term the survey had little effect on the fish that produced the choruses. Underwater visual censuses (UVC) revealed that diversity and abundance of both Pomacentridae (damselfishes and clownfishes) and non-Pomacentridae fish species (inhabtiting shallow-slope regions) showed no significant changes after the seismic survey compared to the long-term temporal trend before the survey. Analysis of recordings from baited remote underwater video stations showed no detectable effects of the seismic survey on the diversity and abundance of deeper water fish communities at the spatial and temporal scales examined. Also, there were no signs of loss of individuals or of systematic re-distribution of individuals and species at any of the time scales examined.

The findings from the research at Scott Reef support those by Wardle et al. (2001), who exposed free ranging fishes inhabiting an inshore reef to sounds from a seismic source (maximum received levels of 195-218 dB re 1 µPa PK). The study found that fishes exhibited a startle response to all received levels, but no avoidance behaviours were observed, they showed no signs of moving away from the reef and exposure to the seismic noise did not interrupt a diurnal rhythm of fishes gathering at dusk. Slight changes were recorded to the long-term day-to-night movements of two tagged pollack (*Pollachius sp.*), particularly when positioned within 10 m of their normal living positions. However, the seismic sound had little effect on the day-to-day behaviour of the resident fishes and invertebrates.

Behavioural observations of two tropical snapper species and another coral reef fish species, spadefish, in field enclosures before, during and after exposure to seismic sound showed that repeated exposure resulted in increasingly less obvious startle responses (Boeger et al. 2006). This is consistent with the potential habituation suggested by McCauley et al. (2000) and by Fewtrell and McCauley (2012).

McCauley & Salgado Kent (2007) observed the behaviour of goldband snapper in fish traps in the Timor Sea using cameras placed inside the fish traps. A seismic vessel towed two 3,090 in^3 seismic sources. Maximum signals reached at the closest trap to each seismic pass-by were 200, 202 and 212 dB re 1 µPa PK-PK (equivalent to approximately 194, 196 and 206 dB re 1 µPa PK). No dramatic behavioural responses of fish to the passing seismic source were observed. Fish generally displayed increased activity immediately after entering a trap presumably as they searched for a way out, with this activity reducing with time. Fish that had been in a trap for some time showed increased activity levels as the operating seismic source approached but were 'quiet' when the array passed at the point of closest approach.

Fewtrell & McCauley (2012) showed that fishes tended to remain lower in the water column and/or swim faster and form tighter schools during periods of close air-gun emissions. Fish populations can

be potentially impacted if behavioural responses result in deflection from migration paths, feeding grounds or disturbance of spawning, thereby affecting recruitment of fish stocks.

Paxton et al. (2017) observed temperate reef fishes, including snapper and grouper species, in 33 m water depths located 7.9 km from a seismic survey line using video recordings. The authors observed fish abundance and habitat use during the evening hours for three days prior to a seismic survey and then during the evening of the day when seismic activity occurred. The authors attempted to measure sound at two other reefs in closer proximity to the survey, but the hydrophones malfunctioned. No video recordings were made at the other reefs where hydrophone measurements were attempted. No hydrophone measurements were made at the reef where video recordings took place, but maximum sound levels were estimated to be more than 170 dB re 1 µPa SPL. Despite no clear visual evidence of behavioural responses in fishes during the seismic survey, the authors noted a 78% decline in abundance in the evening following the survey. No further recordings were made to assess when fish abundance returned to pre-exposure levels or how far they may have moved. Therefore, with limited data, it is not clear from this study if reduced abundance is attributed to the seismic sound or other natural factors such as tidal influence or food availability. However, the study may indicate a possible avoidance response and temporary change in local abundance and distribution.

Bruce et al. (2018) tagged tiger flathead, which were monitored during a seismic survey undertaken in Australian waters. Minor behavioural effects were observed in exposed tiger flathead, which increased their swimming speed during the seismic survey and changed daily movement patterns after the survey but showed no significant displacement. Overall, there was little evidence for consistent behavioural responses (Bruce et al. 2018).

Davidsen et al. (2019) investigated the effects of seismic sound exposure on the physiology and behaviour of captive Atlantic cod (*Gadus morhua*) and saithe (*Pollachius virens*), both species from the Family Gadidae with a swim bladder directly involved in sound detection. Experimental sound exposures were 18-60 dB above ambient. The cod exhibited reduced heart rate in response to the particle motion component of the sound from the air gun, indicative of an initial flight response. No behavioural startle response to the air gun was observed despite some observed changes in swimming depth and position, and the fish seemed to habituate both physiologically and behaviourally with repeated exposure. The authors concluded that sound exposures induced over the three day study period appear unlikely to be associated with long-term alterations in physiology or behaviour.

Hubert et al. (2020) also exposed captive Atlantic cod to one hour of playback of seismic air gun sound pulses with a 10 second shot point interval. Results indicated no strong overall pattern of change in swimming patterns or immediate, short-term behaviours during the exposure, compared to baseline periods without playback. However, several individuals changed their time spent in several behavioural states during the one-hour sound exposure, which may be indicative of changes in energy expenditure.

van der Knaap (2021) investigated the effect of a 3.5-day, full-scale, seismic survey exposure on the movement behaviour of free-swimming Atlantic cod, using acoustic telemetry. The closest point of approach to the tagging location was 2.25 km. The study found that during the experimental survey, cod did not leave the detection area more than expected from baseline data. However, cod left more quickly than expected, from two days to two weeks after the seismic survey. Furthermore, behavioural analyses indicated that during the exposure cod decreased their activity, with time spent being locally active (moving over small distances, showing high body acceleration) becoming shorter, and time spent being inactive (moving over small distances, having low body acceleration) becoming longer. Additionally, diurnal activity cycles were disrupted with lower locally active peaks at dusk and dawn–periods when cod is known to actively feed.

Meekan et al. (2021) undertook a large-scale experiment that quantified the impacts of exposure of an assemblage of tropical demersal emperors (Family Lutjanidae), snappers (Family Lethrinidae)

and groupers (Family Epinephelidae) targeted by commercial fisheries to a commercial-scale seismic source on the North West Shelf off Western Australia. Dominant species included spangled emperor (*Lethrinus punctulatus*), red emperor (*Lutjanus sebae*), and brownstripe snapper (*L. vitta*). A combination of Baited Remote Underwater Video Systems (BRUVS) and acoustic tagging methods were used to measure the behaviours and movements of fishes at high, medium, and low exposure sites, as well as at control sites. The high, medium, and low exposure sites were located at horizontal distances from the path of the seismic source of approximately 0 – 300 m, 2 – 10 km and 11 km respectively. The maximum modelled SEL values received at the high, medium, and low exposure sites were in the order of 180 – 200 dB re 1 $\mu Pa^2 \cdot s$, 130 – 160 dB re 1 $\mu Pa^2 \cdot s$ and 115 – 125 dB re 1 $\mu Pa^2 \cdot s$ respectively. There were no short-term (days) or long-term (months) effects of exposure on the composition, abundance, size structure, behaviour, or movement of fishes at any exposure sites. The authors suggest that it is a reasonable assumption that the behavioural responses of demersal fishes to the bait cue provided by the BRUVS are a realistic proxy of the likely response of the same species to baited hooks or traps used by the commercial fisheries that target them. The acoustic tags and telemetry found little evidence that fish were displaced by the exposure to the seismic source. Movements of tagged fish occurred over a limited area focused on two or three acoustic receivers, and there was no evidence for the departure of tagged fish after exposure. These multiple lines of evidence suggest that seismic surveys have little impact on the behaviours of demersal fishes in this environment.

A recent study examined behavioural responses in spawning Atlantic cod in Norway (McQueen et al. 2022, 2023). Atlantic cod (*Gadus morhua*) may be especially vulnerable to sound disturbance during spawning, as it is a soniferous fish species, with acoustic communication playing an important role in the cod mating system, and a low frequency hearing range (10 – 650 Hz). During the spawning period, male cod produce low frequency grunts (~50 Hz) that have been associated with aggressive and courtship behaviours. Low frequency noise associated with ship traffic has been found to reduce the effective communication range of spawning cod (Stanley et al. 2017; as cited in McQueen et al. 2023), and low frequency anthropogenic noise can elicit stress responses in cod resulting in reduced egg production and fertilization rates (Sierra-Flores et al. 2015). Additionally, cod tend to demonstrate high site fidelity to spawning areas. There have been reports that free-ranging cod move away from an area in immediate or delayed response to seismic surveys (Engås et al. 1996; van der Knaap et al. 2021).

To investigate whether airgun sound causes cod to leave their spawning grounds, McQueen et al. (2022, 2023) deployed acoustic telemetry arrays were on two cod spawning grounds: a test and a reference site. From 2019 to 2021, 136 mature cod from the test site and 45 from the reference site were tagged with acoustic transmitters. Intermittent seismic shooting of two 40 cui airguns for one week during the spawning periods of 2020–2021 resulted in fluctuating SELs at the test site, comparable to a full-scale industrial survey 5–>40 km away. Residency and survival of tagged cod were analysed with capture–mark–recapture models fitted to the detection and recapture data. Departure rate of the mature cod varied between spawning seasons but was similar between the test and reference sites. Cod demonstrated only weak responses to the disturbance from repeated three hour treatment periods over five days, swimming on average slightly deeper during seismic exposure compared to silent control periods. This response varied between individuals. Longer-term effects of seismic exposure on swimming depth were not detected. No changes in swimming acceleration, displacement, or area use occurred. Neither survival nor departure significantly differed between seismic exposure and baseline periods. The results indicated that exposure to airguns at received SEL of up to ~145 dB re 1 μPa^2 s, comparable to a seismic survey occurring several kilometres away, did not displace tagged cod from spawning grounds. These results suggest that relatively distant seismic surveys do not substantially alter cod behaviour during the spawning period at received sound exposure levels varying between 115 and 145 dB re 1 μPa^2 s over a five day period (McQueen et al., 2022, 2023).

The following conclusions are made regarding behavioural effects to fish from seismic airguns, based on the literature above:

- Different fish may exhibit different behavioural responses when exposed to seismic survey noise, depending on their activities, motivation and the context in which they receive sound.
- Fish may change position in the water column (i.e., move closer to the seabed) as a response to becoming aware of approaching seismic sound (e.g., Pearson et al. 1992; McCauley et al. 2000, 2003; Slotte et al. 2004; Fewtrell & McCauley 2012; Miller & Cripps 2013; Davidsen et al. 2019).
- Exposure to higher sound levels at close range to a seismic source may begin to result in more noticeable startle or alarm responses, such as changes in school structure, increased swimming speed and avoidance of the sound source (e.g., Simmonds & MacLennan 2005; McCauley et al. 2000, 2003; Fewtrell & McCauley 2012; Popper et al. 2014; Carroll et al. 2017).
- Many exposure experiments are undertaken using a single airgun and it is not clear how transferrable the behaviours and received SPL/SEL levels are to a full commercial-sized seismic array, particularly if observed behaviours are in response to particle motion close to the sound source rather than to sound pressure.
- There is some evidence that fish may also tolerate gradual increases in sound levels and habituate to repeated sound exposures (Chapman & Hawkins 1969; McCauley et al. 2000; Boeger et al. 2006; Fewtrell & McCauley 2012; Peña et al. 2013; Davidsen et al. 2019).
- Many studies indicate that fishes resume normal behaviour shortly after cessation of the acoustic disturbance (within minutes / less than an hour), with no evidence of long-term changes (e.g., Wardle et al. 2001; Pearson et al. 1992; Santulli et al. 1999; McCauley et al. 2000, 2003; Fewtrell & McCauley 2012; Miller & Cripps 2013; Davidsen et al. 2019).
- Meekan et al. (2021) found no short-term (days) or longer-term (months) effects of seismic sound exposure on the behaviour and movement of tropical demersal snapper, emperor and grouper species on the North West Shelf.
- There is some evidence that changes in distribution may persist for longer than the initial change in behaviour, i.e. position in the water column, schooling behaviours and swim speeds may return to normal relatively quickly (within minutes or hours), but their distribution may not return to normal for hours or days. Potential changes in distribution of fish has been observed in some studies for approximately five days following sound exposure, although such changes are limited to studies that focused primarily on migrating sound pressure-sensitive types of fish with a swim bladder-ear connection (e.g. Clupeidae, Gadidae). These studies also acknowledge that it is difficult to attribute these changes in distribution directly to the seismic survey or to natural migration patterns, food availability or other natural factors (Slotte et al. 2004; Engås et al. 1996; Engås & Løkkeborg 2002). However, it is possible that changes to the behaviour and distribution of some sound-sensitive prey species (e.g. herring, sardines) may have some indirect influence on the distribution of larger predatory fishes during the days following exposure and disturbance.
- Small changes in behaviour or disruption to diurnal activities of pressure-sensitive species of fish (Gadidae) with a swim bladder-ear connection may indicate that activities such as feeding and energy expenditure can be affected if exposed long-term (Davidsen et al. 2019; Hubert et al. 2020; van der Knaap 2021), although these species of fish may also habituate to the sound with repeated exposure (Davidsen et al. 2019).

Given the limited convergence in results from the available studies, the subjective nature of many assessments and the context under which fish received sound, the Popper et al. (2014) ANSI-Accredited Standards Committee Sound Exposure Guidelines for Fishes and Turtles determined

that it is not possible to define exact sound level thresholds for changes in fish behaviours. Instead, Popper et al. (2014) applies relative risk criteria. The criteria reflect the potential for substantial changes in behaviour for a large proportion of the animals exposed to a sound, which may alter distribution, and moving from preferred sites for feeding and reproduction. The criteria do not include effects on single animals or small changes in behaviour such as a startle response or minor movements. As such, Popper et al. (2014) indicate that fish without a swim bladder or with no connection between the swim bladder and the inner ear may experience substantial changes in behaviour within tens or hundreds of metres of a seismic source. These peer-reviewed and accredited sound exposure criteria are reflected in this risk assessment. It is acknowledged that some fishes with swim bladders may show varying levels of awareness of sound pressure at greater distances from the seismic source, but it is important to recognise changes in behaviour that may be of ecological significance from those that aren't.

Sand et al (2000) noted avoidance behaviour of glass eels when exposed to infrasound at a frequency of 11.8Hz and found during the periods with infrasound exposure, the proportion of silver eels entering the section closest to the sound source was reduced to 43% in the control. It should be noted this experiment was a caged study and not representative of a full-scale seismic survey.

Acoustic Masking

Masking impairs an animal's hearing impairment with respect to the relevant biological sounds normally detected within the environment and can have long lasting effects on survival, reproduction, and population dynamics of fishes. The consequences of masking for fishes; however, have not been sufficiently examined to allow a thorough assessment of effects caused in the context of this survey. Popper et al. (2014) surmised that "*It is likely that increments in background sound within the hearing bandwidth of fishes and sea turtles may render the weakest sounds undetectable, render some sounds less detectable, and reduce the distance at which sound sources can be detected. Energetic and informational masking may increase as sound levels increase, so that the higher the sound level of the masker, the greater the masking*." If impulsive sounds are generated repeatedly by many sources over a wide geographic area there is a possibility that the separate sounds might merge and that the overall background noise be raised (Nieukirk et al. 2004). However, acoustic masking only occurs while the interfering sound is present, and therefore, masking resulting from a single pulse of sound (such as seismic source impulses) or widely separated pulses would be infrequent and not likely affect an individual's overall fitness and survival.

5.1 Sharks

Myrberg (2001) stated that sharks differ from bony fishes in that they have no accessory organs of hearing such as a swim bladder and therefore are unlikely to respond to acoustical pressure. The study also suggested that the lateral line system does not respond to normal acoustical stimuli and is unable to detect sound-induced water displacements beyond a few body lengths, even with large sound intensities (Myrberg 2001).

Chapuis et al. (2019) detailed that the auditory apparatus of sharks comprises the paired inner ears that, as in all fishes, detect the particle motion component of a sound. However, unlike most bony fishes, cartilaginous fishes do not possess a swim bladder, which responds to the pressure component of a sound, and therefore are thought to only be sensitive to particle motion. Though Lobel (2009) noted that at very loud levels, an elasmobranch is able to discriminate between sounds based upon the phased difference between particle motion and acoustic pressure (Lobel 2009).

Two sensory maculae, the sacculus and the macula neglecta, have been shown to be responsive to particle motion detection in the inner ear of cartilaginous fishes which are known to be sensitive to low frequency sounds up to 1.5 kHz, peaking between 200 and 600 Hz, depending on the species (Chapuis et al. 2019). This range overlaps with seismic pulses which are primarily less than 2 kHz, with the highest levels at frequencies in the range of 10-500 Hz (McCauley 1994).

There is some indication that a sudden onset of sound can also cause a startle response in sharks (Myrberg et al. 1978). Klimley and Myrberg (1979) established that an individual shark will suddenly turn and withdraw from a sound source of high intensity (more than 20 dB re 1 µPa above broadband ambient SPL) when approaching within 10 m of the sound source.

Research by Bruce et al. (2018), which tagged two shark species and monitored their movements in response to a seismic survey in Australian waters noted that both control sharks and exposed sharks moved freely in and out of the study area which did not indicate any changes in behaviour or distribution as a result of seismic sound exposure.

A study by Chapuis et al. (2019) used a baited underwater camera rig to record the behavioural responses of eight species of sharks (seven reef and coastal shark species and the white shark) to the playback of two distinct sound stimuli in the wild: an orca call sequence and an artificially generated sound. The aim of the study was to look at sound-induced behavioural changes in sharks to potentially identify acoustic repellent devices. When sounds were playing, reef and coastal sharks were less numerous in the area, were responsible for fewer interactions with the baited test rigs, and displayed less 'inquisitive' behaviour, compared to during silent control trials. White sharks spent less time around the baited camera rig when the artificial sound was presented but showed no significant difference in behaviour in response to orca calls.

It is noted that there has been reported cased of sharks biting the seismic streamers, such as during seismic surveys conducted by the survey vessel *Pacific Titan* in New Zealand waters.

6 Marine Turtles

Morphological studies of green turtles (*Chelonia mydas*) and loggerhead turtles (*Caretta caretta*) (Ridgway et al. 1969; Wever 1978; Lenhardt et al. 1985) found that the turtle ear is similar to other reptile ears but has adaptations for underwater listening. In-air electrophysiological and behavioural studies on green and loggerhead turtles found their hearing frequency range is approximately 50-2,000 Hz, with highest sensitivity to sounds between 200 and 400 Hz (Ridgway et al. 1969; Bartol et al. 1999; Ketten & Bartol 2005; Bartol & Ketten 2006; Yudhana et al. 2010; Piniak et al. 2011; Lavender et al. 2012, 2014).

Underwater audiograms are only available for three species, all of whom have poor hearing sensitivity. Two of these species, the red-eared slider (*Trachemys scripta elegans*, freshwater, semi-aquatic) (Christensen-Dalsgaard et al. 2012) and the loggerhead turtle (Martin et al. 2012), demonstrated highest sensitivity at around 500 Hz (Willis 2016). Piniak et al. (2016) found that green turtles have maximum underwater sensitivity between 200 and 400 Hz. Very little research has been performed on the hearing capabilities of hawksbill turtles (*Eretmochelys imbricata*). Yudhana et al. (2010) measured auditory brainstem responses from two hawksbill turtles in Malaysia and found that peak frequency sensitivity occurred at 457 Hz in one turtle and at 508 Hz in the other.

There is no robust information on the susceptibility of marine turtles to noise-induced effects. Most studies researching the effect of seismic noise on marine turtles focused on behavioural responses, as physiological impacts are more difficult to observe in living animals. Turtles avoid low-frequency sounds (Lenhardt 1994) and sounds from an air gun (O'Hara & Wilcox 1990), but these reports did not note received sound levels. Moein et al. (1995) found that penned loggerhead turtles initially reacted to an air gun but then showed little or no response to the sound (i.e., habituated to it). Caged green and loggerhead turtles increased their swimming activity in response to an approaching air gun when the received SPL was above 166 dB re 1 µPa, and they behaved erratically when the received SPL was approximately 175 dB re 1 µPa (McCauley et al. 2000).

The 166 dB re 1 µPa level has been used as the threshold level for a behavioural response to marine turtles by NMFS and applied in the Arctic Programmatic Environmental Impact Statement (PEIS) (NSF 2011) and the Recovery Plan for Marine Turtles in Australia (DoEE 2017). The 175 dB re 1 µPa level from McCauley et al. (2000) is recommended as the threshold for behavioural disturbance. Sound levels defined by Popper et al. (2014) show that animals are very likely to exhibit a behavioural response when they are near an air gun (tens of metres), a moderate response if they encounter the source at intermediate ranges (hundreds of metres), and a low response if they are far (thousands of metres) from the air gun.

Mortality and potential mortality injury (PMI) impacts have not been reported to have occurred in turtles as a result of noise emissions during seismic surveys. Popper et al. (2014) suggested injury to turtles could occur for sound exposures above 207 dB re 1 µPa (PK) or above 210 dB re 1 $uPa^2 \cdot s$ (SEL_{24h}). However, (Finneran et al. 2017, updated by Accomando et al 2025) presented revised thresholds for turtle injury and hearing impairment from impulsive noise, considering both PK and frequency weighted SEL, suggesting that PTS may occur in response to received levels of 204 dB re 1 $uPa^2 \cdot s$ (SEL_{24h}) or 232 dB re 1 µPa (PK) and TTS may occur in response to received levels of 189 dB re 1 $uPa^2 \cdot s$ (SEL_{24h}) or 226 dB re 1 µPa (PK).

7 Birds

There is very little known about the effects of intense underwater sound (i.e. seismic surveys) on marine birds. However, impacts have not been observed during previous seismic surveys (Turnpenny and Nedwell, 1994), and it is generally thought that noise produced from activities associated with seismic surveys may impact only those species of birds that spend large quantities of time underwater, either swimming or plunge diving while foraging for food, for example penguins.

Pichegru et al. (2017) investigated the behavioural response of endangered African penguins (*Spheniscus demersus*) before, during and after a seismic survey conducted within 100 km of their breeding colony in South Africa, using a multi-year GPS tracking dataset.

Penguins foraging within 100 km of the active seismic operations showed a change of foraging direction during seismic periods, increasing their distance between their feeding area and the location of the seismic vessel. The avoidance behaviour by penguins observed in this study may be explained by either a direct disturbance from the noise generated by the operation or a change in fish distribution during that period (possibly as a result of seismic activities). Small-scale acoustic fish surveys assessing distribution and abundance of small pelagic fish in Algoa Bay around both penguin colonies did not show a significant change in distribution and/or abundance of small pelagic fish in the region in March 2013 compared to a few months prior to or after the seismic operations. Therefore, African penguins likely relocated away from their traditional feeding zone to avoid the disturbance generated by the noise of the seismic vessels, rather than to follow their prey.

The African penguins quickly reverted to normal foraging behaviour after cessation of seismic activities during this study, which suggest a relatively short-term influence of seismic activity on these birds' behaviour and/or that of their prey. Most bird and many fish species have the capacity to regenerate lost or damaged sensory cells of the ear, although the researchers could not rule out potential longer-terms impacts on the penguins hearing ability.

Stemp (1985; as cited in LGL 2012) conducted observations on the effects of seismic exploration on seabirds and did not observe any negative effects.

Lacroix et al. (2003) assessed the effect of near shore seismic surveys on the foraging behaviour of moulting long-tailed ducks in the Beaufort Sea, Alaska. Long-tailed ducks are not capable of flying during the moult and to compensate for the nutritionally costly moult process they increase their foraging. Lacroix et al. (2003) found that the abundance and distribution of ducks, in both the seismic and control areas, changed similarly following the start of the seismic operations suggesting other influencing factors such as wind were more important for duck distribution than seismic activities, and that seismic activities did not significantly change the diving intensity of ducks. Overall Lacroix et al. (2003) concluded that there was no evidence to suggest any displacement away from seismic operations.

In a controlled exposure experiment, Sørensen et al. (2020) exposed captive Gentoo Penguins (*Pygoscelis papua*) to impulsive signals, and most animals showed strong aversive reactions at received levels above 120 dB re 1µPa (SPL). While the experiment made efforts to reduce some of the limitations of captive experiments, the study is still difficult to reconcile exposures to sudden sound stimuli at close range (metres) in the absence of natural ocean background noise with a real-life exposure.

8 Marine Mammals

The potential impacts of anthropogenic noise on marine mammals have been the subject of considerable research (see reviews by Nowacek et al. 2007; Southall et al. 2007; Weilgart 2007; Wright et al. 2007; Southall et al. 2019; Southall et al. 2021).

Kavanagh et al. (2019) modelled over 8,000 hours of cetacean survey data across diverse offshore region of the Northeast Atlantic to investigate the effect of seismic surveys on baleen and toothed whales. They found a significant effect of seismic activity across multiple species and habitats, with an 88% (82–92%) decrease in sightings of baleen whales, and a 53% (41–63%) decrease in sightings of toothed whales during active seismic surveys when compared to control surveys. Significantly fewer sightings of toothed whales also occurred during active versus inactive air gun periods of seismic surveys, although some species-specific response to noise was observed.

Southall et al. (2007), Finneran & Jenkins (2012), Wood et al. (2012), Finneran (2015) and more recently NMFS (2018) and Southall et al. (2019, 2021) and most recently updated by Accomando et al 2025), reviewed available literature to determine noise exposure criteria, based on the onset levels of non-recoverable PTS and TTS in cetaceans. The NMFS (2018) criteria incorporate the best available science to inform assessment of PTS and TTS. However, a lack of a quality low-frequency (LF) cetacean audiograms has made it difficult to precisely determine hearing sensitivity, and the criteria for LF cetaceans are likely precautionary.

Hearing Sensitivity

Current data and predictions show that marine mammal species differ in their hearing capabilities, absolute hearing sensitivity and frequency band of hearing (Richardson et al. 1995; Wartzok & Ketten 1999; Southall et al. 2007). While hearing measurements are available for a small number of species based on captive animal studies, direct measurements of many odontocetes and all mysticetes do not exist. As a result, hearing ranges for many odontocetes are grouped with similar species, and predictions for mysticetes are based on other methods, such as anatomical studies and modelling (Houser et al. 2001; Parks et al. 2007; Tubelli et al. 2012; Cranford & Krysl 2015), vocalizations (see reviews in Richardson et al. 1995; Wartzok & Ketten 1999; Au & Hastings 2008), taxonomy, and behavioural responses to sound (Dahlheim & Ljungblad 1990)

To better reflect the auditory similarities between phylogenetically closely related species, but also significant differences between species groups among the marine mammals, Southall et al. (2007) defined five groups of marine mammals, based on phylogenetic relationships and a combination of auditory, physiological, and behavioural characteristics, where known. A revised set of marine mammal hearing groups and associated frequency-weighting functions were proposed by Finneran (2016) and these groups were adopted in technical guidance (NMFS 2018) as a useful approach in developing auditory weighting functions and deriving noise exposure criteria for marine mammals. In 2019, Southall et al. reviewed these marine mammal hearing groups and modified them based on phylogenetic relationships and a comprehensive review of studies on hearing, auditory anatomy, and sound production (Southall et al. 2019). This review resulted in eight discrete hearing groups as detailed in Table B8-3.

Frequency weighting

Different animals are sensitive to different sound frequencies, which are measured in Hertz (Hz) and kiloHertz (kHz). Therefore, if an animal is sensitive to a particular frequency range, a sound in that frequency range will seem louder to that animal than to a different animal that is less sensitive to those frequencies. For example, some large baleen whales are sensitive to very low frequency sounds (7 Hz to 35 kHz), while toothed whales and dolphin species are considered more sensitive to mid-high frequency sounds (150 Hz to 160 kHz) with their peak hearing frequency somewhere between these frequency ranges (NMFS 2018). Therefore, how loud a sound will be perceived will differ between species.

As the hearing of different species of marine fauna is frequency dependent, rather than express received sound pressures in terms of their levels over a broad bandwidth, levels can be weighted by the frequency response of hearing for the animal. This approach has been widely used for examining exposure of humans to sound (Popper et al. 2014). Southall et al. (2007) developed M frequency weighting functions (M-weightings) for five functional hearing groups of marine mammals, with this method designed specifically to represent the broader bandwidth at which auditory effects (TTS and/or PTS) might occur for higher exposures. Southall et al. (2019) expanded on this approach to provide M-weighting functions for eight marine mammal hearing groups, including LF cetaceans, HF cetaceans, VHF cetaceans, sirenians, phocid carnivores and other marine carnivores (refer to Table B8-3).

Table B8-3 - Marine Mammal Hearing Groups

Group	Genera or species included
Low-frequency (LF) cetaceans	The LF cetacean group contains all of the mysticetes: Balaenidae (*Balaena* spp. and *Eubalaena*, Neobalenidae (*Caperea*), Eschrichtiidae (*Eschrichtius*), and Balaenopteridae (*Balaenoptera* spp. and *Megaptera*).
High frequency (HF) cetaceans	The HF cetacean group contains most delphinid species (e.g., bottlenose dolphin, common dolphin, and pilot whale), beaked whales, sperm whales and killer whales.
Very high frequency (VHF) cetaceans	The VHF cetacean group comprises the true porpoises, most river dolphin species, pygmy/dwarf sperm whales, as well as number of oceanic dolphins (Commerson's, Chilean, Heaviside's, Hector's, Hourglass, and Peale's dolphins).
Sirenian (SI)	The SI group includes the manatees and dugongs.
Phocid Carnivores in Air (PCA) and Water (PCW)	This group contains all the true seals, including harbour, grey, and freshwater seals; elephant and monk seals; and both Antarctic and Arctic ice seals.
Other Marine Carnivores in Air (OCA) and Water (OCW)	This group contains all non-phocid marine carnivores, including the otariid seals (sea lions and fur seals), walruses, sea otters, and polar bears.

Behavioural Effects

Differences between species, individuals, exposure situational context, the temporal and spatial scales over which they occur, and the potential interacting effects of multiple stressors can lead to inherent variability in the behavioural response of marine mammals to sound exposure (Southall et al. 2021).

Southall et al. (2007) presented a severity-index ranking the intensity of behavioural responses that was later amended by Ellison et al. (2012), Miller et al. (2012), and Sivle et al. (2015) and has recently been updated by Southall et al. (2021) based primarily on studies of free-ranging mammals.

The NMFS currently uses a step function with a 50% probability of inducing behavioural responses at an SPL of 160 dB re 1 µPa to assess behavioural impact. This threshold value was derived from the HESS (1999) report, which, in turn, was based on the responses of migrating mysticete whales to seismic sounds (Malme et al. 1983, 1984). The HESS team recognized that behavioural responses to sound may occur at lower levels, but significant responses were only likely to occur above an SPL of 140 dB re 1 µPa. An extensive review of behavioural responses to sound was undertaken by Southall et al. (2007), which found varying responses for most marine mammals between an SPL of 140 and 180 dB re 1 µPa, consistent with the HESS (1999) report.

In 2012, Wood et al. (2012) proposed a graded probability of response for impulsive sounds using a frequency weighted SPL metric (see Table B8-4). They designated behavioural response categories

for sensitive species (such as harbour porpoises, *Phocoena phocoena*, and beaked whales) and for migrating mysticetes.

Table B8-4 - Graded Probability of Response for Impulsive Sounds

Marine Mammal Group	Probability of response to frequency -weighted SPL (dB re 1 µPa)			
	120	140	160	180
Sensitive species	50%	90%		
Other species		10%	50%	90%

McCauley et al. (2000) monitored the effects of seismic survey sounds on humpback whales in the Exmouth Gulf region of Western Australia. They documented rapid swimming on the surface, breaching and localised avoidance behaviour by migrating whales during the seismic operation, indicating that the 'risk factor' associated with the marine seismic survey was confined to a comparatively short period and small range displacement. During their migration and breeding season, humpback whales rarely display deep dives. This tendency to stay close to the surface has been interpreted as actively utilising the 'sound shadow' (Lloyd's Mirror effect) near the surface; irrespective of the motivation for this behaviour, it reduces the risk for noise-induced effects unless at very short range from a large seismic source array.

A comparison of behavioural observations of humpback whale behaviour during seismic surveys shows the variability and context dependence of these responses (Richardson et al. 1995). McCauley et al. 2000) estimated that humpback whales would avoid seismic surveys in key habitat (such as breeding, resting, or feeding areas) at distances between 7 and 12 km, whereas migrating individuals generally showed an avoidance range of around 3 km. Some males have even been recorded approaching seismic survey vessels to within 1 to 2 km (McCauley et al. 2000). It is considered that avoidance behaviour represents a temporary and minor effect, unless avoidance results in displacement of whales from breeding, resting, or feeding areas.

The BRAHSS (Behavioural Response of Australian Humpback whales to Seismic Surveys) project conducted studies at Peregian Beach in Queensland, and off Dongara in Western Australia, to better understand the behavioural responses of humpback whales to noise from the operation of seismic air gun arrays (20 in^3 and 140 in^3 arrays) (Cato et al. 2013). Results from the experiments are published in Dunlop et al. (2015, 2016, 2017a, b). The BRAHSS Project found:

- Humpback whale groups responded by decreasing both dive time and speed of southwards movement though the response magnitude was not found to be related to the proximity of the source vessel, the received level of the air gun, the tow path direction, or the exposure time within the during phase. There was no evidence of orientation of the groups towards, or away from, the source vessel in the during phase. Interestingly, this behavioural response was found in the control trials as well as the active trials suggesting a response to the source vessel.
- No abnormal behaviours were recorded during the trials. However, in response to the active seismic array and the controls, the whales displayed changes in behaviour. Changes in respiration rate were of a similar magnitude to changes in baseline groups being joined by other animals suggesting any change group energetics was within their behavioural repertoire. However, the reduced progression southwards in response to the active treatments, for some cohorts, was below typical migratory speeds. This response was more likely to occur within 4 km from the array at received levels over 135 dB re 1 μPa^2.s
- Humpback whales were more likely to avoid the air gun arrays (but not the controls) within 3 km of the source at levels over 140 re. 1 μPa^2 s, meaning that both the proximity and the

received level were important factors and the relationship between dose (received level) and response is not a simple one.

The results of the BRAHSS study are consistent with previous studies with humpback whales in different behavioural contexts. Feeding humpback whales, for example, responded at ranges up to 3 km from the source, at levels of 150-169 dB re 1 µPa (Malme et al. 1985). Resting female humpback whales with calves displayed avoidance reactions at 140 dB re 1 µPa, though other cohorts reacted at higher levels (157-164 dB re 1 µPa - McCauley et al. 2000).

Recent research has found that male humpback whales switch to singing in the presence of seismic airguns (Dunlop and Noad 2024). They found that during periods of active air guns, the number of male singing whales increased, and singers were more likely to be observed joining females, while conversely, non-singing males were less likely to engage in joining interactions suggesting that active air guns caused a switch in male breeding tactics.

Blackwell et al. (2015) found evidence for two behavioural thresholds in migrating bowhead whales responding to seismic operations in the Beaufort Sea. A moderate cessation or modification of vocal behaviour (interpreted as compensation behaviour) was found at received SEL over a 10 minute period of 94 dB re 1µPa²·s (increase of calling rates) and 127 dB re 1µPa²·s (decrease in calling rates). At received levels of >160 dB re 1µPa²·s; however, whales were completely silent. Robertson et al. (2013) detected changes in surfacing, respiration, and diving behaviour of bowhead whales in response to seismic survey activity but did not provide any qualitative information on the received levels. Castellote et al. (2010) documented avoidance behaviour in fin whales in response to seismic survey activity in the Mediterranean Sea lasting over 10 days.

Observations of sperm whale behaviour during seismic surveys provided conflicting results: Stone (2003) identified that while sperm whales were frequently (visually) detected during seismic surveys, these animals did not show any observable behavioural reactions. Jochens et al. (2008) found sperm whales tolerant of seismic activity; however, a decrease in foraging activity was observed for a small number of animals but no horizontal avoidance was measured. In a tagging study, Jochens and Biggs (2003) found that sperm whales did not show any behavioural reaction (horizontal avoidance of the seismic vessel, change in feeding rates) at maximum received levels of 148 dB re 1µPa.

In the Gulf of Mexico, sperm whales were equipped with multisensory tags to investigate their behaviour in response to seismic surveys. The animals did not show any statistically significant changes in horizontal movement, diving and echolocation behaviour at received levels of approximately 118–131 dB re 1µPa²·s ($SEL_{M\text{-}weighted}$) (Miller et al. 2009).

The hearing of dolphins (HF cetaceans) is less sensitive in the low frequency range of air gun impulses (<500 Hz) and seismic operators sometimes report dolphins and other small toothed whales near operating seismic source arrays. However, there is a component of seismic pulses in the higher spectrum and in general most toothed whales do show some limited avoidance of operating seismic vessels. Goold (1996) studied the effects of seismic surveys common dolphins (*Delphinus delphis*) in the Irish Sea. The results indicated that there was a local displacement of dolphins around the seismic operation. This observation is consistent with visual data compiled by Stone (2003) from marine mammal surveys in the North Sea that shows small toothed whale species tend to move away from operating compressed air seismic sources. In a review of behavioural effects of seismic surveys on marine mammals in UK waters, Stone and Tasker (2006) reported that small odontocetes (dolphins, HF cetaceans and porpoises, VHF cetaceans) showed the strongest avoidance response to the seismic survey activity, were seen less often during periods of seismic acquisition, remaining further from the air guns and showing altered behaviour (e.g., less bow-riding, orienting away from the survey vessel, faster swimming). The same study documented that killer whales also showed some localised avoidance to seismic surveys.

A reduction in feeding activity in response to seismic survey activity has been documented for harbour porpoises at estimated received SEL of 150 – 165 dB re 1µPa²·s (Pirotta et al. 2014). Due to the

permanently high energy demands of harbour porpoises (Wisniewska et al. 2016) a prolonged cessation of feeding can have significant effects on the fitness of affected animals.

Gotz et al. (2009) reported that controlled exposure experiments with small acoustic sources (215 - 224 dB re 1µPa) were carried out over one hour to individual harbour seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*), and in seven out of eight trials with harbour seals, the animals exhibited strong avoidance reactions.

Two harbour seals equipped with heart rate tags showed immediate, but short-term, startle responses to the initial acoustic source pulses. The behaviour of all harbour seals seemed to return to normal soon after the end of each trial, even in areas where disturbance occurred on several consecutive days. Only one harbour seal showed no detectable response to the acoustic sources and approached the acoustic source to within 300 m, and seals remaining in the water returned to pre-trial behaviours within two hours of the end of the experiment (Gotz et al. 2009). General avoidance behaviour of other Northern Hemisphere seal species was exhibited at exposure levels above 170 dB re 1µPa.

Monitoring studies (Harris et al. 2001) undertaken on the behaviour of phocid seals (more sensitive to sound than otariid pinnipeds) during a nearshore seismic program in Alaska observed that:

- During daylight hours seals were seen at nearly identical rates during periods where there were no air guns firing, one air gun firing and the full array operational.
- Seals tended to be further away during full array seismic. Swimming away was more common during full array operation than no air gun periods, but relative behaviours (looked, approached, swam parallel to boat's track, dive or swam away when full array was firing) did not differ significantly among the distance categories.
- Approximately 79% of seal sightings were within 250 m of the seismic vessel. There was partial avoidance of the zone less than 150 m from the vessel during full array seismic, but seals did not move much beyond 250 m at any time.
- Received levels of noise pulses from the full array were ≥180 dB SPL out to a radius of 1 km. Despite this, many seals showed little or no obvious avoidance and no obvious tendency to avoid diving.

Darias-O'Hara et al. (2025) presents research conducted by a team of experts attempting to determine thresholds for Antarctic marine mammal species. The work conducted on LF cetaceans relied heavily on the extensive body of research on humpback whale responses to seismic airguns, using these studies as the primary evidence base. These results were then adjusted to infer how other low-frequency species may respond, drawing on comparative studies across marine mammals. This approach produced a median behavioural response threshold of 139 dB, driven predominantly by humpback whale data and supported by broader cross-species insights.

Darias-O'Hara et al. note the lack of consensus globally on the most appropriate behavioural thresholds for marine mammals, emphasising that different permitting agencies apply different metrics and, as a result, harmonising to a single universal threshold is not currently feasible. The study also recognises that the elicitation process revealed "*significant uncertainty – driven by a lack of data – on how marine mammal species respond to these sound sources*," particularly when attempting to apply results from different species, sound sources, or regions to Antarctic EIAs. The authors reinforce this point, stating that "*the distributions clearly highlight the uncertainty associated with these thresholds. Critically, these behavioural response thresholds are restricted to the scenarios and assumptions in this elicitation. Specifically, these thresholds are appropriate for use in applications in Antarctic waters where the definition of response is the same as applied here*."

The behavioural thresholds presented represent the average levels at which responses with potential fitness consequences may begin to occur, offering a reasonably conservative basis for delineating areas where significant behavioural changes could arise. However, whether these responses result in meaningful biological impacts depends on several external factors, including activity duration, individual health, prey availability, and recovery capacity. While the thresholds reflect expert judgement certainty, the accompanying dose–response functions capture variability and uncertainty within and between species. As Darias-O'Hara et al. acknowledge, this work represents a necessary early step toward refining impact assessment, but substantial knowledge gaps remain. Further research is essential for regulators to more confidently assess and mitigate the effects of anthropogenic noise on Antarctic marine mammals as research activity in the region continues to expand.

Physiological Effects

A study on the physiological response of Arctic Narwhals to anthropogenic noise found individuals had marked cardiovascular, respiratory and locomotor reactions in response to seismic pulses. Noise exposed Narwhals experienced a 2-2.2-fold increase in the energetic cost of diving, whilst paradoxically heart rate reduced (bradycardia). Williams et. al. 2022 compared these results to studies on trained harbour porpoises (Phocoena phocoena, Elmegaard et al., 2021) and a closely related species, the Beluga Whale (Delphinapterus leucas, Lyamin et al., 2011). In the harbour porpoise study, the cetaceans initially had intensified levels of bradycardia, however this response diminished as they habituated to the noise. In the Beluga Whale study, the continued noise exposure resulted in eventual bradycardia. These studies are impacted by variation in environmental conditions and type of fear stimuli (Williams et. al. 2022). [Paragraph has been added in response to Matter M11].

Acoustic Masking

Masking is the process by which the threshold of hearing for one sound is raised by the presence of another (masking) sound (Erbe & Farmer 1998; Erbe 2008; Erbe et al. 2016). This describes the reduction in audibility for one sound (termed 'signal') caused by the simultaneous presence of another sound (termed 'noise'). For this to occur, the sound must be loud enough, have similar frequency content to the signal, and must happen at the same time. Masking depends on the spectral and temporal characteristics of signal and noise and is reduced if the signal and noise are separated in time, frequency, or direction (space); it can occur if the noise happens shortly before or after the signal (forward and backward masking). The zone of masking can maximally be as large as the zone of audibility, as a faint noise might mask a faint signal. The masking effect can be reduced or remedied by various active or passive mechanisms for masking-release, such as spatial or temporal release from masking, the Lombard effect, or co-modulation masking release.

Auditory masking can lead to disruption of a behaviour, lack of appropriate behavioural reactions, increased vulnerability to predators, reduced access to prey, reduced communication, changes in vocal behaviour, disruption of spawning activities, and stress. The biological significance of acoustic masking is directly linked to the duration of the masking sound. While masking can be detrimental to the fitness, reproduction, and survival of individuals, it ends immediately after the masking sound ceases. Both anthropogenic and natural marine sound can affect hearing and partially or completely reduce an individual's ability to effectively communicate; detect important predator, prey, and/or conspecific signals; and detect important environmental features associated with spatial orientation (Clark et al. 2009). This is true for all marine fauna; however, masking is most frequently associated with marine mammals. Masking in fishes has not been studied in detail.

Masking reduces the communication space of marine mammals (Clark et al. 2009; Hatch et al. 2012). A calculation of reductions in communication range can be a useful proxy for impact. So far, a direct

assessment and quantification of masking effects in wild animals has proven impossible (Tougaard et al. 2015). It depends on the positions of the signalling and the receiving animal relative to the sound source and to each other. In humpback whales (*Megaptera novaeangliae*), tonal and grunting sounds acting as contact calls between a mother and its calf were recorded at comparatively low levels (Videsen et al. 2017). While there is controversy about the validity of conclusions, such low levels would create a small communication space (<100 m) which, in turn, would be sensitive to increases in ambient noise.

Most studies related to masking effects in marine mammals have investigated the auditory parameters that are most relevant in this context, such as auditory sensitivity, frequency-tuning (critical bandwidth and critical ratio), auditory integration time, and critical interval. Erbe et al. (2016) reviewed the current knowledge on masking in marine mammals, summarising data on marine mammal hearing as they relate to masking and discussing masking release processes of receivers. The variability seen in auditory sensitivity (see Hearing sensitivity) indicates the variability seen with respect to auditory masking.

Temporary Threshold Shift and Permanent Threshold Shift

In marine mammals, the onset level and growth of TTS is frequency specific, depends on the temporal pattern, duty cycle, and the hearing test frequency of the fatiguing stimuli. Exposure to intense impulse noise might be more hazardous to hearing than non-impulsive noise, and there is a positive relationship between exposure duration and the amount of TTS induced. TTS can accumulate across multiple exposures, but the resulting TTS will be less than the TTS from a single, continuous exposure with the same total sound exposure level. Sounds generated by seismic sources, pile driving and mid-frequency sonars have directly been tested and proven to cause noise-induced threshold shifts in marine mammals at high received levels. Finneran (2015) reviewed the current state of knowledge on TTS and PTS. TTS typically decreases in marine mammals relative to the logarithm of the increasing recovery time. However, there is considerable individual difference in all TTS-related parameters between subjects and species tested so far.

PTS is considered injurious in marine mammals, but there are no published data on the sound levels that cause PTS in marine mammals. Hence, PTS effects in marine mammals should be viewed as theoretical, as they have never actually been demonstrated in either captive or wild animals. Regeneration of sensory cells, as known to occur in fishes, has not been documented for any marine or terrestrial mammal. Onset levels of PTS onset are typically extrapolated from TTS onset levels and assumed growth functions (Southall et al. 2007). The NMFS (2018) criteria incorporate the best available science to estimate PTS onset in marine mammals from sound energy (SEL_{24h}), or very loud, instantaneous peak sound pressure levels. Criteria are given separately for each cetacean functional hearing group and discriminate between impulsive and non-impulsive sounds. Southall et al. (2019) undertook a comprehensive review of all available data on direct measures of hearing auditory anatomy, and emitted sound characteristics for all marine mammal species. The quantitative process undertaken resulted in exposure criteria, in many respects identical to those derived by Finneran (2016) and adopted by the NMFS (2016, 2018); however, the Southall et al. (2019) exposure criteria (Table B8-5) appear in a peer-reviewed publication and include marine mammal species for all noise exposures, both under water and in air for amphibious species.

Table B8-5 - TTS- and PTS-onset Thresholds for Marine Mammals Exposed to Impulsive Noise

Marine mammal hearing group	TTS onset: SEL (weighted)	TTS onset: Peak SPL (unweighted)	PTS onset: SEL (weighted)	PTS onset: Peak SPL (unweighted)
LF	168	213	183	219
HF	170	224	185	230
VHF	140	196	155	202
SI	175	220	190	226
PCW	170	212	185	218
OCW	188	226	203	232
PCA	123	138	138	144
OCA	146	161	161	167

The role of the temporal pattern of sound on TTS in marine mammals has been studied in MF and HF cetaceans (Mooney et al. 2009; Finneran et al. 2010; Kastelein et al. 2014; Kastelein et al. 2015). The results of these studies show that TTS can accumulate across multiple exposures, but the resulting TTS will be less than the TTS from a single, continuous exposure with the same total SEL.

Only a few studies have investigated TTS in marine mammals in response to exposure to impulsive sounds such as seismic impulses. Lucke et al. (2009) tested the effect of a single seismic source on a male harbour porpoise. They documented onset of TTS at received (unweighted) SEL of 164 dB re 1 $\mu Pa^2 \cdot s$. This equates to a (HF) weighted SEL_{24h} of 140 dB re 1 $\mu Pa^2 \cdot s$ (NOAA 2016). The main energy of the fatiguing stimulus (seismic pulse) was centred below 500 Hz, but a substantial amount of energy was also present at higher frequencies. Kastelein et al. (1997) tested the auditory tolerance of a harbour porpoise to playbacks of broadband pile driving sounds. After one hour of exposure an unweighted SEL 146 dB re 1 $\mu Pa^2 \cdot s$ and a SEL_{24h} of 180 dB re 1 $\mu Pa^2 \cdot s$, a TTS of 2.3 dB and 3.6 dB occurred at 4 kHz and 8 kHz, respectively. The average weighted SEL_{24h} from these exposures was 144 dB re 1 $\mu Pa^2 \cdot s$.

In a study using playbacks of pile driving sounds, Kastelein et al. (2013) exposed harbour porpoises to a maximum single-strike unweighted broadband SEL of 145 dB re 1 $\mu Pa^2 s$ and a cumulative SEL_{24h} of up to 187 dB re 1 $\mu Pa^2 \cdot s$. TTS increased from 0 dB after 15 minutes exposure to 5 dB after 360 minutes exposure. Based on their results, they calculated an onset of TTS for this type of sound at a SEL_{24h} of approximately 175 dB re 1 $\mu Pa^2 \cdot s$. Kastelein et al. (2017) exposed a harbour porpoise to 10 and 20 consecutive seismic impulses at received SEL_{24h} of 188-191 dB re 1 $\mu Pa^2 \cdot s$ with a mean shot intervals of around 17 seconds. TTS of ~4.4 dB was measured at 4 kHz.

Finneran et al. (2015) tested the exposed three bottlenose dolphins to 10 impulses produced by a seismic source. The highest exposures were conducted at peak sound pressure levels (PK) of 210 dB re 1 µPa, peak-peak sound pressure levels (PK-PK) of 212 dB re 1 µPa, and cumulative (unweighted) SEL_{24h} of 195 dB re 1 $\mu Pa^2 \cdot s$. This exposure induced 9 dB TTS in one animal at 8 kHz.

9 Commercial Fishing Catch and Abundance Effect Studies

Some effort to relate fishing catch data to marine seismic survey effects has been undertaken, but to date none of the Australian efforts to relate catch data with marine seismic surveys have yielded significant results. Elsewhere, the potential effects of seismic operations on fish distribution, local abundance or catch have been examined for some teleost species with varying results (Carroll et al. 2017).

A range of behavioural responses have been observed in wild fish in the presence of anthropogenic sound. Studies suggest that fish will generally move away from a loud sound source to minimise their exposure, but this response may depend upon the animal's motivational state. Anthropogenic sound (including marine seismic surveys) has been shown to cause changes in schooling patterns and distribution (Engås et al. 1996; Engås and Lokkeborg 2002; Slotte et al. 2004; Lokkeborg et al. 2012; Popper at al. 2014; Streever et al. 2016) potentially altering the catchability of commercially valuable species or recreationally targeted species.

The following studies have relevance to commercial fish and invertebrate species with respect to their catchability:

- The effects of a marine seismic survey on demersal long-line and trawl catch rates of Atlantic cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) in Norway after a marine seismic survey were shown to fall by 45% and 70% respectively five days after survey completion (Engås et al., 1996). Based upon this decline Engås et al. (1996) hypothesised a reduction in catch rates due to fish avoidance behaviour, but this was not quantified. Similar reductions in catch rates (52% decrease in catch per unit effort (CPUE)) relative to controls) has been observed in the hook-and-line fishery for rockfish during controlled discharges of a single air gun (Skalaski et al. 1992). The authors suggest that the CPUE decline may not be dispersal but a decreased responsiveness to baited hooks from alarm response behaviour. A companion behavioural study showed the alarm and startle responses were not sustained following the removal of the sound source (Pearson et al. 1992; Skalski et al. 1992) suggested fishing effects may be transitory, primarily occurring during the sound exposure.
- Lokkeborg et al. (2012) observed, following air gun exposure, gillnet catches increased substantially for redfish (*Sebates norvegicus*) and Greenland halibut (*Reinharditius hippoglossoides*) by 86% and 132% respectively compared with pre-shooting levels, while longline catches of Greenland halibut and haddock decreased by 16% and 25% respectively compared with pre-survey catch. These contradictory results were explained by greater swimming activity versus lowered food search behaviour in fish when exposed to air-gun emissions. Changes in catch rates of all species studied, including saithe and ling, found all species responded to air-gun sounds. Except for saithe (a pelagic hearing sensitive fish), acoustic mapping of fish abundance did not suggest displacement from fishing grounds.
- Sonar observations by Peña et al. (2013) observing real-time behaviours of Atlantic herring (*Clupea harengus* - a clupeid species with good hearing capability) schools exposed to an acoustic source approaching from 27 km to 2 km over a two hour period found no changes in school size, swimming speed or direction. The lack of response was interpreted as a combination of a strong motivation for feeding, a lack of suddenness of the air gun stimulus and an increased tolerance to seismic shooting.
- Catch studies undertaken as part of a marine seismic survey in the Gippsland Basin found no clear evidence of adverse effects on scallops, fish or commercial catch rates (Przeslawski et al. 2016a; Bruce et al. 2018) The study followed 15 species caught by Danish

seine and demersal gillnet and identified in the six months which followed the survey, six species showed increased catch. For Danish seine this included tiger flathead, goatfish and elephantfish. For demersal gillnet this included boarfish, broadnose shark and school shark. Three species showed decreased catch caught via Danish seine – gummy shark, red gurnard, sawshark. No change was observed in the remainder of species. No change to gummy shark catch was observed for demersal gillnet capture techniques. These results support previous studies in which the effects of seismic surveys on catch seem transitory and vary among species and gear types.

In October 2020, the FRDC released preliminary results of a Multiple BACI experiment that they funded to investigate the effects of a 3D marine seismic survey in eastern Bass Strait on Danish Seine catch rates (Fishwell Consulting 2020). The key targets for the Danish Seine fishery in the areas of the marine seismic survey are flathead (*Platycephalus* sp.) and whiting (*Sillago* sp.). The October 2020 report (Fishwell Consulting 2020) provided preliminary results of three phases of the four phase study and found that overall, the BACI analyses provide robust evidence for a negative impact of seismic acquisition on whiting catch rates in the Danish Seine Fishery up to ~100 days following the survey and on flathead rates up to ~200 days. Relative catch indices for both species in the years preceding the marine seismic survey were highly variable (temporally and spatially), and that relative catch index is a measure of catch per effort, not an absolute measure of abundance. As the relative catch indices for both species in the years preceding the marine seismic survey were highly variable it is difficult to determine the effect of the survey.

Specific studies examining the effect of seismic survey signals on invertebrate catch data are rare but include:

- Carroll et al. (2017) undertook a critical review of the potential impacts of marine seismic surveys on fishes and invertebrates. Carroll et al (2017) found no significant differences in any of the studies reviewed in catch rates from the potential effects of seismic signals (Christian et al. 2003; Parry & Gason 2006; Przeslawski et al. 2016a).

- Christian et al. (2003) investigated the behavioural effects of exposure to seismic survey sound on snow crabs. Caged animals on the ocean bottom at a depth of 50 m were monitored with a remote video camera during exposure to seismic sound and did not exhibit any overt startle response during the exposure period. Eight animals were equipped with ultrasonic tags, released, and monitored for multiple days prior to exposure and after exposure. None of the tagged animals left the immediate area after exposure to the seismic survey sound. Five animals were captured in the snow crab commercial fishery the following year, one at the release location, one 35 km from the release location, and three at intermediate distances from the release location.

- Parry & Gason (2006) undertook a statistical analysis of CPUE data collected over nearly 30 years in the Victorian southern rock lobster (SRL) fishery (in southwest Victoria) that showed no influence of historical 2D and 3D marine seismic survey activity. Analyses looked at short-term (weekly) and long-term variations (up to seven years) in CPUE to determine whether changes were correlated with the marine seismic survey. The surveys occurred in water depths ranging from 10 m to 150 m. The study included surveys occurring during the SRL spawning period as well as during the lobster fishing. This study found no evidence that catch rates were affected in the weeks or years following the surveys; however, Day et al. (2016a) suggest that catch rates would have had to decrease by around 50% for this study to detect a result.

- A study undertaken by the CSIRO and Geoscience Australia (Thomson et al. 2014) examined fisheries catches (10 species of interest) and catch rates for potential effects from 183 seismic surveys undertaken in the Gippsland Basin (Bass Strait). The authors found that there were no clear or consistent relationships between seismic surveys and subsequent

fisheries catch rates in their study. However, they cautioned that the results did not imply that such impacts do not exist, but that data was lacking. In terms of duration since a seismic survey occurred, significant positive and negative effects were found but could not be distinguished from inter-annual changes in stock size or availability to fishing gear resulting from other dynamics (Thomson et al., 2014).

- Przeslawski et al. (2016a) monitored scallop populations and fish behaviour before, during, and/or after an April 2015 seismic survey in the Gippsland Basin, commercial scallops (*Pecten fumatus*) and doughboy scallops (*Mimachlamys asperrima*) were assessed using dredged samples and underwater imagery from an Autonomous Underwater Vehicle (AUV) before and two and ten months after completion of the seismic survey. The study provided no clear evidence of adverse effects on scallops or commercial catch rates due to the 2015 seismic survey undertaken in the Gippsland Basin. It was noted that there were limitations with some of the analyses (e.g., large variance in scallop catch).
- Haddon (2017) further investigated the effect of the 2015 seismic survey in the Gippsland Basin on deepwater flathead catches and concluded that the significant drop in CPUE was very likely negatively influenced by the seismic survey. However, Haddon (2017) went on to add that the seismic survey did not appear to have had a lasting impact on deepwater flathead CPUE, which returned to typical values in the first month following the seismic survey.
- Morris et al. (2018) investigated the effects of 2D seismic acquisition on the snow crab fishery along the continental slope in Canada in a BACI study over a period of two years. Crabs were exposed to received levels of 187 dB re 1µPa^2 s (single shot) and 200 dB re 1µPa^2 s (cumulative over 24-hours). There was no negative effects on the catch rates in the shorter term (days) or longer term (weeks), and the authors concluded that seismic effects on snow crab harvest (if they do exist) would be smaller than changes related to natural spatial and temporal variation.
- In a further study, Morris et al. (2020) conducted a field experiment applying a series of comparisons conducted within a BACI study design to investigate the effect of prolonged industrial 3D seismic exposure on the catch rates of snow crab over nine weeks in 2017 and five weeks in 2018. Changes in catch rates at 3D seismic surveying sites were inconsistent across years, with reduced catches in 2017 and increased catches in 2018. Catch rates were similar at experimental and control sites within two weeks after exposure, and the potential effect of seismic surveying was not measured at a distance of 30 km. The large variation in catch rates across small temporal and spatial scales coupled with the absence of notable mechanistic responses of snow crab in past studies to seismic in associated snow crab movement behaviour, gene expression and physiology, the authors concluded that the observed differences owing to seismic surveying in this study design are likely a result of stochastic processes external to their manipulation.

10 Scuba Divers and Snorkelers

Scuba divers and snorkelers exposed to high levels of underwater sound can suffer from dizziness, hearing damage or other injuries to other sensitive (mainly air-filled) organs, depending on the frequency and intensity of the sound. The human auditory system is significantly less sensitive underwater than in air and is further degraded if diving equipment obstructs the ears or face (e.g., diving with a hood or full facemask).

Underwater, the human ear is about 20 dB less sensitive than it is in air at low frequencies (20 Hz), increasing to 40 dB at mid-frequencies (less than 1 kHz), and increasing to 70–80 dB less sensitive at higher frequencies (Parvin 1998). Divers who wear neoprene hoods have even higher hearing thresholds (lower sensitivity) above 500 Hz because the hood material absorbs high-frequency sounds (Sims et al. 1999). Exposure studies related to divers have typically focused on military sonar exposure, with little information on seismic survey operations, and as such care is required when considering thresholds for non-military divers, particularly for impulsive sounds such as seismic source impulses (Ainslie 2008).

Underwater auditory threshold curves indicate that the human auditory system is most sensitive to waterborne sound at frequencies between 400 Hz to 1 kHz (Parvin et al. 1994) and these frequencies have the greatest potential for damage. The auditory threshold of hearing under-water was lowest at 1 kHz (70 dB re 1 µPa SPL) and increased for lower and higher frequencies to around 120 dB re 1 µPa at 20 Hz (Parvin 1998).

Within the literature there is some variation in acceptable SPLs for divers (Ainslie 2008).

Fothergill et al. (2000) and Fothergill et al. (2001) conducted controlled acoustic exposure experiments on military divers under fully controlled conditions at a US Ocean Simulation Facility and an US Open water test facility. In all tests, the divers were covered with soft or hard shell dive suits and their position and distance relative to sound source, signal characteristics and received levels were controlled and documented (Pestorius et al. 2009). A total of 89 male Navy divers were exposed to pure tone signals and sweeps between 160-320 Hz at SPLs up to 160 dB re 1 µPa. The divers were exposed to these sounds over 100 seconds at depths from 10 to 40 m. The divers rated the sounds on a severity scale. For frequencies between 100 and 500 Hz, at a received SPL of 130 dB re 1 µPa, divers and swimmers detected body vibration. None of the divers tested rated levels of 140 dB re 1 µPa as “very severe”; however, at 157 dB re 1 µPa, sound was rated as “very severe” 19% of the time. No physiological damage was observed at the highest levels tested: 160 dB re 1 µPa (Fothergill et al. 2001).

In a subsequent study, recreational divers were exposed to tonal signals or 30 Hz sweeps at frequencies between 100 and 500 Hz at received levels of 130-157 dB re 1 µPa (Pestorius et al. 2009). Each exposure lasted for seven seconds. Nine female and 17 male scuba divers were tested, all wearing full body neoprene wetsuits. Diver aversion and perception of body vibration were used as test parameters. The results showed no sex-specific differences. The results differed as a function of frequency – while test results showed a strong overall variation between subjects, signals at 100 Hz elicited the strongest aversion in all tests and even at 148 dB a few diver ratings indicated extreme aversion. Due to this and the strong variation between test subjects, the following exposure limit for both military and recreational divers was suggested as a conservative measure: For frequencies between 100 and 500 Hz, the maximum SPL should be 145 dB re 1 µPa over a maximum continuous exposure of 100 seconds or with a maximum duty cycle of 20% and a maximum daily cumulative total of three hours. The trading relation between the maximum SPL and duration was 4 dB per doubling of duration (e.g., 141 dB SPL for a 200 second exposure) (Pestorius et al. 2009).

In alignment with these studies, and considering only frequencies between 100 and 500 Hz, Parvin (2005) suggested 145 dB re 1 µPa as a safety criterion for recreational divers and swimmers. This does not imply that this level is associated with the onset of injury not been established due to ethical

research protocols. Parvin (2005) reported vibration in forearms and thighs at 180 dB re 1 µPa but no physical injury.

Guidance issued by the Diving Medical Advisory Committee (DMAC 2020) suggests that adverse effects to divers may be experienced at distances of up to 27 km from the seismic source, which is a considerably greater distance than has previously been recognised. However, the basis for this conclusion is not provided.

11 Acronyms and Abbreviations

BRUVS	Baited remote underwater video stations
dB	Decibels
FRDC	Fisheries Research Development Corporation
HF cetaceans	High-frequency cetaceans
hr	Hour
Hz	Hertz
IMAS	Institute for Marine and Antarctic Studies
In3	Cubic inch
kHz	KiloHertz
km	Kilometre
LF cetaceans	Low-frequency cetaceans
m	Metre
m3	Cubic metre
MSS	Marine Seismic Survey
nm	Nautical mile
OCA	Other Marine Carnivores in Air
OCW	Other Marine Carnivores in Water
PCA	Phocid Carnivores in Air
PCW	Phocid Carnivores in Water
PK	Peak sound pressure level
PK-PK	Peak-to-peak sound pressure level
PSI	Pound per square in
PTS	Permanent threshold shift
RMS	Root mean square
sec	Second
SEL	Sound exposure level
SPL	Sound pressure level
µPa	Micropascal
TTS	Temporary threshold shift
VHF cetaceans	Very-high-frequency cetaceans

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Annex 1

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table B8-6 If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table B8-6 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4504	GMTOAC objects to the weakening and inconsistency of shutdown measures between the November 2024 and April 2025 versions of CGG's EP. The earlier EP committed to shutting down the sound source if any whale was within 2 km (with larger buffers for Southern Right and Blue Whales), but the April 2025 EP introduces a much smaller 500 m shutdown zone for most whales, which GMTOAC argues increases the risk of exposure to harmful sound levels. GMTOAC notes that the April 2025 EP creates confusion by implying that CGG's "shutdown zone" is actually a 2 km low-power zone, despite providing no explanation of what "low-power" means, what sound levels it produces, or how continuous low-power operation affects Karntubul, other cetaceans, or cumulative noise exposure. This contradicts Appendix G2, which states CGG will use a shutdown zone rather than a low-power zone, consistent with EPBC Policy Statement 2.1. GMTOAC warns that such internal contradictions undermine the reliability and enforceability of mitigation measures. GMTOAC questions CGG's assumption that a 10 km behavioural shutdown zone will protect Blue Whales, given scientific uncertainty about behavioural impact distances. They highlight evidence that seismic noise can mask baleen whale calls across thousands of kilometres, that ambient noise levels can be elevated by 25 dB over 40 km from air-gun operations, and that reverberated pulses can create	All relevant details of the sound source, including low-power mode, is in Appendix A2. We have also committed to a full shutdown if any whale enters the 2 km shutdown zone, far more precautionary than the EPBC Policy 2.1 requirement of a 2 km low-power zone and a 500 m shutdown zone. This approach exceeds industry standards and legislative requirements for mitigating potential impacts from seismic sound sources. Our EP applies a suite of measures designed to ensure impacts to Blue Whales and Southern Right Whales remain at acceptable levels. We will shut down the sound source immediately upon detection of any SRW, including cow–calf pairs, and we will manage to ambient sound levels in the SRW reproduction BIA to ensure those levels are never exceeded. The Regia MSS is a short, temporary activity, 90 days in total, including 60 days of acquisition, so any increase in ambient noise will be brief and localised. No exceedance of ambient sound levels will occur in the SRW reproduction BIA during the reproductive season, ensuring cow–calf pairs are not exposed to elevated noise or displaced from critical habitat. Our shutdown zones include highly conservative buffers well beyond standard requirements, further reducing potential impacts. Collectively, these measures ensure any short-term noise increases are managed to acceptable levels, consistent with the precautionary intent of relevant recovery plans. Appendix B8 addresses acoustic masking using recent scientific literature, not the older references cited by GMTOAC. For example, Nieukirk et al.	EVT352

	near-continuous noise for months. GMTOAC argues that such persistent elevated noise levels could impair communication, migration, and calf–mother cohesion, posing cultural and ecological harm, and that CGG's 10 km buffer is therefore not precautionary. GMTOAC is also concerned about ambiguity over whether shutdown means turning the source off or merely reducing power, noting that this ambiguity is not precautionary and risks behavioural impacts for Blue Whales.	(2012) showed that airgun signals detected thousands of kilometres from fin whales were unlikely to have direct effects, with the most probable impact being reduced communication range. Even then, the study had major limitations, including uncertainty about the actual distance between vocalising whales and receivers. Key context from Estabrook et al. (2016) is omitted, which analysed multiple seismic surveys over multiple years. That study does not represent received levels for animals closer to the sound source and therefore is not applicable to the Regia MSS. No other seismic surveys are currently planned in the Otway region, further limiting the relevance of that study's conclusions.	

Otway Exploration

Cultural heritage desktop assessment

Prepared for ConocoPhillips Australia Pty Ltd

1 September 2023

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Executive summary

Biosis Pty Ltd was commissioned by Conoco Phillips to undertake a cultural heritage desktop assessment for the proposed resource exploration in Bass Strait.

The purpose of this report is to explore cultural heritage and cultural heritage landscapes to understand Country, and Sea Country within and surrounding the project area in order to provide the project a grounding in Aboriginal cultural heritage. This short report will describe the known cultural environment, include a brief ethnohistory and history, and detail results of register searches.
The study area includes the proposed permit areas (the location of the exploration zone(s)), where seabed surveys and drilling exploration may occur. In general, the permit areas are located south of Port Fairy and the Great Otway National Park, and west of King Island.

The study area consists of a large geographical area noted as the 'Investigation Area for the Identification of Values and Sensitivities' which is based on stochastic modelling of oil spills, generating a statistical area where impacts may occur under many eventualities. This modelling predicts potential oil spill outcomes over many different variables to generate an investigation area for potential impacts.

Due to the significant size of the study area, it is broken into three areas for discussion in parts of this report and for the Communication Plan (CP), this includes:

1. Primary Stakeholder area (Victoria) – the area directly surrounding the proposed permit areas and adjacent coastlines
2. Secondary Stakeholder area – the wider area affected by the modelling of oil spills
3. Primary Stakeholder area (Tasmania) – North and Northwest Tasmania and the Bass Strait islands

Within the study area, along the Victorian coast, there are 5636 registered Aboriginal places with the most common site types being shell middens, artefact scatters and LDADs. Shell middens are typically found along the coastline, whereas artefact scatters, while also being found along the coast, are varied and move inland following freshwater sources, likely to be indicative of past inland-coastal travel routes. LDADs are also typically found further inland than shell middens and artefact scatters, indicative of widespread use of the landscape in the past, rather than concentrations and repeated patterning.

In light of a review of Aboriginal places within the study area, there is a high likelihood for Aboriginal cultural heritage material to be present within the areas subject to potential impact.

Within Tasmania and the Bass Strait Islands, there are no recent published figures of sites located on the coastal margins. Access to this data is restricted, and permission will need to be sought by the Aboriginal Heritage Council to access the Aboriginal Heritage Register via Aboriginal Heritage Tasmania. However, from the assessment of available regional data, Aboriginal heritage should be expected in any area of low-lying coastal areas, shelter sites, and sources of food, water and raw materials. These coastal margins contain all Tasmanian Aboriginal site types. It is also known on the West Coast of Tasmania, that a number of rock art sites are located on the coast, many either close or in tidal margins (Dix pers. obs.). Large midden sites are also located very close to the waters edge, as well as some stone quarry sites within tidal margins (Dix pers .obs.).

Contents

Executive summary ..... **ii**

1 Introduction **5**

1.1 Acknowledgement 5
1.2 Scope of works 5
1.3 Study area 5
1.4 Heritage Advisor/Authorship 6
1.5 Stakeholders 7

2 Background review **9**

2.1 Geology and geomorphology 9
2.1.1 Bass Strait, Islands and the land bridge 9
2.1.2 The Victorian Coast 9
2.1.3 The Tasmanian Coast 10
2.1.4 Archaeology of the Sea Floor 10
2.2 Land use history 12
2.3 Aboriginal heritage – registered archaeological places in the study area 13
2.3.1 Primary Stakeholder Area - Gunditjmara Aboriginal places 14
2.3.2 Primary Stakeholder Area - Eastern Maar Aboriginal places 14
2.3.3 Primary Stakeholder Area – Shared Gunditjmara and Eastern Maar Aboriginal places 15
2.3.4 Secondary Stakeholder Area - Wadawurrung Aboriginal places 15
2.3.5 Secondary Stakeholder Area - Bunurong Aboriginal places 16
2.3.6 Secondary Stakeholder Area - Gunaikurnai Aboriginal places 16
2.4 Aboriginal heritage – archaeological places in Tasmania 17
2.4.1 Primary Stakeholder Area – Bass Strait Island Aboriginal places 17
2.4.2 Secondary Area – Tasmanian coastal Aboriginal places 18
2.5 Archaeological summary 20
2.6 Traditional Owner groups and ethnohistory 21
2.6.1 Primary Stakeholder Area - Gunditjmara 21
2.6.2 Primary Stakeholder Area - Eastern Maar 22
2.6.3 Secondary Stakeholder Area - Wadawurrung 23
2.6.4 Secondary Stakeholder Area - Bunurong 24
2.6.5 Secondary Stakeholder Area - Gunaikurnai 25
2.6.6 Primary Stakeholder Area – Palawa (Tasmania) 25
2.7 Conclusion 27

3 References **28**

4 Glossary of Terms **30**

5 Appendix A – Aboriginal Cultural Heritage Search Results **33**

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Tables

Table 1 – Aboriginal places within the study area (Victoria) 14

Figures

Figure 1 Extent of the study area and RAP groups 8
Figure 2 Land Bridge 11

1 Introduction

1.1 Acknowledgement

Biosis acknowledges that the authors of this assessment identify as non-Aboriginal Australians living on Bunurong and Wurundjeri Countries. We acknowledge that they interpret, present and understand the past through their own cultural lens. In writing this report about Aboriginal living culture including their cultural heritage and the events following the commencement of colonisation, we pay our respects to Elders past, present and emerging and recognise that Country is unceded.

The authors acknowledge the inherent racism, cultural ignorance and political agendas imbedded within ethnographic sources at the time of, and following, colonisation.

Traditional Owners are the owners of all Traditional knowledge. Traditional knowledge and cultural values remain the intellectual property of the Traditional Owners and the interpretation and understanding of cultural values must be undertaken in genuine consultation with Aboriginal people.

1.2 Scope of works

Biosis Pty Ltd was commissioned by Conoco Phillips to undertake a cultural heritage desktop assessment for the proposed resource exploration in Bass Strait.

It must be emphasised, that this report is not intended to meet the requirements of a formal assessment under First Peoples – State Relations, Heritage Victoria, Aboriginal Heritage Tasmania or Heritage Tasmania guidelines.

The purpose of this report is to explore cultural heritage and cultural heritage landscapes to understand Country, and Sea Country within and surrounding the project area in order to provide the project a grounding in Aboriginal cultural heritage. This short report will describe the known cultural environment, include a brief ethnohistory and history, and detail results of register searches.

1.3 Study area

The extent of the study area is shown in Figure 1.

The study area includes the proposed permit areas (the location of the exploration zone(s)), where seabed surveys and drilling exploration may occur. In general, the permit areas are located south of Port Fairy and the Great Otway National Park, and west of King Island.

The study area consists of a large geographical area noted as the 'Investigation Area for the Identification of Values and Sensitivities' which is based on stochastic modelling of oil spills, generating a statistical area where impacts may occur under many eventualities. This modelling predicts potential oil spill outcomes over many different variables to generate an investigation area for potential impacts.

Due to the significant size of the study area, it is broken into three areas for discussion in parts of this report and for the Communication Plan (CP), this includes:

4. Primary Stakeholder area (Victoria) – the area directly surrounding the proposed permit areas and adjacent coastlines
5. Secondary Stakeholder area – the wider area affected by the modelling of oil spills

6. Primary Stakeholder area (Tasmania) – North and Northwest Tasmania and the Bass Strait islands

1.4 Heritage Advisor/Authorship

Emily Ward BArch

Emily has recently started her career in the Heritage Industry by initially interning at Biosis from August 2022 to September 2022, to her current role as a Graduate Heritage Consultant. Within her internship, Emily learnt and completed many techniques and processes such as aiding in background research to Cultural Heritage Management Plans, illustrating stratigraphic contexts and subsurface field testing. Emily also gained experience in field photography, rock art and heritage building surveys. Emily has been a part of several projects since she was an intern, gaining knowledge of several systems, such as HERMES and ACHRIS.

Emily completed her Bachelor of Archaeology at LaTrobe University at the end of 2022 and will start further study in 2024.

Erica Walther BArch(Hons)

Erica (B Arch Hons (2007)) is an Archaeologist and Heritage Advisor, with over 15 years' experience as a heritage consultant. Erica is the Technical Director for heritage in Victoria and specialises in project management, community liaison and the resolution of complex cultural heritage issues in varying situations. Erica provides specialist cultural heritage legislative advice and completes technical reports to meet the requirements of heritage legislation. Erica has broad experience completing various heritage assessments, including over 60 Cultural Heritage Management Plans (CHMPs). Erica carries out cultural heritage inductions, salvages, and other compliance requirements for completed CHMPs. Erica has also completed Due Diligence Assessments, Heritage Impact Assessments, "Consents to Disturb" and other permit applications, conservation management plans, and heritage reports. Erica has also assisted on a wide variety of other heritage projects, including as an expert witness and with planning and overlay applications, strategic advice, and continues to work towards completing projects to best practice standards.

Erica is a full member of the Australian Association of Consulting Archaeologists and is a listed heritage advisor under the *Aboriginal Heritage Act 2006*.

Dr Samuel Dix BA(Hons), PhD, MCIfA

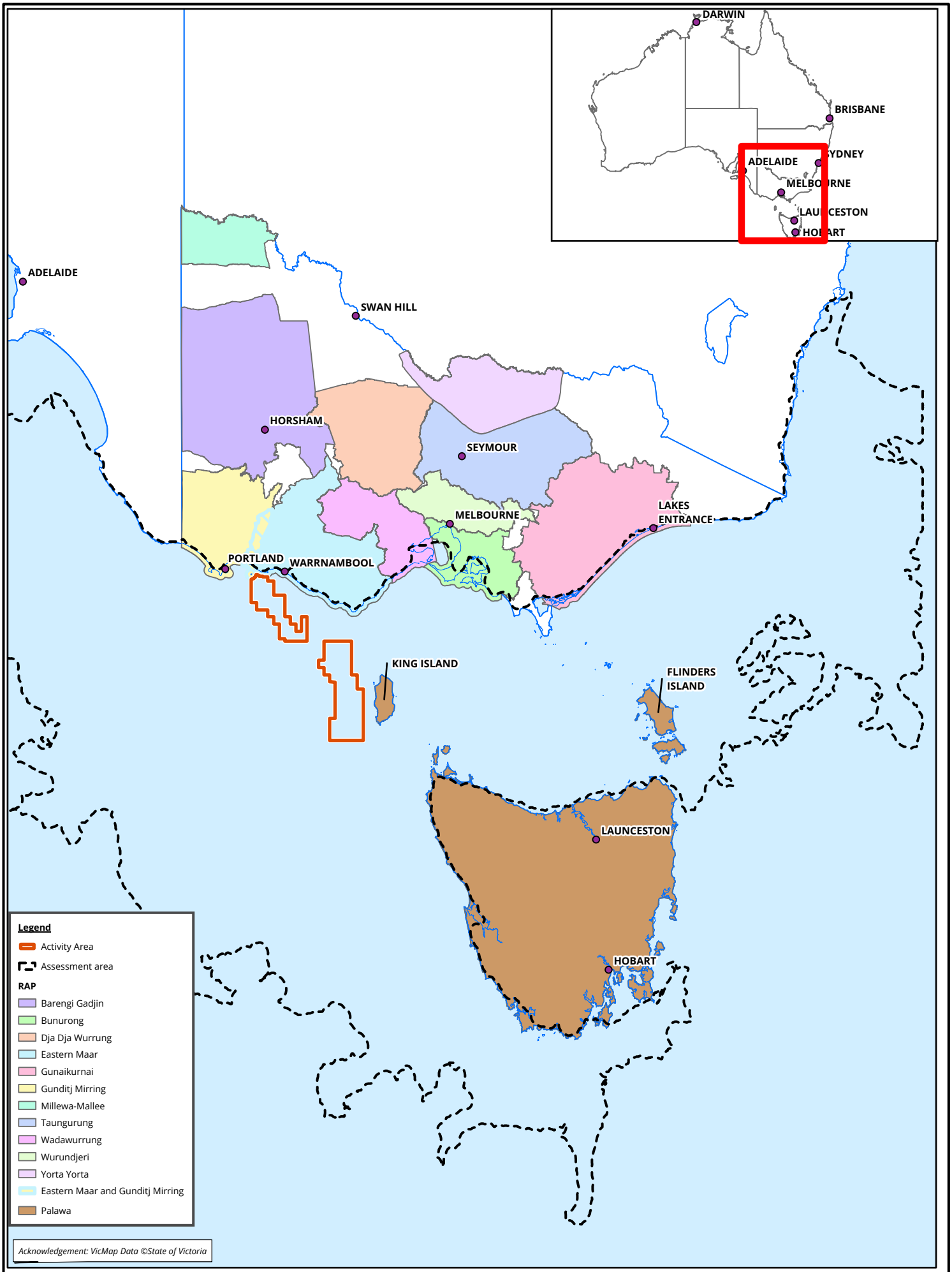
Samuel has worked in archaeology and heritage management since 2007. Samuel has undertaken numerous archaeological projects around Australia and has worked in consulting, government, teaching and museums in Victoria, Tasmania, Northern Territory, Western Australia, the United Kindom, Middle East, and South Africa. Samuel completed his Bacheor of Arts with First Class Honours where his thesis focussed on hand stencil rock art. After a break from university to undertake consulting, government and teaching based archaeological work, Samuel returned to complete his PhD at Griffith University where he was the recipient of the Australian Research Council Laureate Scholarship in 2016. His thesis explored contact archaeology in Arnhem Land, and how people reacted to change through what was depicted in rock art.

Samuel is a registered heritage advisor under the Victorian *Aboriginal Heritage Act 2006.*

1.5 Stakeholders

It is not within the remit of this report to undertake consultation with Traditional Owner groups, industry bodies or other stakeholders. No consultation was undertaken. Stakeholder engagement is considered in the Communication Plan (CP). In Victoria, Traditional Owner groups are represented by the relevant Registered Aboriginal Party (RAP). There are five RAPs registered in the study area, including the Gunditjmara, Eastern Maar, Wadawurrung, Bunurong, and Gunaikurnai.

In Tasmania, the Traditional Owner group is referred to collectively as the Palawa, and are not represented by a representative or governing body.



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Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Figure 1 Location of the Activity Area

Matter: 38331,
Date: 07 February 2023,
Prepared for: GA, Prepared by: GO, Last edited by: mknudsen
Location:P:\38300s\38331\Mapping\38331_OtwayExploratoryDrilling

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Kilometers

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2 Background review

2.1 Geology and geomorphology

The Bass Strait is the stretch between the south of the Australian mainland and north of the Tasmanian state. The Bass Strait formed during the last glacial period, also known as the Last Ice Age, which occurred between 110,000 and 12,000 years ago (Williams et al. 2018, p. 149). During this time, the Earth's climate was much cooler and global sea levels were much lower due to the large amount of water that was locked up in glaciers and ice sheets.

As the climate began to warm and the glaciers began to melt, sea levels began to rise. This process caused the land bridge that connected Tasmania to mainland Australia to be gradually flooded eventually forming the Bass Strait as we know it today.

This gradual flooding is therefore known to have occurred within the period of human occupation in southeastern Australia – the diaspora of people from Victoria to Tasmania occurred prior to the total flooding of the strait, across a land bridge for which archaeological evidence may be buried deep below the ocean (Lourandos 1997, p. 244). Evidence for this indicates people crossed the land bridge from Victoria to Tasmania at 35,000 years ago (Lourandos 1997, p. 254). In addition, dreaming stories of both Victorian and Tasmanian Aboriginal communities further reinforce the memories and songlines relating to the flooding and connection to Sea Country of coastal communities (Nunn & Reid 2016).

2.1.1 Bass Strait, Islands and the land bridge

The Bass Strait is bordered on the west by King Island and the King Island Rise and on the east by Flinders Island and the Bassian Rise, with an approximated depth of between 60 and 80 metres (Harris & Heap 2009, Robinson 1974). The predominant deposits within the Bass Strait consist of Tertiary sediments overlaid on early Cretaceous deposits. The sediments in the early Cretaceous period contained combinations of shale, siltstone, sandstone, while a variety of marl, mudstone, limestone and shale can be seen in the later deposits (Robinson 1974).

Phillip Island's geomorphology is centred around Quaternary limestone dunes with higher-level shore platforms that were formed by Quaternary sea levels (Birch 2003). French Island is boarded by sandy sheets, similar to Western Port Sunkland. Port Phillip Bay is the lowest part of the Sunklands and is currently flooded due to Quaternary sea-level fluctuations in the Last Glacial Maximum (Birch 2003, p. 556). Also during this period the Yarra River water levels had risen and spilled over the coastal plain, forming what is now known as the Bass Strait (Birch 2003, p. 556).

2.1.2 The Victorian Coast

The coastal plains of southwest Victoria are made up of both Tertiary and Quaternary marine and nonmarine sediments, formed on calcareous sands and sandy limestones, overlaid with dune ridges and beaches that were formed during the last 800 000 years. The dune ridges closer to the coast are younger than those further inland and are comprised of calcareous sands. Caves are common in ridges of the limestone sands (Birch 2003, p. 545).

The coastline of western Victoria is seen to have several layers of sedimentary deposits, as evident in the cliffs often found, containing stratigraphic sections of basalt, limestone and clay (Birch 2003, p. 555).

The geomorphic evolution of southeast coastal plains of Victoria is varied, with Tertiary overlaying early Cretaceous sediments on the Otway coast as well as Quaternary sand and limestone dunes in Mornington

Peninsula and Phillip Island (Birch 2003, pp. 547,556). The coast of East Gippsland is covered extensively in coastal dunes, with intermittent pockets of Pleistocene deposits. Parabolic dunes formed from Pleistocene and Holocene age deposits are also located in this area (Birch 2003, p. 557).

2.1.3 The Tasmanian Coast

The Tasmanian coast consists of varying deposits making up its rugged nature. Geological formations include Dolerite, Sandstone, Mudstone, Granite, Limestone, and other Volcanic rocks. These varying geologies are reflected in high cliffs and outcrops, dune-backed beaches, sea stacks and arches. The Tasmanian geological makeup is complex and varies. Along the coastal regions detailed in the study area, these consist of Devonian granites, Tertiary Basalt, Neoproterozoic dolomite, Cambrian bonitite, Cambrian Sediment, and Mesoproterozoic quartzite (MRT: 2022).

Tasmania is known to have been one of the few areas in the southern hemisphere that was glaciated during the Pleistocene (MRT 2002). This generally occurred in higher regions of the state and influenced many of the earlier Pleistocene sites recorded in Tasmania (MRT 2022).

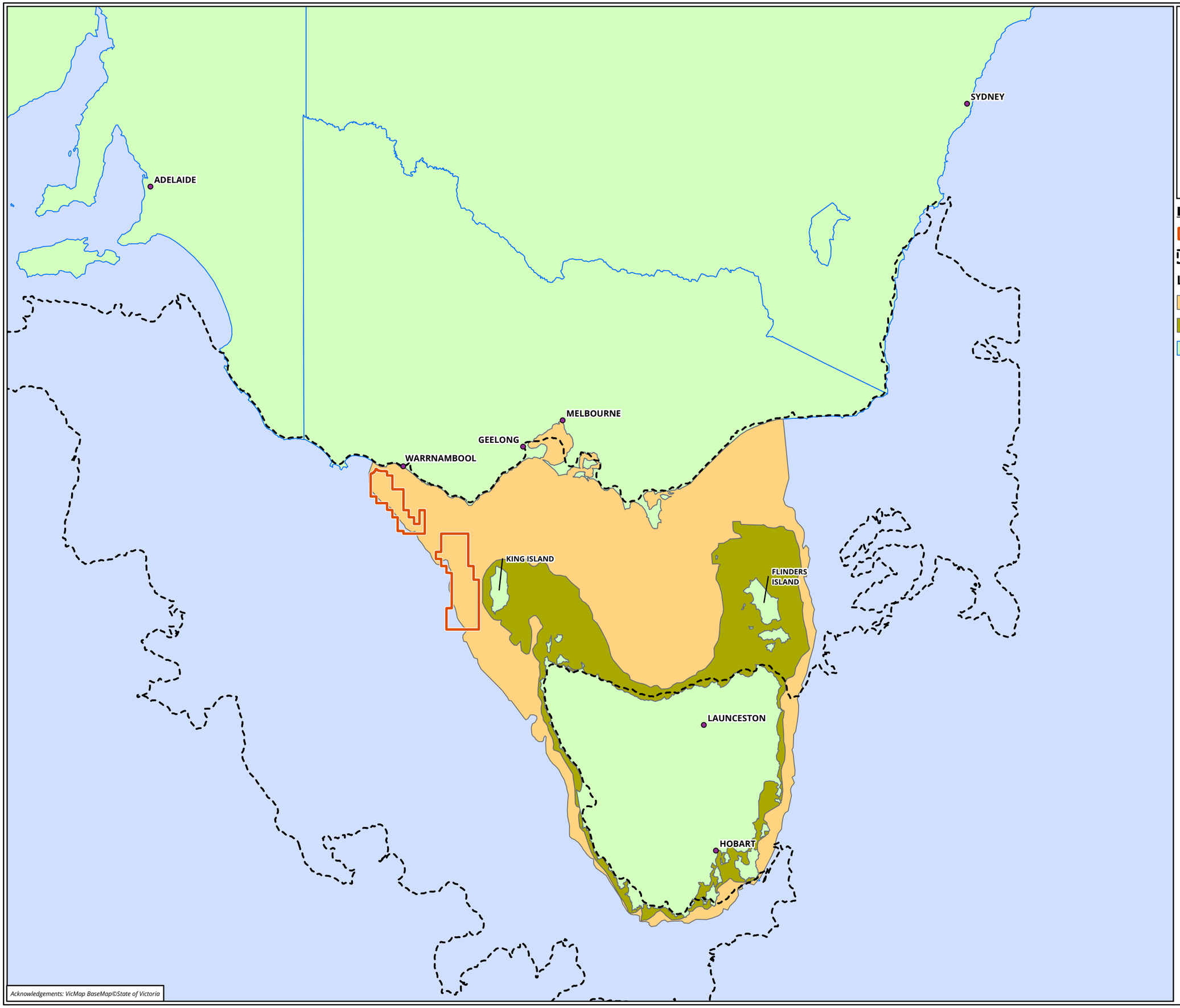
2.1.4 Archaeology of the Sea Floor

Archaeology of the sea floor is an emerging aspect of archaeological science. Throughout the world, archaeological investigations have shown that there is evidence for human occupation to be recovered below current sea levels. Investigations in the Sunda Shelf, Southeast Asia demonstrates the impact of sea level rise at approximately 12,000 years ago, with the investigation of settlements, fish traps, and other structures. Other investigations have occurred in India (Kumar et al. 2021), and the Black Sea (Ryan et al. 1996), investigating more recent sea level change, around 7,500 years ago. In the UK and US, the offshore wind industry is required to complete offshore archaeological investigations including desk-based studies and field survey.

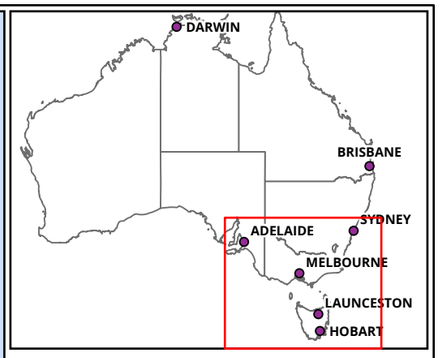
In comparison, Bass Strait is comparable to the vanished landscape of Doggerland that was submerged similarly in rising sea levels during the Mesolithic Period. Like the Bassian Plain, Doggerland formed a land bridge between the United Kingdom and Europe. Works by marine archaeologists have found that many artefacts and environmental sediments still remain form this now vanished ancient landscape (Gaffney et al. 2007). It is even suggested by Weninger et al (2008) that this was caused by a catastrophic flood. However, such ideas are not believed in the example of Bass Strait, and that this was a more gradual separation (see Davidson and Roberts 2008:20)

In Victoria, limited investigations have been completed, however the use of LiDAR and shoreline mapping has occurred. In particular, Gunditjmara have worked with Extent Heritage in partnership with Wessex University in determining the location of prior shorelines with the use of remote sensing. Should archaeological evidence survive, it is likely that the previous shorelines would provide the most likely locations for this. Physical investigations are likely to be difficult, complex, and costly.

Following deposition, archaeological evidence of human occupation along the Bass Strait has flooded. Since flooding, sedimentation has also occurred, capping any archaeological evidence deep below the current sea floor. The depth of sedimentation varies throughout the strait, however combined with deep waters (400 to 5,500 metres) and harsh conditions, exploration of sea floor archaeology utilising physical methods in this area is currently unlikely.



Acknowledgements: VicMap BaseMap©State of Victoria



Legend

- Activity Area
- Assessment area

Land coverage

- 18000 years ago
- 14000 years ago
- Current land extent

Figure 2 Extent of historic land bridge

0 40 80 120 160 200

Kilometers

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Scale: 1:6,000,000 @ A3

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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2.2 Land use history

Permanent European colonisation of Victoria and Tasmania occurred first in Tasmania, in 1803, and Victoria in 1835. Earlier exploration and transitory, temporary or failed settlements occurred in the two states. Early settlements in Tasmania were penal, with free settlement commencing following. The Gold Rush in Victoria in the 1850s resulted in the rapid expansion of population and the establishment of towns throughout the state. Agriculture and Industry heavily influenced the growth of the population of Tasmania.

Settlement, population growth and utilisation of land for agricultural purposes has resulted in the spread of disease, displacement, and violence to Indigenous communities, leading to a significant decline in population and disruption to traditional cultural practice. Aboriginal people were subject to forced displacement and assimilation, including the forced removal of Aboriginal children, from the 1800s up until the 1970s. Overall the impact of colonisation on Aboriginal people has been devastating.

In regard to the remains of physical cultural heritage (such as sites and places), the practice of archaeology has increased the knowledge of Aboriginal occupation of the land in the past. The potential for archaeology to shed light on Aboriginal connections to Country has been realised with increasing frequency due to relatively recent legislative requirements.. Archaeology is, however, a finite resource which has also been impacted by the effects of population growth, construction, land clearance, resource extraction, and climate change. Self-determination for Aboriginal people in regard to ownership of cultural heritage and knowledge has resulted in increased investigations led by Aboriginal people supported by technical experts, following research pathways set by the communities themselves.

Archaeological sites are located throughout the land and adjacent seascape and consist of the physical remains of the way people used the land in the past. Places may reflect resource extraction (such as scarred trees, stone quarries); be evidence of settlement (such as stone huts), manufacture (stone artefact scatters) and cultural practices (such as painting, etchings, and stone arrangements); food consumption (shell middens, earth mounds and hearths); and ritual practice (such as burials). Other cultural values can take the form of intangible places or be recorded in historic (ethnographic) references.

Whilst long-lasting, archaeological sites are heavily affected, and frequently destroyed, by the effects of modern, and past, impacts. Land clearance and increasingly intense bushfires result in the removal of old growth trees, including those showing cultural scarring, and also increases the effects of erosion. Ploughing for agricultural practices displace artefact scatters and deflate earth mounds. Coastal erosion, coastal change and increased storm surges destroys shell middens and artefact scatters located in coastal and offshore landforms. The practice of archaeology itself is destructive and results in the loss of archaeological places. Alteration of the natural environment also affects intangible values, affecting connections between the Dreamtime and the landscape, for example, by interrupting songlines. As Aboriginal people have strong connections to Country, effects on the natural environment, the land, sea, and animals, also have strong effects on Aboriginal people.

2.3 Aboriginal heritage – registered archaeological places in the study area

A search of the Victorian Aboriginal Heritage Register (VAHR) was undertaken by Emily Ward, Biosis Pty Ltd on the 21 of December 2022 utilising access number 11456. The search area was set by the study area and consists of the entire Victorian coastline.

The search identified 5636 recorded Aboriginal places within the study area (Table 1).

The dominant Aboriginal place types in the study area are shell middens (n=2639, 46.82%), artefact scatters (n=2210, 39.21%) and low density artefact distribution also known as LDADs (n=321, 5.70%). Other place types include earth features (n=181, 3.21%), object collections (n=160, 2.84%), Aboriginal Ancestral Remains (Burial) (n=51, 0.90%), scarred trees (n=42, 0.75%), stone features (n-12, 0.21%), quarries (n=9, 0.16%), Aboriginal historical places (n=8, 0.14%), Aboriginal Ancestral Remains Reinterments (n=2, 0.04%) and rock art (n=1, 0.012%).

Object Collections represent places that have been removed from the context in which they were originally recorded. More specifically, they represent the location of stored artefacts (i.e. heritage consultancies, museums, private collections) or places where artefacts have been repatriated; therefore, Object Collections are not necessarily representative of the archaeological character of the region

Due to most of the search area being coastal, the dominance of shell middens in the study area is not surprising. Middens represent the repeated consumption of coastal resources (predominantly shells of rocky or sandy shore types, such as mussel, pipi, oyster, turban) and consist of the discarded shell. Other objects may be discarded within the midden, such as bones (seal and bird are common), and artefacts. The shells and other items were discarded in discrete areas over time, some middens are small consisting of a smaller number of meals or individuals, others are larger, indicating multiple meals, some revisited over many hundreds, or thousands, of years (Frankel 2017, p.38).

> *'Archaeological evidence from Victoria indicates that occupation of coastal areas is as old as the present coastline – about 6000 years. Most coastal occupation sites in Victoria, however, are 4000 years old or younger' (National Oceans Office, 2002:80)*

Within the study area the Traditional Owner group with the most registered Aboriginal places is Bunurong with 1486 place registrations, with 26.37% of the total registered sites in the study area. This is then followed by Gunditjmara with 853 registered sites (15.77%), then Eastern Maar with 853 registered sites (15.13%), Wadawurrung with 798 registered sites (14.16%), Gunaikurnai with 700 registered sites (12.42%) and the area of overlap of Gunditjmara and Eastern Maar has 88 registered sites (1.56). The area within the study area that has no registered RAP group has a total of 822 registered sites (14.16%). The specifics of each group are discussed below.

The areas of Bellarine Peninsula, Mornington Peninsula and French Island and Wilson's Promontory have been searched specifically on the Victorian Aboriginal Heritage Register (VAHR) as they are distinctive landforms on the coastline of Victoria and hold distinct cultural patterning, regarding both tangible and intangible cultural heritage values. These three areas contribute 1775 of the registered sites (31.5%), out of the 5636 total registered sites in the study area; The Bellarine Peninsula has 578 registered sites, Mornington Peninsula and French Island have 813 registered sites and Wilson's Promontory has 384 registered sites.

Table 1 – Aboriginal places within the study area (Victoria)

Aboriginal Place Type	Total number of sites	Percentage of sites
Aboriginal Ancestral Remains (Burial)	51	0.90%
Aboriginal Ancestral Remains (Reinternment)	2	0.04%
Aboriginal Historical Place	8	0.14%
Artefact Scatter	2210	39.21%
Earth Feature	181	3.21%
LDAD	321	5.70%
Object Collection	160	2.84%
Quarry	9	0.16%
Rock Art	1	0.012%
Scarred Tree	42	0.75%
Shell Midden	2639	46.82%
Stone Feature	12	0.21%
Total	5636	100%

2.3.1 Primary Stakeholder Area - Gunditjmara Aboriginal places

The search of the Victorian Aboriginal Heritage Register (VAHR) identified 889 recorded Aboriginal places within the Gunditjmara RAP area. The dominant Aboriginal place types in the study area are artefact scatters (47.36%), shell middens (38.81%) and LDADs (6.3%).

Artefact scatters have been registered throughout the search area, with notable clusters of artefact scatters south of Portland, around Point Danger. Low Density Artefact Distributions (LDADs) consisting of fewer artefacts less densely present than artefact scatters, are most often found further inland, compared to artefact scatters and shell middens which are located close to the shoreline. This suggests concentration of activity close to the coast, and increased transitory movement to and from the coast, as material is being discarded when people are moving across the landscape.

Other registered place types include earth features (6.3%), object collection (0.56%), Aboriginal historic places (0.34%), Aboriginal Ancestral Remains Burial (0.11%), quarry (0.11%) and scarred trees (0.11%) There are no registered sites in the western most area of the Gunditj Mara RAP group, within the study area. This area is along the southern most point of the Fitzroy River and west of Narrawong.

2.3.2 Primary Stakeholder Area - Eastern Maar Aboriginal places

The search of the Victorian Aboriginal Heritage Register (VAHR) identified 853 recorded Aboriginal places within the Eastern Maar RAP area. The dominant Aboriginal place types in the study area are shell middens (53.81%), artefact scatters (34.11%) and earth features (5.39%)

Shell midden sites on in coastal landforms have been frequently registered. The artefact scatters with the study area tend to follow natural paths inland. This suggests movement to and from the coast, with people utilising land resources. This may indicate some form of land use patterning (Lawler, Oataway, & Berelov 2016).

Other registered place types include LDADs (3.99%), object collection (1.52%), Aboriginal Ancestral Remains Burial (0.94%), quarry (0.12%) and stone features (0.12%)

2.3.3 Primary Stakeholder Area – Shared Gunditjmara and Eastern Maar Aboriginal places

In this area, the two RAP groups overlap. The search of the Victorian Aboriginal Heritage Register (VAHR) identified 88 recorded Aboriginal places within the shared Gunditjmara and Eastern Maar RAP area. The dominant Aboriginal place types in the study area are shell middens (52.27%) artefact scatters (34.09%) and stone features (7.95%).

Majority of the artefact scatters and shell midden sites with the study area are located between the coast and Eumerella River. This suggests the use of both fresh and sea water sources for material and resources. Shell midden sites can be found along the coastline while the artefact scatters tend to be closer to fresh water sources. This may indicate some form of land use patterning (Lawler, Oataway, & Berelov 2016).

Other registered place types include earth features (4.55%) and Aboriginal historic places (1.14%).

2.3.4 Secondary Stakeholder Area - Wadawurrung Aboriginal places

The search of the Victorian Aboriginal Heritage Register (VAHR) identified 798 recorded Aboriginal places within the Wadawurrung RAP area. The predominate Aboriginal place types in the study area are artefact scatters (46.12%), shell middens (33.83%) and LDADs (9.27%).

Within the study area, artefact scatters tend to follow freshwater sources inland and cluster around headlands (such as the Queenscliff and the Indented Heads area). This may indicate some form of land use patterning (Lawler, Oataway, & Berelov 2016), with groups using freshwater sources as occupation sites and opportunities for resource gathering, as well as using the headlands as vantage points across the bay or out to sea. LDADs are most often found further inland, compared to shell middens which are located closer to the shoreline. This suggests movement to and from the coast, as material is being discarded when people are moving across the landscape

Other registered place types include object collection (5.64%), earth features (2.88%), scarred trees (0.88%), Aboriginal Ancestral Remains Burial (0.75%) Aboriginal historic places (0.25%), stone features (0.25%) and quarry (0.13%)

Bellarine Aboriginal Places

The search of the Victorian Aboriginal Heritage Register (VAHR) identified 578 recorded Aboriginal places within the Bellarine Peninsula. The predominate Aboriginal place types found on the Bellarine Peninsula are artefacts scatters (48.44%), shell middens (29.41%) and LDADs (10.03%).

Within the study area, artefact scatters tend to follow freshwater sources inland and cluster around headlands (such as Queenscliff and Barwon Heads). This may indicate some form of land use patterning (Lawler, Oataway, & Berelov 2016), with groups using freshwater sources as occupation sites and opportunities for resource gathering, as well as using the headlands as vantage points across the bay or out to sea. LDADs are most often found further inland, compared to shell middens which are located closer to the shoreline. This suggests movement to and from the coast, as material is being discarded when people are moving across the landscape

Other site types include object collection (6.75%), earth features (3.29%), Aboriginal Ancestral Remains Burial (0.87%), scarred trees (0.69%), Aboriginal historical places (0.35%) and stone features (0.17%).

2.3.5 Secondary Stakeholder Area - Bunurong Aboriginal places

The search of the Victorian Aboriginal Heritage Register (VAHR) identified 1486 recorded Aboriginal places within the Bunurong RAP area. The predominate Aboriginal place types in the study area are shell middens (45.56%), artefact scatters (38.36%) and LDADs (8.28%).

Within the study area, artefact scatters on French Island and Phillip Island are found further inland, compared to shell middens. Some of the shell middens within the study area can be found in clusters around headlands (such as the Portsea and Sorrento area). This may indicate some form of land use patterning (Lawler, Oataway, & Berelov 2016), with groups using freshwater sources as occupation sites and opportunities for resource gathering, as well as using the headlands as vantage points across the bay or out to sea.

Other registered place types include object collection (5.79%), earth features (1.28%), scarred trees (0.20%), Aboriginal Ancestral Remains Burial (0.20%), quarry (0.13%). Aboriginal historic place (0.07%), rock art (0.07%) and stone features (0.07%)

Mornington Peninsula and French Island Aboriginal Places

The search of the Victorian Aboriginal Heritage Register (VAHR) identified 813 recorded Aboriginal places within the Mornington Peninsula and French Island area. The dominant Aboriginal place types in the study area are shell middens (50.43%), artefact scatters (31.12%) and LDADs (11.69%).

Along the coast of the Mornington Peninsula there is a significant increase in shell midden sites from Sorrento to Cape Schanck. This could indicate targeted gathering of resources specific to this area and purposeful occupation of the coastline. From Cape Schanck, moving east, there is a noticeable decrease in the number of registered sites along the coast. Shell middens can be found along the coast, either along the shore or along creeks close to the coast (such as Merricks Creek). Artefact scatters can be found intermittently along the coast but can also be seen following water sources inland. This may indicate some form of land use patterning (Lawler, Oataway, & Berelov 2016), with groups using freshwater sources and coastal sites as occupation sites and opportunities for variety in resource gathering. LDADs are an inland site type within the locality. This suggests movement to and from the coast, as material is being discarded when people are moving across the landscape.

There are 50 registered sites on French Island. Only 9 of these sites are located along its coast, the other 41 are inland sites, with the majority of the sites being artefact scatters. The inland artefact scatters are located along paths of water, suggesting targeted use of the landscape (land use patterning).

Other registered place types include object collection (4.31%), earth features (1.72%), scarred trees (0.37%), Aboriginal historic places (0.12%), quarry (0.12%) and rock art (0.12%).

2.3.6 Secondary Stakeholder Area - Gunaikurnai Aboriginal places

The search of the Victorian Aboriginal Heritage Register (VAHR) identified 700 recorded Aboriginal places within the Gunaikurnai RAP area. The predominate Aboriginal place types in the study area are shell middens (46.29%), artefact scatters (43.14%) and scarred trees (4.29%).

Clusters of artefact scatter sites can be found on the eastern coast of the Corner Inlet Marine and Coastal Park. These artefact scatters ten to follow sources of freshwater inland. This may indicate some form of land use patterning (Lawler, Oataway, & Berelov 2016), with groups using freshwater sources as occupation sites and opportunities for resource gathering, as well as using the headlands as vantage points across the bay or out to sea.

Other registered place types include LDADs (2.14%), Aboriginal Ancestral Remains Burial (2.14%), earth features (1%), object collection (0.57%), Aboriginal Ancestral Remains Reinternment (0.14%), Aboriginal historic places (0.14%) and stone features (0.14%).

Wilson's Promontory Aboriginal Places

The Traditional Owners of Wilson's Promontory come from two recognised RAP groups: Bunurong and Gunaikurnai.

The search of the Victorian Aboriginal Heritage Register (VAHR) identified recorded 384 Aboriginal places within the Wilson's Promontory area. The predominate Aboriginal place types in the study area are shell middens (72.40%), artefact scatters (21.61%) and earth features (2.08%)

Clusters of shell midden sites can be found both inland and around the coast of Wilson's Promontory. A large shell midden cluster can be found along the western coast of the Promontory with a total of 163 shell midden registered sites. Another two clusters have been recorded around the opening of Wilson's Promontory, with a total of 18 registered sites between them. All 18 shell midden sites are in close proximity to either the coast or moving water. Majority of the artefact scatter register sites recorded at Wilson's Promontory follow water sources inland. The strategic locations of both shell midden and artefact scatter sites demonstrate land use patterning.

Other registered place types include LDADs (1.56%), Aboriginal Ancestral Remains Burial (1.3%), object collection (0.52%), Aboriginal Ancestral Remains Reinternment (0.26%) and scarred trees (0.26%)

2.4 Aboriginal heritage – archaeological places in Tasmania

2.4.1 Primary Stakeholder Area – Bass Strait Island Aboriginal places

Mackay (1946) was the first to identify archaeological evidence of past Aboriginal use of the Bass Strait Islands in the 1930s (see also Sim 1991:6). Earlier thoughts were that these were stone artefacts left behind when the Tasmanians were moved to Flinders Island by George Augustus Robinson in the 1830s. It was not until Rhys Jones' work in the 1960s that attention to the Bass Strait islands was made. Sandra Bowdler (1979) excavated at Cave Bay Cave on Hunter Island that provided the first evidence of Pleistocene occupation, dating from 23,000 years. At this time, this was the oldest recorded date of Aboriginal occupation in Tasmania. This was also archaeological proof of the Bassian Land Bridge that once connected Tasmania to Mainland Australia (Sim 1991).

Further work was carried out on Flinders Island and several other smaller islands in Bass Strait showed signs of earlier occupation, including stone artefacts, middens and burials. It was believed at the time that the absence of middens on some islands, but the presence of stone artefacts meant that the midden sites were once closer to the original pre-Ice Age coast, which is now under water (Orchiston and Glenie 1978). The first middens excavated in Bass Strait was by Orchistone (Orchiston and Glenie 1978, Orchiston 1979a, 1979b, 1984), however, the full details of the report have not been published. Sim (1991:12) recorded a number of middens on Flinders Island in 1989 and noted that many of the remaining midden sites were found where the sea floor drops away abruptly, further suggesting that many of the midden sites were possibly found on ground level now under water due to rising waters after the Ice Age. Sim (1991) argued that the Bass Strait islands were abandoned before the last remnants of the Bassian Plain land bridge between Mainland Australia and Tasmania disappeared. Davidson and Roberts (2008:20) state:

> *For a while, perhaps, it was possible to use watercraft to maintain contact with families and friends on the other side but eventually this became more difficult. Boats sank sometimes, or storms and rough seas would have made the crossing perilous. When the sea barrier became too wide, those left on the Tasmanian side turned their backs and never saw their friends and families again. It proved to be a monumental turning point, leading to an independent evolution in their technology, economy, society and culture. They were alone for five hundred generations, knowing no other people in the world, living with the knowledge and beliefs derived from those they had known before the sea surrounded them. They remained isolated from the rest of*

humanity until that same sea brought the first Europeans in the late seventeenth and early eighteenth centuries

Brown (1990) conducted excavations on Flinders Island that again proved the antiquity of the Bass Strait Islands, where sporadic occupation from 20,000 years to 8,500 years was found at Mannalargenna Cave on Prime Seal Island. Again, it was hypothesised that the islands were abandoned after 8,500 years due to the rising sea levels (see Sim 1991:11). Early thoughts at the time state that water craft between the islands would have been possible, and the sea level rise was gradual and would have been shallower. However, with the rise of waters, also meant that the distance between land masses increased, therefore making travel much harder and dangerous. It is thus why many believe that the islands were abandoned around 6,000 years ago when the seas reached their current levels (Sim 1991:12).

The flooding of the Bassian Plain meant that the people who chose to remain in Tasmania would soon be Isolated for generations. Jones (1977) states '… no other human society, which survived until modern times, had been isolated so completely and for so long'.

2.4.2 Secondary Area – Tasmanian coastal Aboriginal places

Archaeological evidence of occupation in Tasmania range between 34,000 – 40,000 BP. The most accurate date for occupation is from the Parmerpar Rockshelter close to Cradle Mountain that was excavated by archaeologist Richard Cosgrove (Mulvaney and Kamminga 1999:189). This was a time when Tasmania was still a part of the landmass of Australia before it was disconnected with the flooding of the Bassian Plain after the last Ice Age. Further excavations of Kutukina Cave (formally Frasier Cave) in southwest Tasmania established Pleistocene settlement of Tasmania with radio carbon dates ranging from 15,000 to 20,000 years BP (Kiernan 1983; Mulvaney and Kamminga 1999:182).

By the end of the last Ice Age (12,000 BP) the rising temperatures and subsequent rising sea levels flooded the Bassian Plain and separated Tasmania from the mainland of Australia (Kee 1987:12; Taylor 2003). The formation of what is now known at the Bass Strait ultimately led to the isolation of the Tasmanians from their groups on the mainland of Australia. The resulting 10,000 years of isolation crafted a unique culture and economy that was independent from any mainland Australia influence (Mulvaney and Kamminga 1999:339). A series of environmental and climatic changes started to occur in Tasmania as a result of this separation with a reduction in rainfall, lower than normal temperatures, some reduction in the seeding of vegetation, as well as the formation of sand dune systems that were to become a prime area for the discovery of Aboriginal remains. Kee (1987:14) stated that these dunes formulated a new abundance of resources available to the Tasmanian's, which is reflected in much of the early archaeology of this period. These climatic changes started to stabilise around 6,000 years ago. This has been noted by radiocarbon dating at Carlton Bluff, where dates ranged from 8,000 to 6,000 BP (Dix 2015:147-148; Key 1987:12 Neil 1981; Reber1965), and therefore the range of sites found on the coast are more than likely representative of this 6,000 year figure.

Regionally, sites vary in Tasmania. As such, the state has been divided into three geographic regions. Various studies were conducted in the 1980s and 1990s to understand these regional differences in sites, and to understand more broadly Tasmanian Aboriginal archaeology (Brown 1991; Cane 1980; Cosgrove 1985; 1990; Gaughwin 1985: 52; Jones 1965; 1966; 1967; Key 1991; Lourandos 1968; 1970; 1977; MacFarlane 1993; Stockton 1977a, 1977b; 1982). Many of these were published as part of the Parks and Wildlife section of the Tasmanian government. More recent and accurate data is available at Aboriginal Heritage Tasmania, however prior approval from the Aboriginal Heritage Council will be required to access this data.

- East/South East Tasmania
  - Middens formulate 90% of all site types on the east coat with a range of shell from turbo, oyster, limpet, abalone and mussel. Brown (1991:46) determined that turbo middens dominated areas behind rock platforms where oysters were mostly predominant behind sandy beaches, where shell fish consumption generally took place within the immediate proximity of where it was procured from;
  - 50m within the coastline appears to be the limit of the majority of the larger sites in the area;
  - Sites are generally situated on well drained more inland areas;
  - That 81% of sites recorded contained some level of stone artefacts, and generally consist of hornfels, cert, quartzite and chalcedony flakes.
  - Stone artefact scatters were generally located on flat or gently inclined landscapes where they were close to a water source;
  - The underlying geology of the inland area suggests that areas where the underlying rock was sandstone was more favourable over those areas that contain dolerite;
  - Sandstone rock shelters located close to water often contain signs of occupation.
  - Rock art can occasionally be found on sandstone rock shelters, and is generally executed in ochre.
- Archaeological Sites – North/ North East Tasmania
  - Sites generally occur on high energy coastlines;
  - Approximately 78% of sites occur within 50m from a water source;
  - Sand dune areas most commonly have sites located on them;
  - The main stone typology noted in these assemblages include hornfels, chert, and quartz.
  - Rock art can be found pecked in stone on coastal margins
- Archaeological sites North West/ West/ South West
  - Majority of sites can be found on sand dunes close to rock platforms;
  - Middens are generally smaller and lower on sandy shores.
  - Middens are generally absent along rocky granite shorelines.
  - Site types include artefact scatters, isolated artefacts, stone and ochre quarry sites and rock shelters.

- The main stone types used in the area include spongolite, quartzite, quartz, silcrete and hornfels.
- Artefact scatters and isolated artefacts are generally located on the forest plain.
- Stone artefacts will be varies in material type, which reflects the opportunistic nature of collecting material.
- Areas within 500m of major water courses and creeks will generally contain Aboriginal sites.
- Sites that contain stone artefacts made from spongolite artefacts will no predate 2,500BP.
- Generally, sites are 70 to 100 artefacts per km^2. Densities are approximately 1.7 artefacts per site in places away from major rivers and quarry sites, whereas there will be approximately 6.5 artefacts per site in areas close to these resources.
- Sites will generally be located near the transition of inland heath plains and forest margins.
- Large artefact scatters will be located close to major creeks or rivers especially where flat grounds are associated with the area;
- Hut depression occur on coastal margins, generally close to food sources
- Rock art is found on coastal margins, and is generally pecked or engraved on large sandstone faces, or where creeks exit to the sea.

2.5 Archaeological summary

Within the study area, along the Victorian coast, there are 5636 registered Aboriginal places with the most common site types being shell middens, artefact scatters and LDADs. Shell middens are typically found along the coastline, whereas artefact scatters, while also being found along the coast, are varied and move inland following freshwater sources, likely to be indicative of past inland-coastal travel routes. LDADs are also typically found further inland than shell middens and artefact scatters, indicative of widespread use of the landscape in the past, rather than concentrations and repeated patterning.

In light of a review of Aboriginal places within the study area, there is a high likelihood for Aboriginal cultural heritage material to be present within the areas subject to potential impact.

Within Tasmania and the Bass Strait Islands, there are no recent published figures of sites located on the coastal margins. Access to this data is restricted, and permission will need to be sought by the Aboriginal Heritage Council to access the Aboriginal Heritage Register via Aboriginal Heritage Tasmania. However, from the assessment of available regional data, Aboriginal heritage should be expected in any area of low-lying coastal areas, shelter sites, and sources of food, water and raw materials. These coastal margins contain all Tasmanian Aboriginal site types. It is also known on the West Coast of Tasmania, that a number of rock art sites are located on the coast, many either close or in tidal margins (Dix pers. obs.). Large midden sites are also located very close to the waters edge, as well as some stone quarry sites within tidal margins (Dix pers .obs.).

2.6 Traditional Owner groups and ethnohistory

For the purposes of this assessment, information about Aboriginal Victorian pre and post contact history has been sourced from nineteenth and twentieth century primary and secondary ethnographic/historical records.

2.6.1 Primary Stakeholder Area - Gunditjmara

The Gunditjmara RAP group covers the area boarding the South Australia border with Victoria and the Southern Grampians. This area includes Harrow and Horsham, south to Dunkeld and MacArthur, and southwest to Portland and Cape Nelson. The Gunditjmara RAP area also includes many state and national parks such as Discovery Coastal Park, Mount Richmond National Park, Cape Nelson State Park and the Grampians National Park.

The area between the Shaw and Eumerella Rivers in the south-west to Lake Linlithgow in the north and Yambuk in the south, are shared by both the Gunditjmara RAP and the Eastern Maar RAP groups.

There are many landscapes within Gunditjmara Country – Nyamat Mirring (Sea Country), Tungatt Mirring (Stone Country), Bocara Mirring (River Country) and Woorrowarook Mirring (Forest Country) (Glenelg-Hopkins Regional Catchment Strategy 2023).

It can be noted that the Gunditj Mara view water as part of their traditional lands and should be recognised and protected as such (Clark 1990, RNTBC 2023)

Evidence of Gunditj Mara knowledge of water is found in the eel trapping and the redirecting of waterways at Lake Condah and in the larger Budj Bim National Heritage Landscape. The Budj Bim National Heritage Landscape had been managed by Traditional Owners to form waterways and channels to bring eels down from Darlots Creek into Lake Condah for fishing and resource gathering (Department of Climate Change, Energy, the Environment and Water 2021). This practice can be dated to approximately 6600 years old, with one of five of the eel trap systems around the lake's edge being carbon dated. The relocating and breeding of eels became a sustainable husbandry practice that sustained the Gunditj Mara through every season, providing food stuffs and sources of trade. There are plans currently being made with VicWater and Wannon Water to reestablish traditional eel farming in the Budj Bim area (VicWater 2022)Another plan devised to aid in the management of Indigenous water landscapes is the Sea Country IPA Program. The Sea Country IPA (Indigenous Protected Areas) Program was developed at the beginning of 2021 to aid in the conservation and protection of Indigenous marine and coastal environments. The IPA program covers the Gunditj Mara area from the Convincing Ground to the Yambuk Lakes and provides further protection of the Budj Bim landscape as well as opportunities for Indigenous employment, documentation of traditional knowledge and sea management (DCCEEW n.d.)

The Lake Condah mission was opened in 1867 in response to the displaced Gunditj Mara after the Eumerella wars (Budj Bim Cultural Landscape 2023). The Eumerella wars lasted over 20 years, beginning in the mid 1830's to the 1860's, starting over disagreements in ownership of land in southwest Victoria. The Dhauwurd wurrung people (apart of Eastern Maar country) refused to settle at the mission in Framlingham, so the Lake Condah mission was established, where they farmed and learnt to read and write English. The mission was strategically position to both house eel trapping facilities and have a view of the Budj Bim Reserve. In 1918, the mission was formally closed, and some of the Gunditj Mara were moved to other missions, such as the Lake Tyers Mission, while others refused to leave country. In 1987, the land on which the mission was situated on was given back to the Gunditj Mara (Budj Bim Cultural Landscape 2023).

Gunditj Mara hold strong cultural connections to sea country (Nyamat Mirring), and Nyamat Mirring features heavily in the Dreaming and creation stories of the Gunditj Mara. The Gunditj Mara believe that after the initial eruption of the creator spirit, Budj Bim, out of a volcano, the spirits movement throughout the landscape created the surrounding landscapes and their features. The lava

flow from this eruption caused the creation of the wetlands found within the Gunditj Mara landscape. In the traditional funeral rites of the Gunditj Mara people, bodies are bundled in grass and laid into the ground with their heads pointing towards Deen Maar (Lady Julia Percy Island). This is due to Deen Maar having a cave called Tarn Wirrung, which is thought to be the beginning of the passage towards the afterlife. Once the bodies were buried, if grass grew at the mouth of the cave, it was thought that the spirit had made it to the island, and into the realm of the clouds

Deen Maar (Lady Julia Percy Island) is the point where two creator deities, Punjil and Pallian left this earth. Pallian was the creator deity of the sea and fish and the governor of the oceans (after William Thomas, Letters from Victorian Pioneers, in National Oceans Office 2003:12). This island holds and creation story holds significance for both the Gunditj Mara and Eastern Maar.

Significant locations of conflict are also located on the coast, including the massacre of Gunditj Mara at Convincing Ground, east of Portland. The Convincing Ground Massacre occurred at Allestree, approximately 10km from Portland, where Kilcarer Gundidj, Gundtij Mara people were killed by whalers over a disagreement about the ownership of a beached whale(VHR n.d.). The suggested dates for this massacre are between 1833 and 1834, with an unknown number of Indigenous peoples being killed(VHR n.d.).

2.6.2 Primary Stakeholder Area - Eastern Maar

The Eastern Maar RAP group covers the area including Port Fairy and Warrnambool, down to Apollo Bay, east to Lorne and northwest towards Ararat. The RAP area of Eastern Maar also extends 100 meters off the coast and therefore encompasses the Twelve Apostles.

Eastern Maar is an umbrella term, used to describe a large area of land containing many, smaller traditional owner groups, such as Maar, Eastern Gunditgimara, Tjap Wurrung, Peek Whurrong, Kirraw Whurrung, Kuurn Kopan Noot. Yarro waetch and many others.(Eastern Maar Aboriginal Corporation 2020)

In 1865 the first Aboriginal mission was formed in the Western District at Framlingham in Girai wurrung country, north-east of Warrnambool. Aside from the Dhauwurd wurrung clans who moved to the Lake Condah mission in the 1860s, other Indigenous people were removed to the Framlingham Aboriginal Mission, which was gazetted as a "temporary reservation for the use of Aborigines" (Barwick 1979: 4).In this mission the Eastern Maar people continued both cultural and spiritual traditional practices. In 1867 and 1899 the mission was meant to close down, and the Eastern Maar people were expected to move into the Lake Condah mission. Again, in 1916, the Eastern Maar people were expected to move into missions within Gippsland Victoria. All three times, the people refused to move and were successful in staying on country. During the 1970's, Eastern Maar were granted ownership of the land, including 586 acres of the original mission(Lawler, Oataway, & Berelov 2016).

Eastern Maar's connection to water relies heavily in the marine resources, abundant around the area. Fishing practices are still used today with the fishing and collection of eels, perch, blackfish, yabbies, abalone, cockles and crayfish (Eastern Maar Aboriginal Corporation 2015, pp. 9). The techniques used in eeling have been passed down for generations, meaning the practices used today are techniques and skills traditional owners were using to eat and to trade (Eastern Maar Aboriginal Corporation 2015, pp. 9). Shell middens are an important archaeological site to the Eastern Maar, where they take time to teach others about the importance of culture and preservation and management of sea resources (Eastern Maar Aboriginal Corporation 2015, pp. 9).

> *When Maar citizens visit places with archaeological sites, we take time to teach our young ones about what they mean in terms of our history and culture. For example, our ancestors left many ancient middens along the coast which continue to tell a story about our Country - how the coastline and estuaries fluctuated, how and when our ancestors used the resources along the coast, what was harvested from out in the open ocean, how climatic conditions changed over time, where the meeting places were and ceremonies took place. This type of cultural*

learning helps develop empathy for Country; a deeper understanding on a societal scale of what Country means to us as a nation. We always pay our respects…(Eastern Maar Aboriginal Corporation 2015, pp. 9)

Through Country, Eastern Maar People connect with their ancestors who are associated with different water systems within the landscape (Eastern Maar Aboriginal Corporation 2015, pp. 9):

> *We believe that the spirits of our dead reside in our waterways and water bodies, and that they use animate and inanimate objects to move through Country. The signs they reveal to us are an important part of the interaction with our Ancestors – engaging, guiding, informing and warning us. When our citizens die, they are often buried with their bodies facing towards Deen Maar (Island). A story associated with Deen Maar Island is that the spirits go first to Deen Maar and then up to the stars, as Bunjil had done. A star falling or lights flying through the sky is a sign that the spirit is going over.*
>
> *Sea Country Maar citizens have always had a close connection with the sea and its resources, which were central to our culture, economy and survival. The ocean nourished our Ancestors and we still rely on it for our survival. Abundant middens along the coastline tell a rich story of our past. The coastline is home to sites that are important for our Dreaming - Three Sisters Rocks and Deen Maar (Lady Julia Percy Island) where our Ancestors leave the earth. Our connection with our Sea Country extends well beyond the current shoreline to the edge of the continental shelf. While this area is under the sea today, we occupied it for thousands of years and rising sea levels have not washed away the history, physical evidence or our connection.*(Eastern Maar Aboriginal Corporation 2015, pp. 13)

2.6.3 Secondary Stakeholder Area - Wadawurrung

Aboriginal groups mapped natural features as boundaries for their ranges, estates and economic territories. The Wadawurrung held land along the coast from Painkalac Creek at Aireys Inlet, east into Port Phillip Bay and to the Werribee River and to the north as far as Mt Emu and Fiery Creeks (Clark 1990).

Little is known about the Wadawurrung and their social organisation as they were one of the first Aboriginal groups within the region to be affected by European settlement in the area (Clark 1990). However, the Wadawurrung RAP organisation has traced its people's lineage to that of the seven families of John Robinson who was born in 1846 and passed in 1919 (WTOAC 2019).

During the summertime months, Wadawurrung along with Djab wurrung, Dhauwurd wurrung and girai wurrung language groups gathered at Mirraewuae swamp for ceremony and hunting. In early autumn the *Wada wurrung* would meet with Girai wurrung at Lake Bolac with local Djab wurrung named groups to take advantage of the migratory eels. The Wadawurrung participated in trade meetings at Terang, trading axe's and adhesive gum.

The coastal Wadawurrung first came into contact with settlers around the early 1800s when John Murray and William Flinders surveyed part of Indented Head. By the end of 1836 sheep runs were endemic around Geelong for an approximate 40.2 kilometre radius. The following year, settlers began to spread westward towards the Colac district.

An important figure in the history of Wadawurrung country was an escaped convict named William Buckley. The Wadawurrung balug first encountered Europeans in 1832 when William Buckley, escaped from the failed Sorrento settlement in 1803. Buckley was adopted by the Wadawurrung balug and spent the next 32 years with them; taking part in their customs, learning the language as well as hunting gathering techniques (Clark 1990). Buckley's story was recorded by John Morgan in 1852. From Buckley's accounts it was recorded that the Wadawurrung balug would catch eels at Lake Modewarre and would spend time on the hunting ground of the neighbouring Bengalat bulluck. According to Buckley the clan was at odds with the Bun wurrung, Woi wurrung and Daung wurrung clans (Clark 1990).

2.6.4 Secondary Stakeholder Area - Bunurong

The land encompassing the eastern side of the study area, as mapped by Clark (Clark 1990), is held by the Boon Wurrung language group, commonly associated with the Bunurong people. Boon Wurrung land occupied the coastal area from the Werribee River to Anderson Inlet, Phillip Island and probably beyond to Wilsons Promontory(Horton & Morris 1983, pp. 44). The Bunurong RAP group covers the Mornington Peninsula (such as Rosebud and Frankston), Western Port (French Island, Phillip Island and San Remo) and the eastern most part of South Gippsland (Warragul down to Leongatha)(BLCAC 2023).

The Bunurong group is loosely divided into smaller clan or family groups, named for the area they associated with (Gaughwin & Sullivan 1984, pp. 85). Barwick (1984, pp. 117–118) identified six clans: the *Burinyung-balluk* from Point Nepean and Cape Schanck, the *Mayone-bulluk* associated with the Carrum swamp, Cranbourne and the northern part of the Mornington Peninsula, the *Ngaruk-willam* associated with the Brighton area and Mordialloc, the *Yallock-bulluk* (most relevant to the study area) associated with the eastern side of Bass River and Tooradin, the *Yallukit-willam* associated with the area now called St Kilda and a broader region from the Werribee River to Mordialloc, the *Yowengherra* occupying the Tarwin River area. Thomas distinguished between the Bunurong people from Port Phillip and those of Western Port, though he rarely had contact with the Bunurong people on the eastern side of Western Port Bay (Sullivan 1981, pp. 16–19, Clark 1990). The Yallock-Bulluk Bunurong group are the most likely to have lived and associated with San Remo and Phillip Island area. The moiety of the Yallock-Bulluk named group is Bunjil, commonly associated with the Phillip Island area.

People were likely to have moved between the interior in winter and the coast in the summer. Movement was made up of many small distances (c. 10 km per day) punctuated by camps of one to three nights and occasionally longer stays of eight to ten days (Sullivan 1981). Social activity involving neighbouring named or socio-dialectical groups was usually held in warmer periods, held at the intersection of group boundary's and arranged by a person assigned of the responsibility of travelling between groups to organise the time, place, and events of the meeting.

An important figure in the history of Bunuroung country was an Indigenous man named Derrimut. Derrimut was the *arweet* the *Yalukit Willam* group at the time of European settlement of the region (Clark 1990, pp. 368–369). His name, Derrimut (derrimart/derremot), is believed to mean 'to hunt' or 'to pursue' in the language of the *Yalukit Willam* (Clark 2005, p. 1), Derrimut was a prominent figure in both the Indigenous and European histories of early Melbourne, and historical and contemporary views of his status vary. William Buckley, an escaped convict who lived with the Wadawurrung people of the Geelong region, considered him a 'traitor' who should be speared for divulging impending attacks to European colonists (Clark 2005, pp. 109). Clark (2005) considers Derrimut a "culture-broker" who sought to navigate the newly imposed political context of colonial Victoria by forging relationships with prominent early European Melbournians including John Pascoe Fawkner and William Thomas, who held Derrimut in high regard (Clark 2005, pp. 111). In 1849, Derrimut and other members of the *Yalukit-Willam* agitated for the establishment of the Mordialloc Reserve, and when it was later divided for sale in 1863, Derrimut used his European connections to angrily protest its sale (Clark 2005, pp. 116).

Bunurongs use of water-based resources is evident in the quantity of shell midden sites found along the coastline. Within the study area and the bounds of the Bunurong RAP group, there are a total of 677 registered shell midden sites, within two hundred meters of the shoreline. This suggests knowledgeable exploitation of marine resources as practiced techniques and an understanding of the ocean would be needed to accumulate the amount of shell middens listed on Bunurong country.

2.6.5 Secondary Stakeholder Area - Gunaikurnai

The Gunaikurnai RAP group covers most of the Gippsland Area, spanning from Warragul and Noojee, down to Port Albert and Port Welshpool, eastward towards Bairnsdale, Lakes Entrance and Marlo, and north towards Omeo and Hotham Heights

The Gunaikurnai believe in strong connections between land (Wurruk), water (Yarnda) and air (Watpootjan) and how these connections support living things. The Gunaikurnai see no separation of land and water, combining the two to represent whole country and therefore, demonstrate the same levels of importance to both land and sea. Due to this definition of country, both land and ocean receive the same amount of protection and management(GLWAC 2023a).

Throughout Gunaikurnai country, there are multiple sites that detail indigenous relation to country and resource exploitation. One site that displays local resource exploitation is the recently excavated cave near Mitchell River, Raymond Creek 2 Rock Shelter, that provides evidence of using mussel shell tools and localised resource gathered through fishing(Monash University & GLWAC 2019).

The Buchan Caves Reserve is an example of the spiritual and physical relation to country that the Gunaikurnai people share. At this site in Eastern Victoria there are registered indigenous burials located in and around the cave system, creating a spiritual space within the landscape. In conjunction to the sacred burials, the site was already known to be a great place of connection as it played an integral role in the migrating patterns of the Gunaikurnai travelling through the mountains(GLWAC 2023b).

The area surrounding Buchan Caves Reserve is also considered special to country, with several other caves being recognized as having cultural meaning One such cave is Cloggs Cave, located southeast of Buchan Caves Reserve, having an undisturbed cultural sequence, that could prove indigenous settlement in the Late Holocene and holds evidence of megafauna that challenge the idea of megafaunal extinction being caused by the LGM(GLWAC 2023a, David et al. 2021, GLWAC 2023b)

2.6.6 Primary Stakeholder Area – Palawa (Tasmania)

According to Jones (1974), Tasmanian Aboriginal society consisted of three social units: hearth group, the band and the Tribe. The hearth group was described as being the family unit, and consisted of a man, woman, their children, aged relatives, and ranged from 2-8 people (Jones 1974: Plomley 1983).

> *There were nine individuals in this family, and clearly they represented a hearth group, because Peron visited their campsite with its single hut. The group comprised an older man and wife, a younger man and wife, and five children, one a daughter (Oure-Oure) of the older man and wife, and the other four the children of the younger man and wife. (Plomley 1983:168).*

The band was more similar to a social unit, comprising of a number of hearth groups, and this was defined by land owned and the boundaries within this territory being lined with defined geographic boundaries (Jones 1974:324-325). Brown (1986:21) further notes that the band was generally led by an older man who had a reputation as a successful hunter and fighter. Brown (1986:21) also believes that the band was exogamous, with the wife generally moving to her husband's band and hearth group. Each of these bands were then further associated with a 'political' unit, as termed by Jones (1974:328-329) as a tribe. Jones (1974:328-329) describes:

> *...that agglomeration of bands which lived in contiguous regions, spoke the same language or dialect, shared the same cultural traits, usually intermarried, had a similar pattern of seasonal movement, habitually met together for economic and other reasons, the pattern of whose peaceful relations were within the agglomeration and of whose enmities and military adventures were directed outside it. Such a tribe had a territory, consisting of the sum of the land owned by its constituent bands ... The borders of a territory ranged from a sharp well defined line associated with a prominent geographic feature to a broad transition zone.*

Ryan (2012:14) hypothesises that the population of Tasmania was associated with a broad network of nine Tribes, each consisting of six to 15 bands. Ryan (2012:14) estimates that at by the time of European colonisation, the population of each tribe was around 350 and 800 people, where the overall population of Tasmania is estimated at being 3000-8000 people.

Coastal sites generally consist of midden sites, however, significant stone quarries, rock art, and former hut depressions and camp site can still be located. These sites show a seasonal exploitation of the coastal areas (Brown 1991; Jones 1977). The recording of bark canoes by early explorers shows that the Tasmanians did have a rich maritime tradition, however, many of these were used to access smaller off shore islands, not the larger islands of Bass Strait, or to the main land of Australia (Jones 1977).

With the removal of the Tasmanians to Flinders Island, population decreases, and associations with different geographical areas of Tasmania were lost. When the Tasmanian's returned to the mainland to Oyster Cove, many of these survivors were not allowed back into their traditional areas where they were born, or where their family had resided for generations.

2.7 Conclusion

Aboriginal communities in Victoria and Tasmania continue to be present and vibrant, and maintain strong connections to their traditional lands, waters, and their cultures. Each group is distinct and hold different systems of belief, connection, ceremony, language and lore and cultural practice. Each group hold traditional ecological knowledge of plants, animals and land management passed down through generations.

Aboriginal communities continue to practice traditional hunting, fishing, and gathering, and have a deep understanding of the environment around them. They also have a spiritual connection to the land and sea. Aboriginal people and representative bodies in Victoria and Tasmania have become more active in conservation, land and heritage management, working to protect and restore their traditional lands and waters, and to ensure that their cultural heritage is respected and protected.

> *Coastal environments in south-eastern Australia are rich in cultural sites. These include archaeological sites, such as shell middens and stone quarries, as well as "natural" sites, such as headlands, river mouths, reefs and islands. These sites have continuing cultural meaning because of their connection with Creation Stories, Dreaming Tracks, ceremonial places, camping places and massacre sites. Many of these places are listed on the Register of the National Estate, others are recorded in State-based heritage registers, while many others are known only to Indigenous people themselves and are not formally recorded...*
>
> *Protecting this cultural heritage is a major concern for Indigenous people. (National Oceans Office 2002:4).*

This Cultural Heritage Desktop Assessment explores the cultural heritage background for the region, provides a summary of available information in order to provide the project with a grounding in the cultural heritage of Aboriginal people in the study area.

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4 Glossary of Terms

The glossary provides definitions of various archaeological and heritage related terms.

Heritage place: A place that has aesthetic, historic, scientific or social values for past, present or future generations – ' ...this definition encompasses all cultural places with any potential present or future value as defined above' (Pearson & Sullivan, 1995, p. 7).

Aboriginal place: Aboriginal place is defined under Section 5 of the *Aboriginal Heritage Act* 2006 as follows:

5 What is an Aboriginal place?

(1) For the purposes of this Act, an Aboriginal place is an area in Victoria or the coastal waters of Victoria that is of cultural heritage significance to the Aboriginal people of Victoria.

(2) For the purposes of subsection (1), *area* includes any one or more of the following—

(a) an area of land;

(b) an expanse of water;

(c) a natural feature, formation or landscape;

(d) an archaeological place, feature or deposit;

(e) the area immediately surrounding anything referred to in paragraphs (c) and (d), to the extent that it cannot be separated from the thing without diminishing or destroying the cultural heritage significance attached to the thing by Aboriginal people;

(f) land set aside for the purpose of enabling Aboriginal human remains to be re-interred or otherwise deposited on a permanent basis;

(g) a building or structure.

Alluvial terrace: a platform created from deposits of alluvial material along river banks.

Angular fragment: a piece of stone that is blocky or angular, not flake-like.

Archaeology: the study of the remains of past human activity.

Artefact scatter: a surface scatter of cultural material. Aboriginal artefact scatters are defined as being the occurrence of five or more items of cultural material within an area of about 100 square metres. Artefact scatters are often the only physical remains of places where people have lived camped, prepared and eaten meals and worked.

Backed piece: a flake or blade that has been abruptly retouched along one or more margins opposite an acute (sharp) edge. Backed pieces include backed blades and geometric microliths. They are thought to have been hafted onto wooden handles to produce composite cutting tools. Backed pieces are a feature of the 'Australian small tool tradition', dating from between 5,000 and 1,000 BP in southern Australia (Holdaway & Stern, 2004).

Blade: a flake at least twice as long as it is wide.

Burial place: usually a sub-surface pit containing human remains and sometimes associated artefacts.

Contact place: see 'Aboriginal historical archaeological place'.

Core: an artefact from which flakes have been detached using a hammerstone. Core types include single platform, multi-platform and bipolar forms.

Cortex: original or natural (unflaked) surface of a stone.

Cortical: refers to the cortex.

Flake: a stone piece removed from a core by percussion (striking it) or pressure. It is identified by the presence of a striking platform and bulb of percussion, not usually found on a naturally shattered stone.

Flaked piece: a piece of stone with definite flake surfaces, which cannot be classified as a flake or core.

Formal tool: an artefact that has been shaped by flaking, including retouch, or grinding to a predetermined form for use as a tool. Formal tools include scrapers, backed pieces and axes.

Geocentric Datum of Australia 1994 (GDA94): a system of latitudes and longitudes, or east and north coordinates, centred at the centre of the earth's mass. GDA94 is compatible with modern positioning techniques such as the Global Positioning System (GPS). It supersedes older coordinate systems (AGD66, AGD84). GDA94 is based on a global framework, the IERS Terrestrial Reference Frame (ITRF), but is fixed to a number of reference points in Australia. GDA94 is the Victorian Government Standard and spatial coordinates for excavations, transects and places in CHMP documents.

Geometric microlith: a small tool that has been fashioned from breaking apart a microblade. The piece is then retouched or backed and a small tool formed.

Grindstones: upper (handstone) and lower (basal) stones used to grind plants for food and medicine and/or ochre for painting. A handstone sometimes doubles as a hammerstone and/or anvil.

Hearth: usually a sub-surface feature found eroding from a river or creek bank or a sand dune - it indicates a place where Aboriginal people cooked food. The remains of a hearth are usually identifiable by the presence of charcoal and sometimes clay balls (like brick fragments) and hearth stones. Remains of burnt bone or shell are sometimes preserved within a hearth.

Isolated artefact: the occurrence of less than five items of cultural material within an area of about 100 square metres. It/they can be evidence of a short-lived (or one-off) activity location, the result of an artefact being lost or discarded during travel, or evidence of an artefact scatter that is otherwise obscured by poor ground visibility.

Manuport: foreign fragment**,** chunk or lump of stone that shows no clear signs of flaking but is out of geological context and must have been transported to the place by people.

Map Grid of Australia (MGA): The official coordinate projection for use with the Geocentric Datum of Australia 1994 (GDA94).

Mound: these places, often appearing as raised areas of darker soil, are found most commonly in the volcanic plains of western Victoria or on higher ground near bodies of water. The majority were probably formed by a slow build-up of debris resulting from earth-oven cooking; although some may have been formed by the collapse of sod or turf structures.

Percussion: the act of hitting a core with a hammerstone to strike off flakes.

Platform preparation: removal of small flake scars on the dorsal edge of a flake, opposite the bulb of percussion. These overhang removal scars are produced to prevent a platform from shattering.

Pre-contact: before contact with non-Aboriginal people.

Post-contact: after contact with non-Aboriginal people.

Quarry (stone/ochre source): a place where stone or ochre is exposed and has been extracted by Aboriginal people. The rock types most commonly quarried for artefact manufacture in Victoria include silcrete, quartz, quartzite, chert and fine-grained volcanics such as greenstone.

Rejuvenation flake: a flake that has been knapped from a core solely for the purpose of preparing a new platform and making it easier to get flakes off a core, as it reduces the angle between platform and core surface.

Retouch: a flake, flaked piece or core with intentional secondary flaking along one or more edges.

Rock art: 'paintings, engravings and shallow relief work on natural rock surfaces' (Rosenfeld, 1988, p. 1). Paintings were often produced by mineral pigments, such as ochre, combined with clay and usually mixed with water to form a paste or liquid that was applied to an unprepared rock surface. Rock engravings were made by incising, pounding, pecking or chiselling a design into a rock surface. Rare examples of carved trees occasionally survive.

Rock shelter: may contain the physical remains of camping places where people prepared meals, flaked stone, etc. They are often classed as a different type of place due to their fixed boundaries and greater likelihood of containing sub-surface deposits. Rock shelters may also contain rock art.

Scarred tree: scars on trees may be the result of removal of strips of bark by Aboriginal people e.g. for the manufacture of utensils, canoes or for shelter; or resulting from small notches chopped into the bark to provide hand and toe holds for hunting possums and koalas. Some scars may be the result of non-Aboriginal activity, such as surveyors' marks.

Scraper: a flake, flaked piece or core with systematic retouch on one or more margins.

Shell midden: a surface scatter and/or deposit comprised mainly of shell, sometimes containing stone artefacts, charcoal, bone and manuports. These place types are normally found in association with coastlines, rivers, creeks and swamps – wherever coastal, riverine or estuarine shellfish resources were accessed and exploited.

Significance: the importance of a heritage place or place for aesthetic, historic, scientific or social values for past, present or future generations.

Striking platform: the surface of a core, which is struck by a hammerstone to remove flakes.

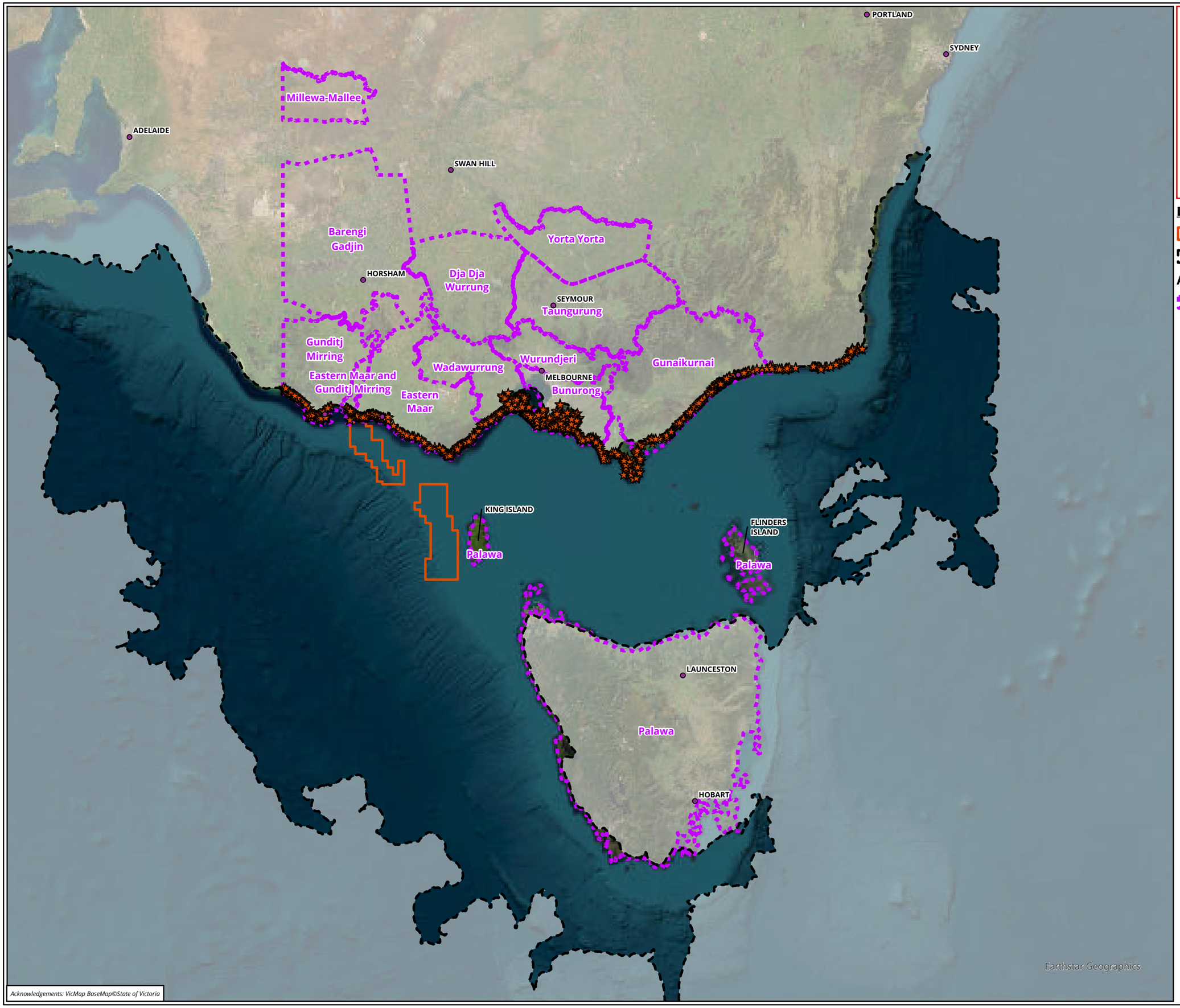
Structures (Aboriginal): can refer to a number of different place types, grouped here only because of their relative rarity and their status as built structures. Most structures tend to be made of locally available rock, such as rock arrangements (ceremonial and domestic), fishtraps, dams and cairns, or of earth, such as mounds or some fishtraps.

Stratified deposit: material that has been laid down, over time, in distinguishable layers.

Transect: A fixed path along which one records archaeological remains.

Utilised artefact: a flake, flaked piece or core that has irregular small flake scarring along one or more margins that does not represent platform preparation.

5 Appendix A – Aboriginal Cultural Heritage Search Results



Legend

- Activity Area
- Assessment area

Aborignal Cultural Heritage

- RAP groups
- VAHR Place

Figure x Location of Victorian Aboriginal Heritage Register places in the Assessment area

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Kilometers

N

Scale: 1:6,000,000 @ A3

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

biosis

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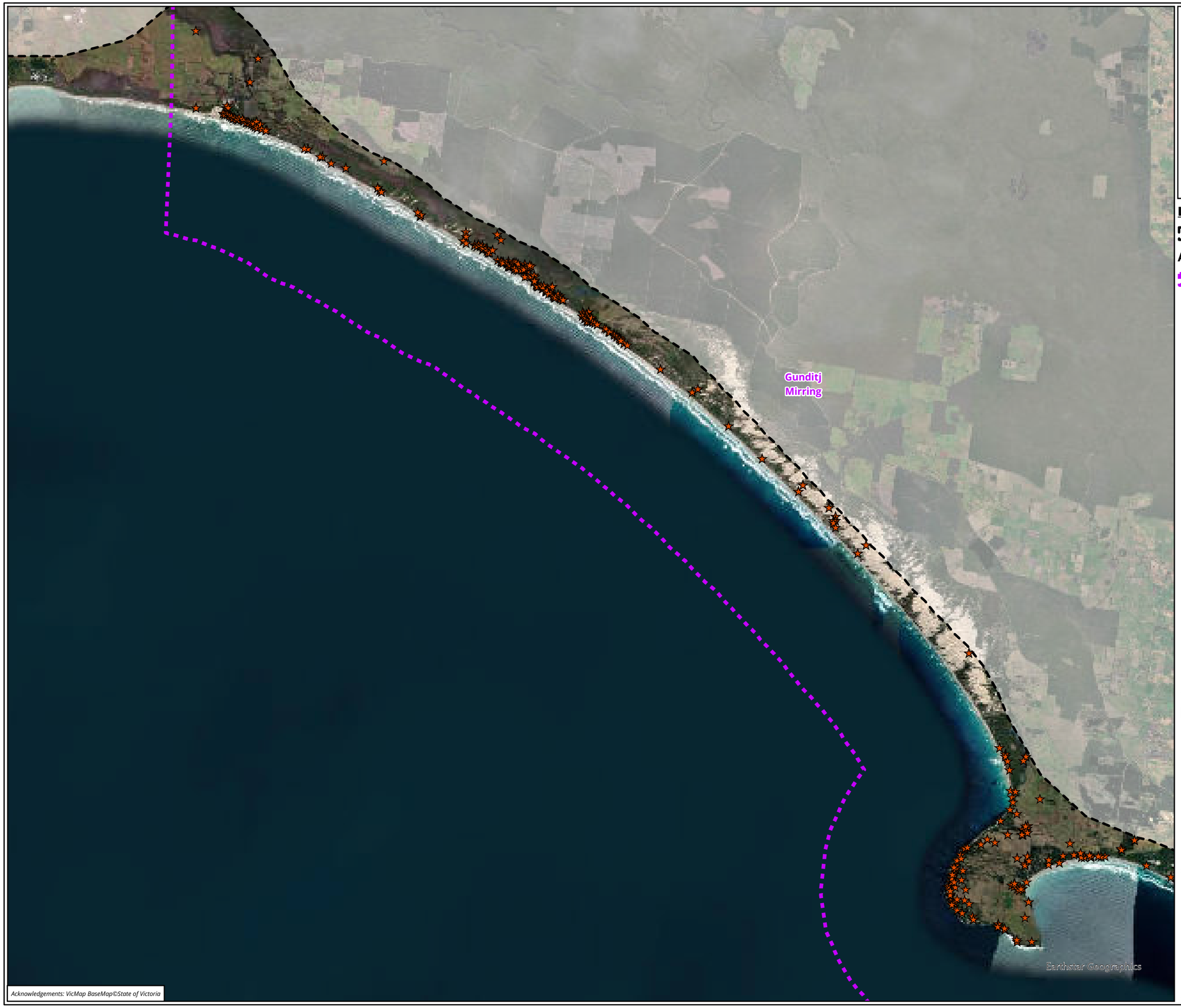

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Assessment area

Aborignal Cultural Heritage

RAP groups

VAHR Place

Figure x Location of Victorian Aboriginal Heritage Register places in the Assessment area

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Kilometers

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Scale: 1:200,000 @ A3

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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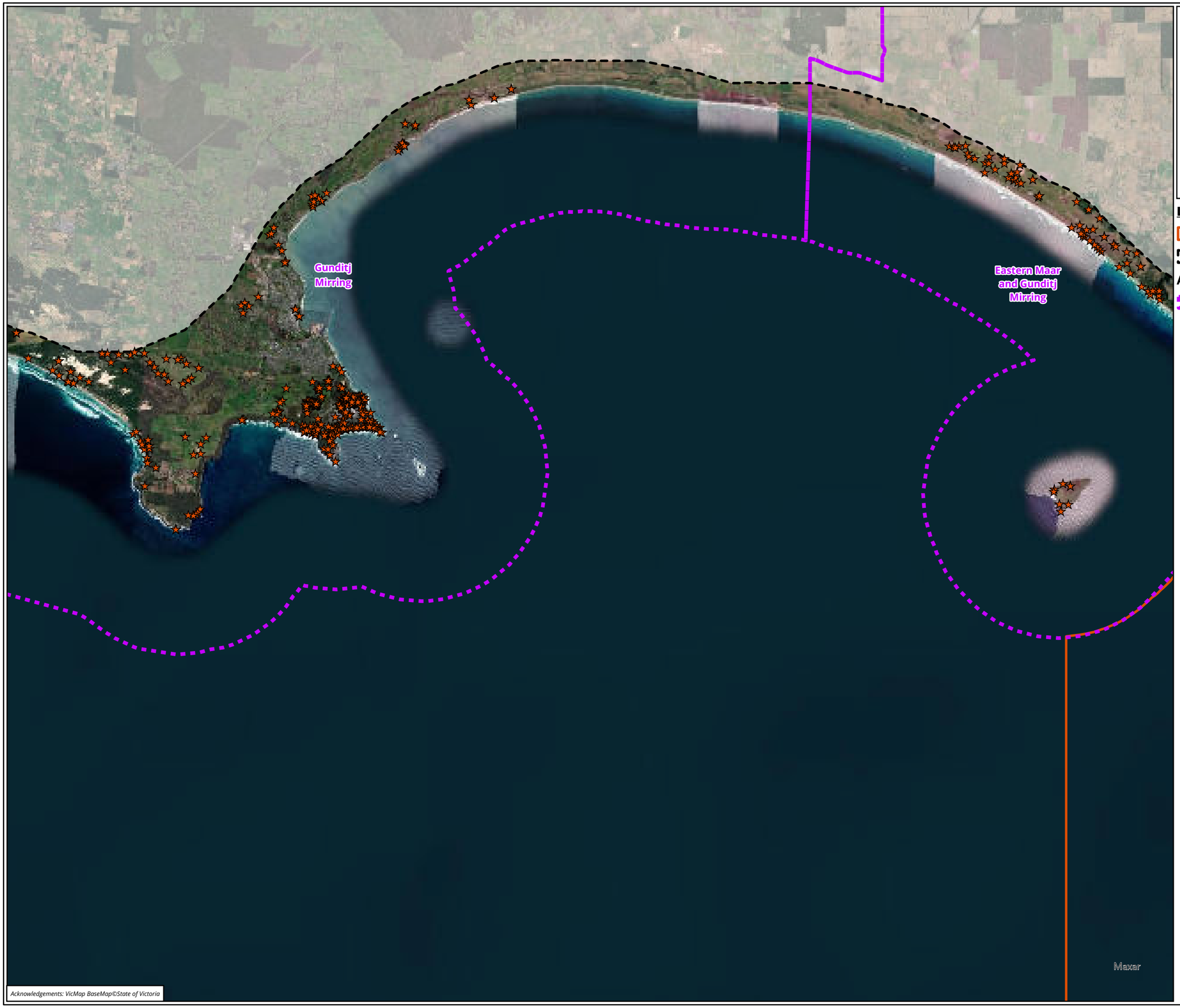

Legend

- Activity Area
- Assessment area

Aborignal Cultural Heritage

- RAP groups
- VAHR Place

Figure x Location of Victorian Aboriginal Heritage Register places in the Assessment area

0 2 4 6 8 10
Kilometers

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Scale: 1:200,000 @ A3
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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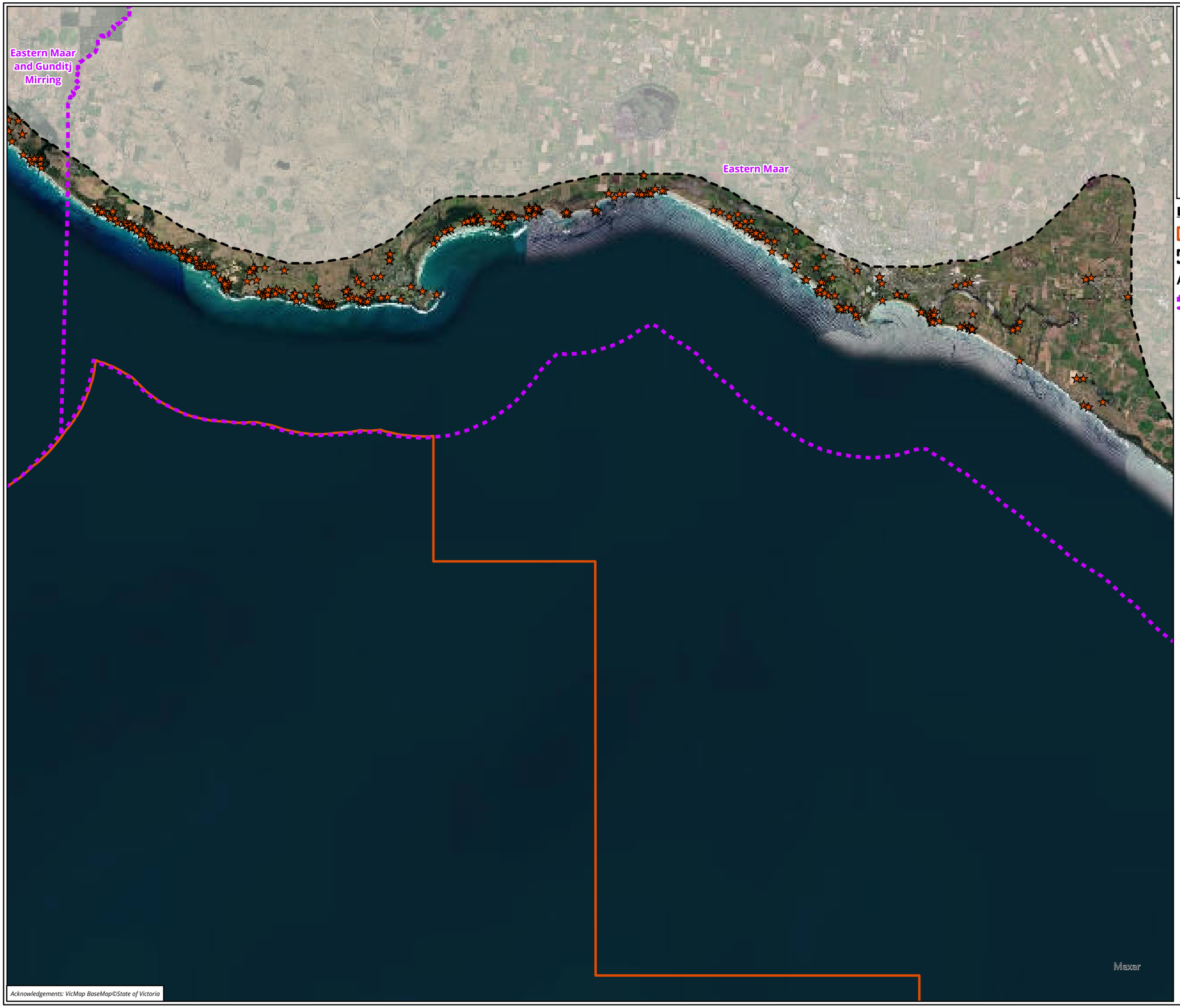

Legend

- Activity Area
- Assessment area

Aborignal Cultural Heritage

- RAP groups
- VAHR Place

Figure x Location of Victorian Aboriginal Heritage Register places in the Assessment area

0 2 4 6 8 10 Kilometers

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Scale: 1:200,000 @ A3
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

Acknowledgements: VicMap BaseMap©State of Victoria

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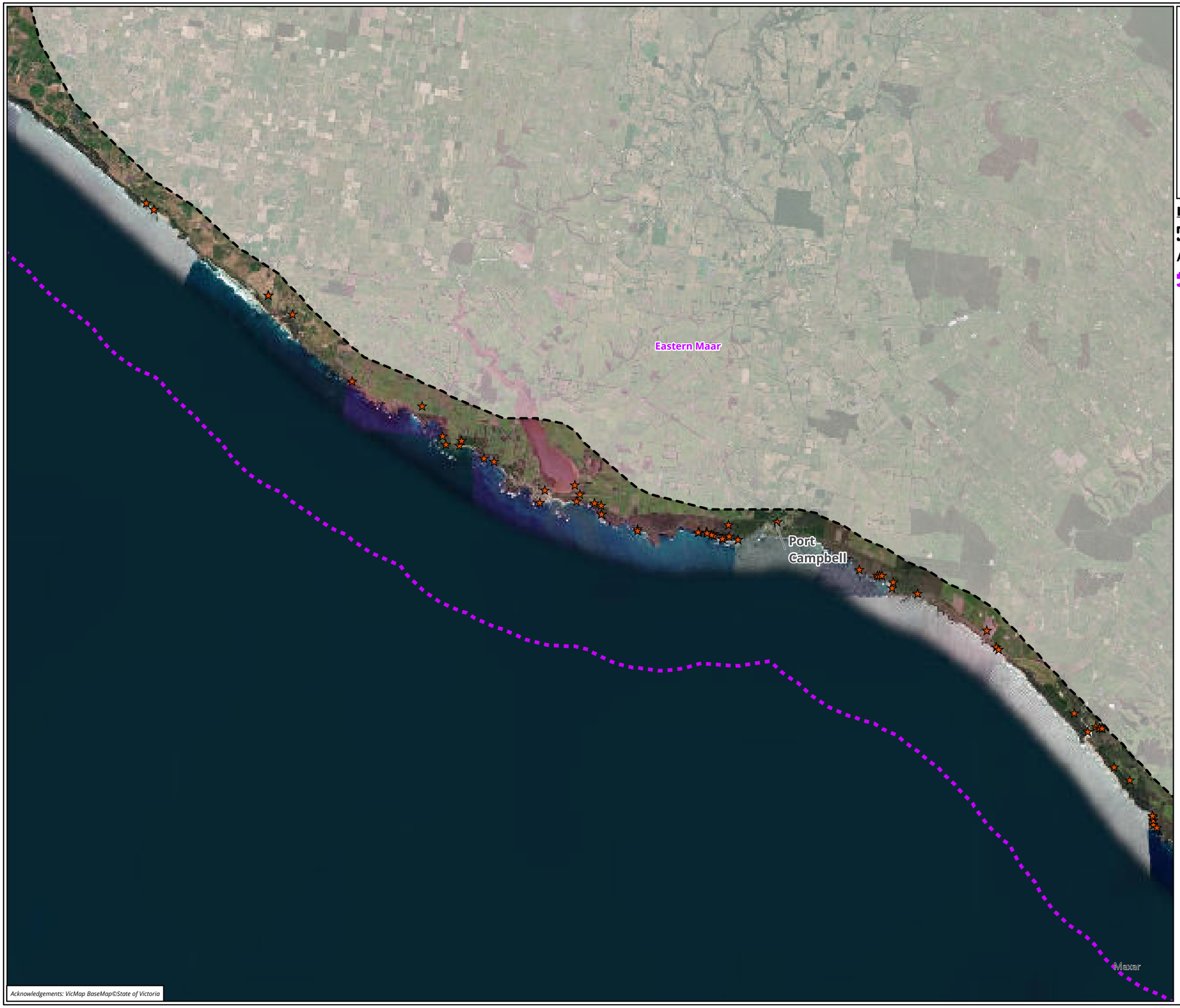

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Assessment area

Aborignal Cultural Heritage

RAP groups

VAHR Place

Figure x Location of Victorian Aboriginal Heritage Register places in the Assessment area

0 2 4 6 8 10

Kilometers

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Scale: 1:200,000 @ A3

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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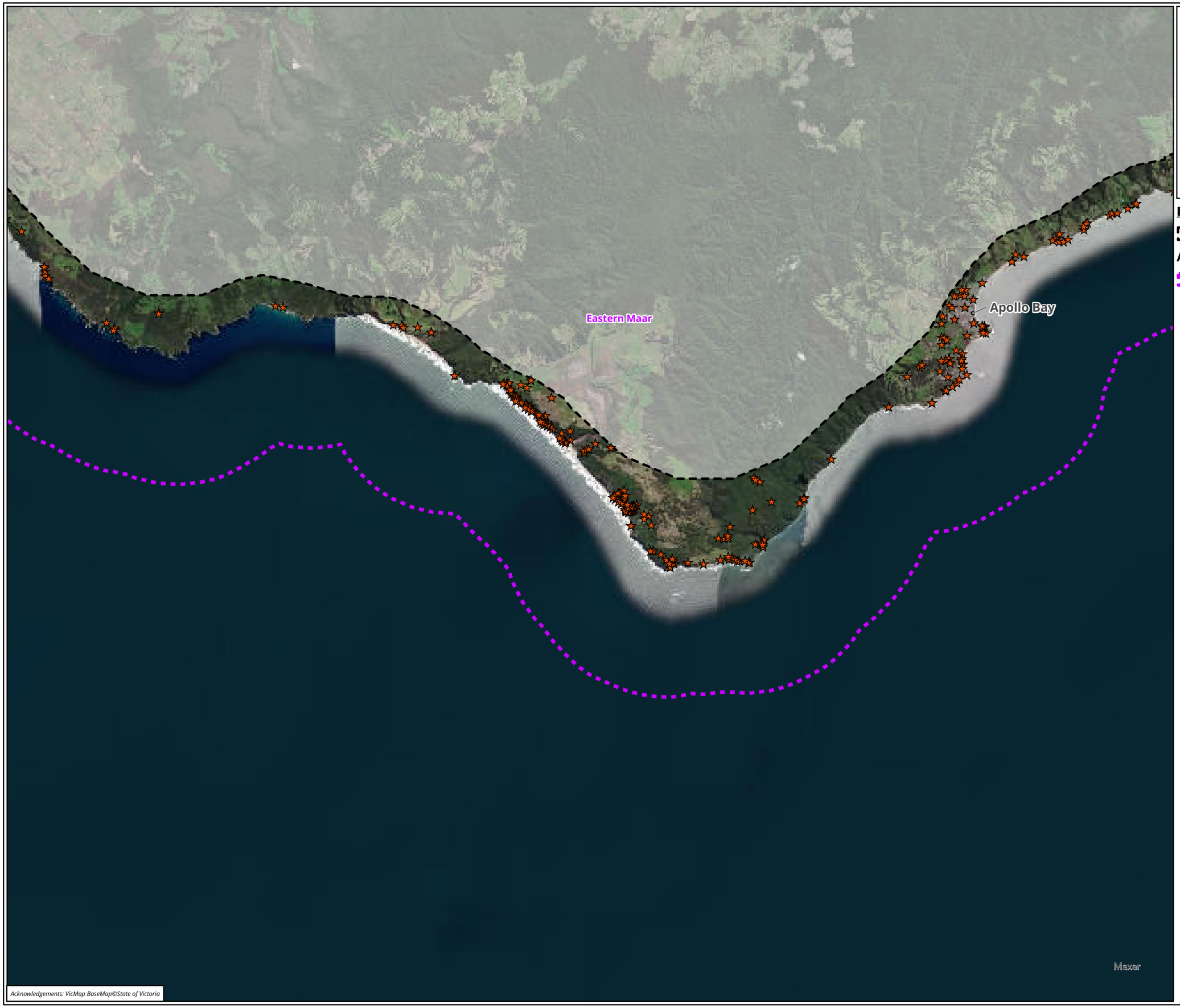

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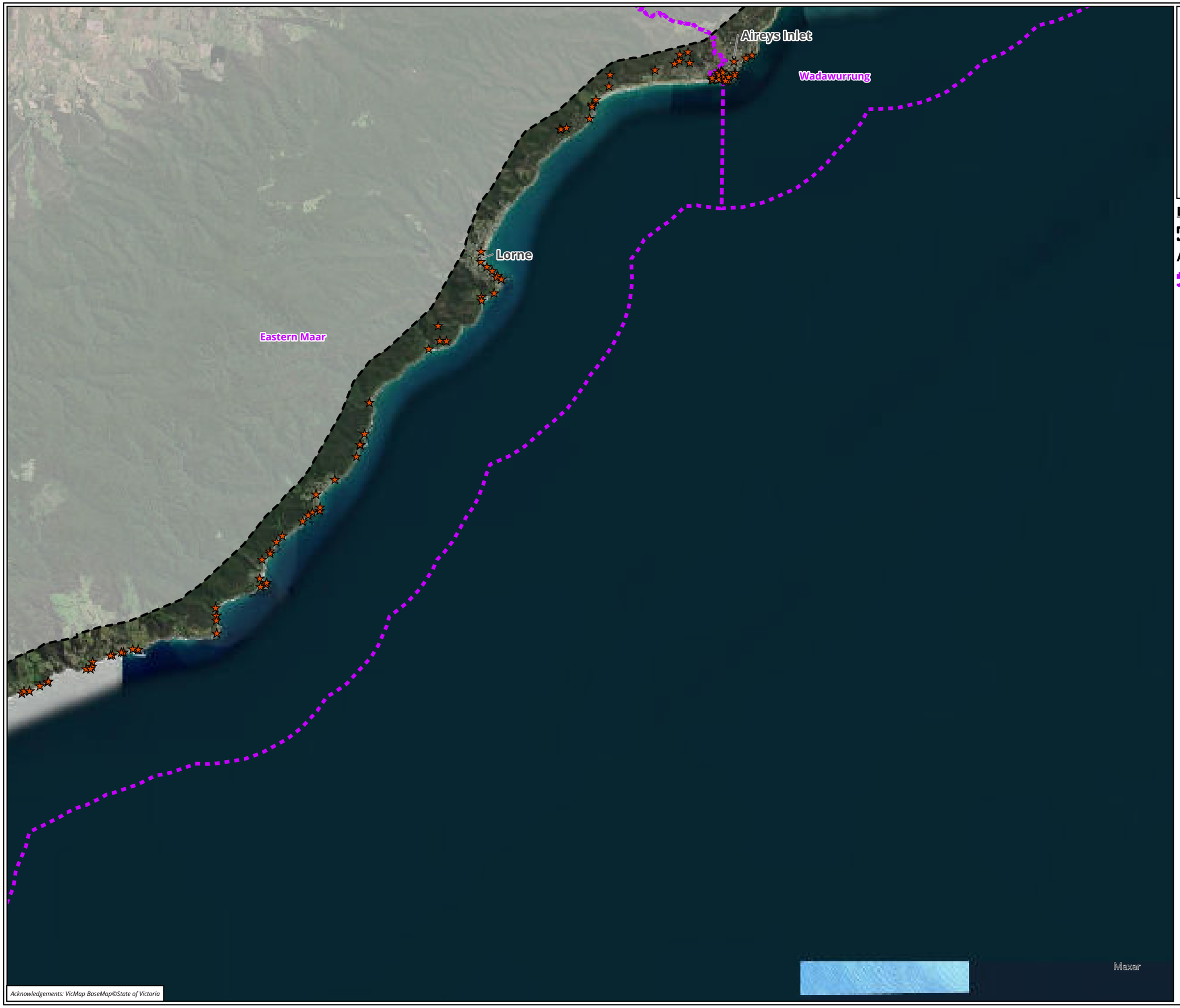

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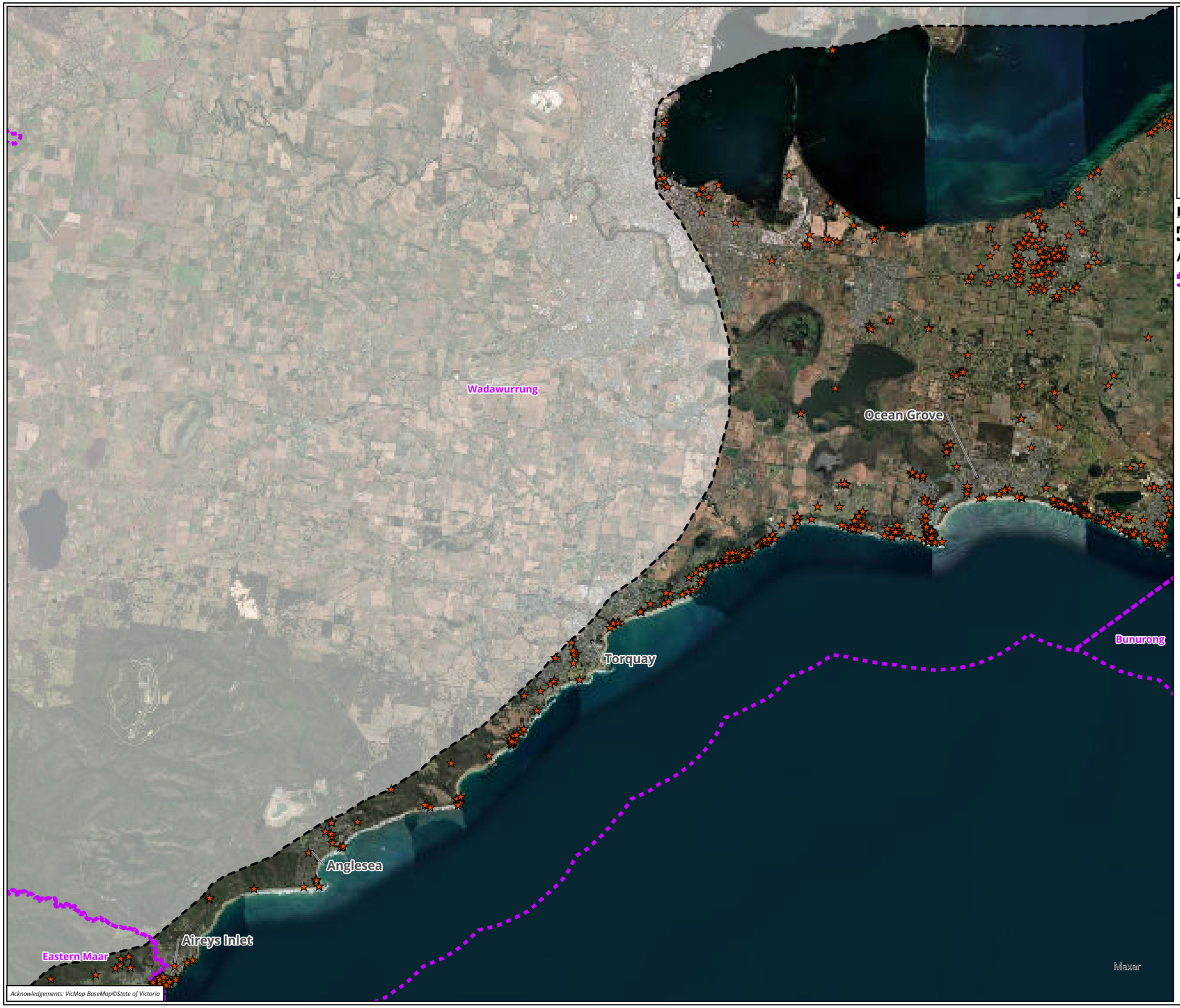

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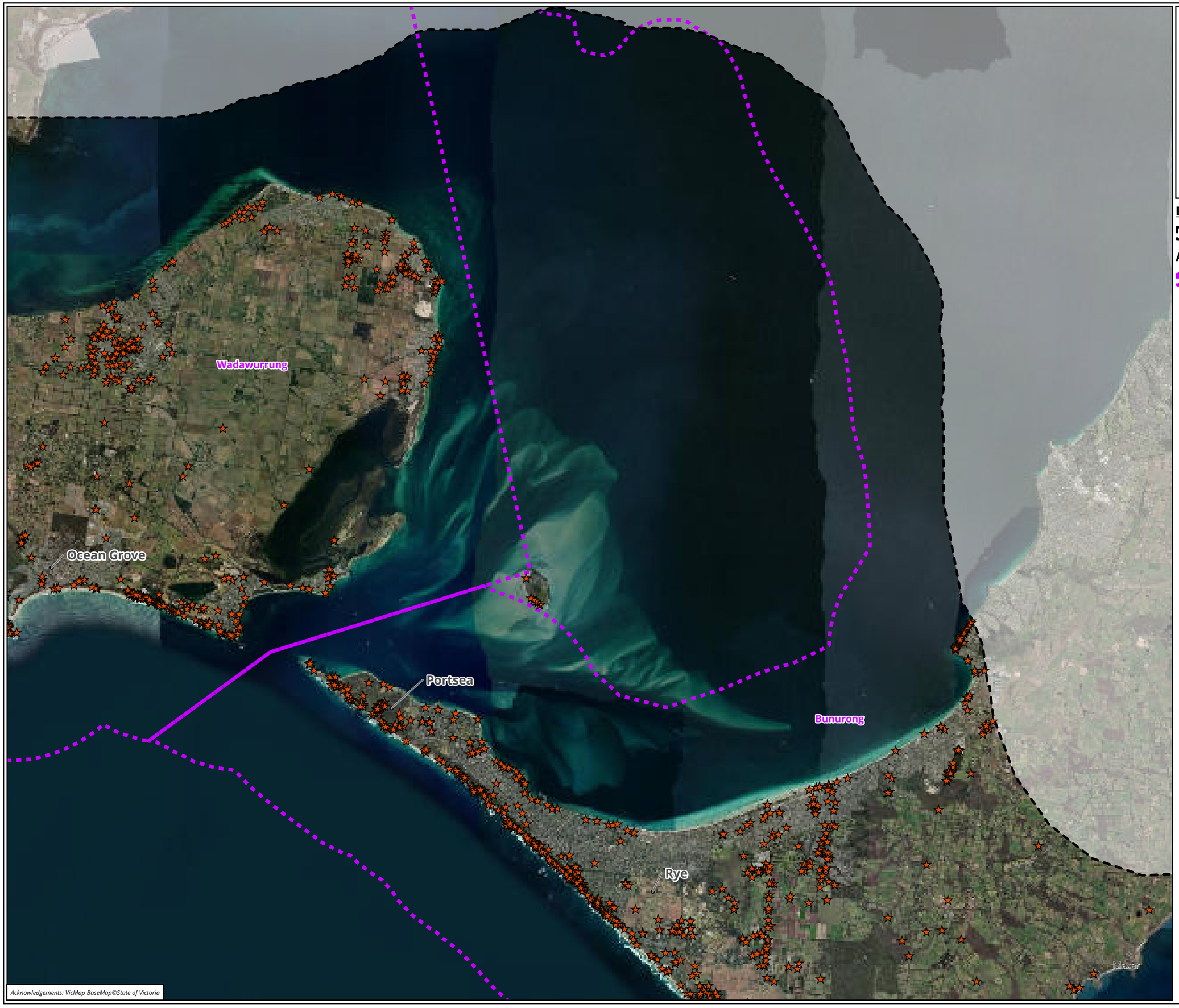

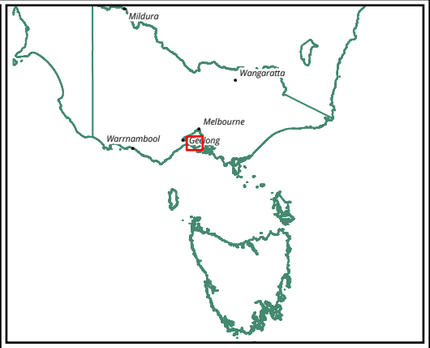

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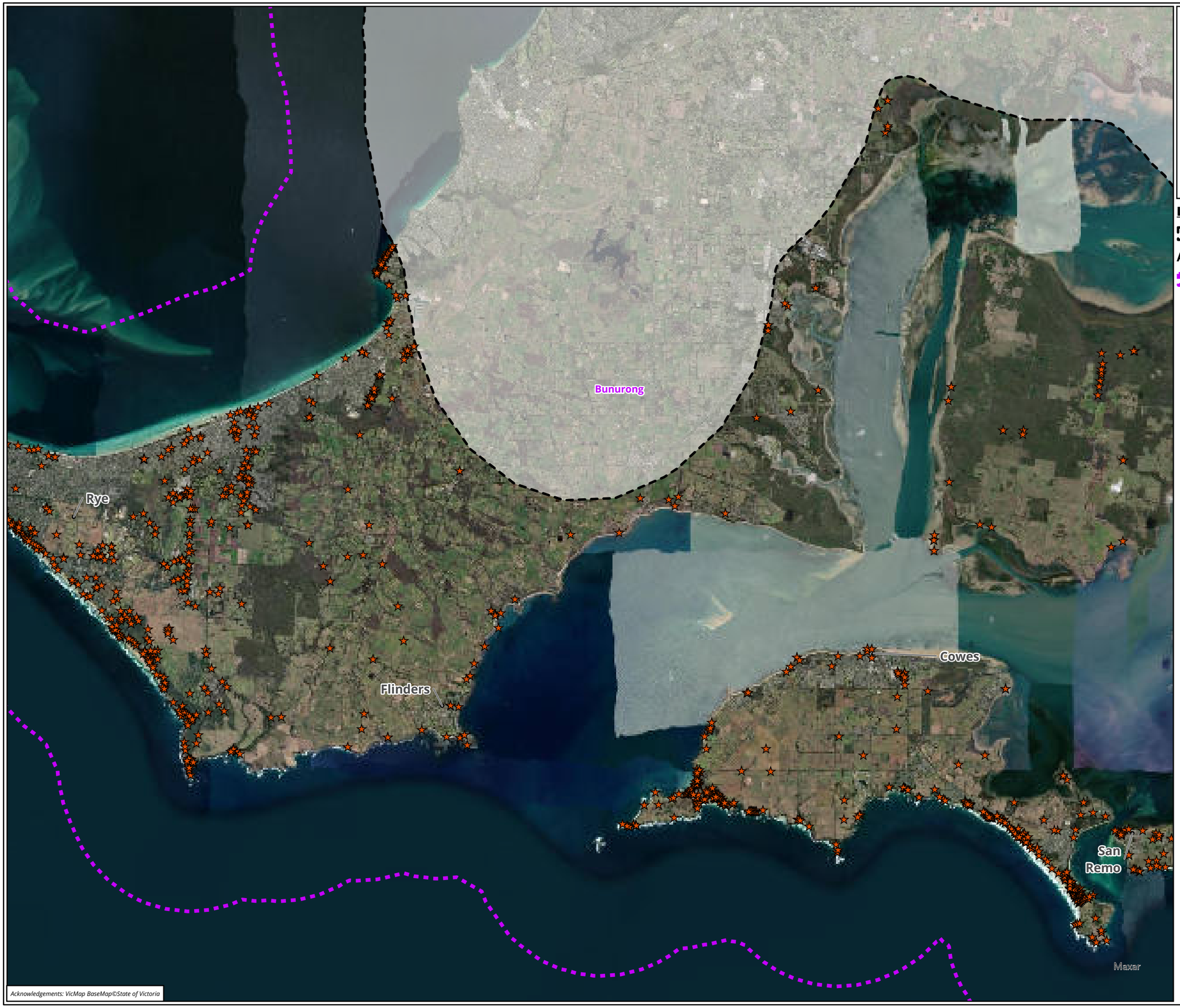

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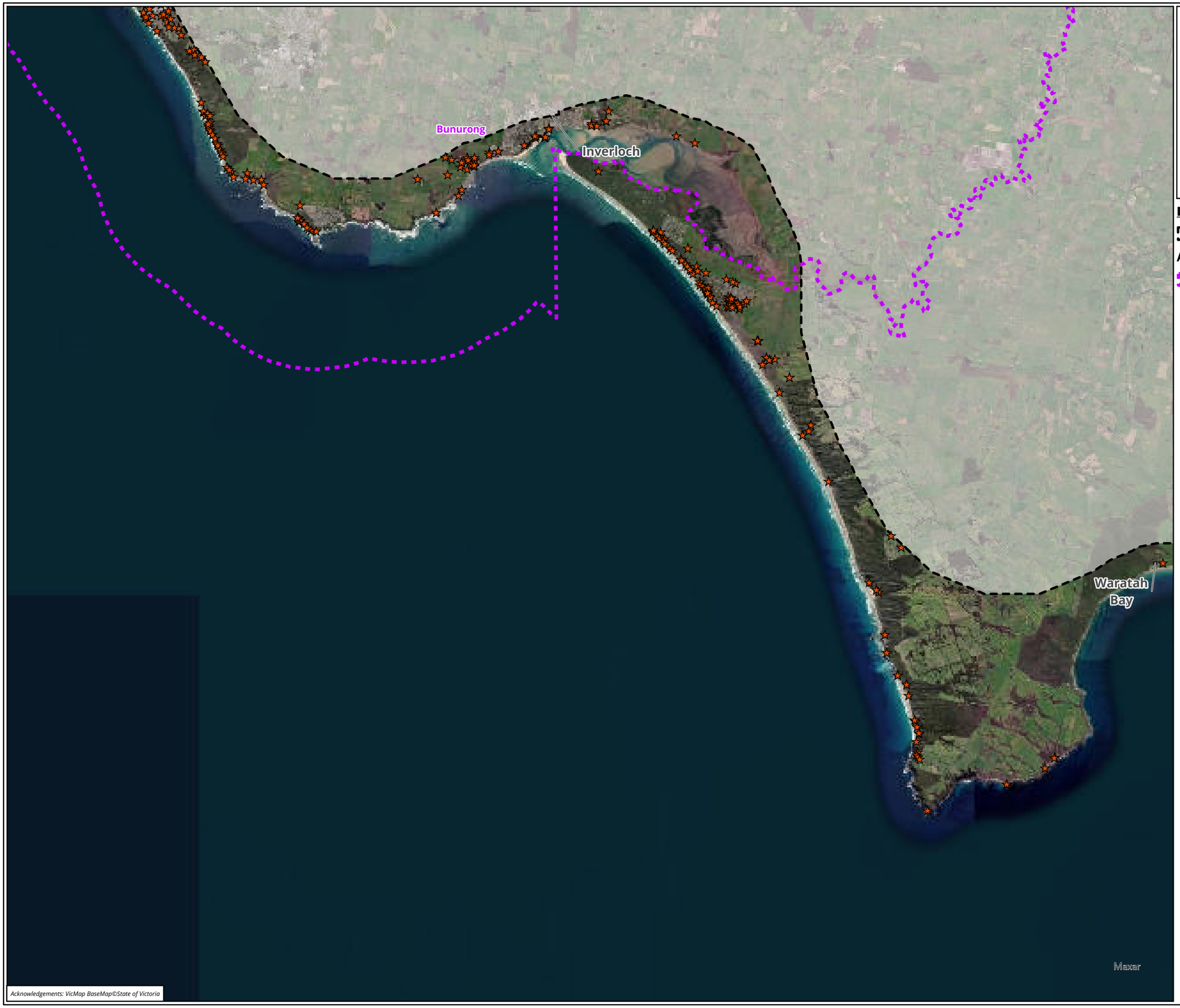

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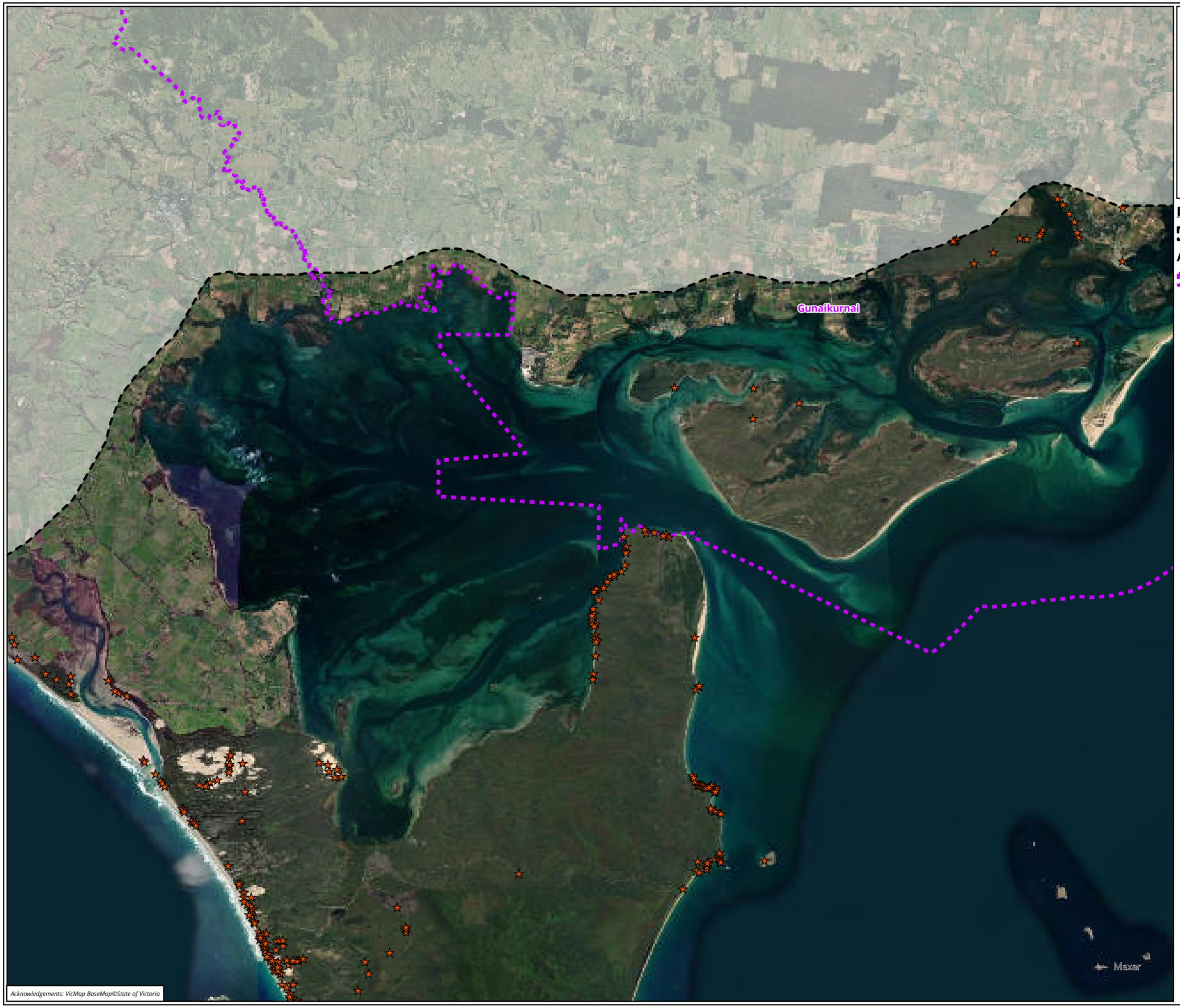

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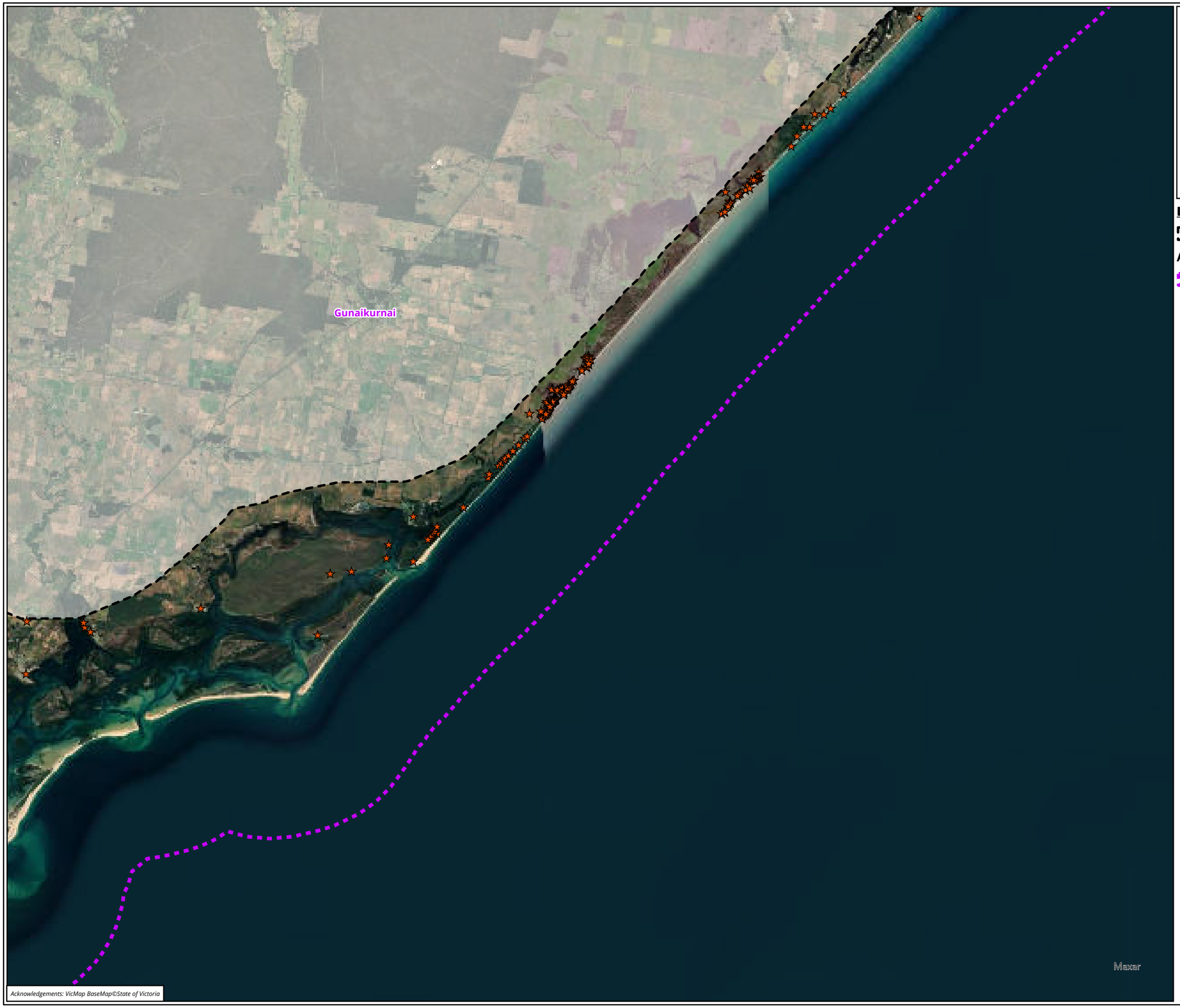

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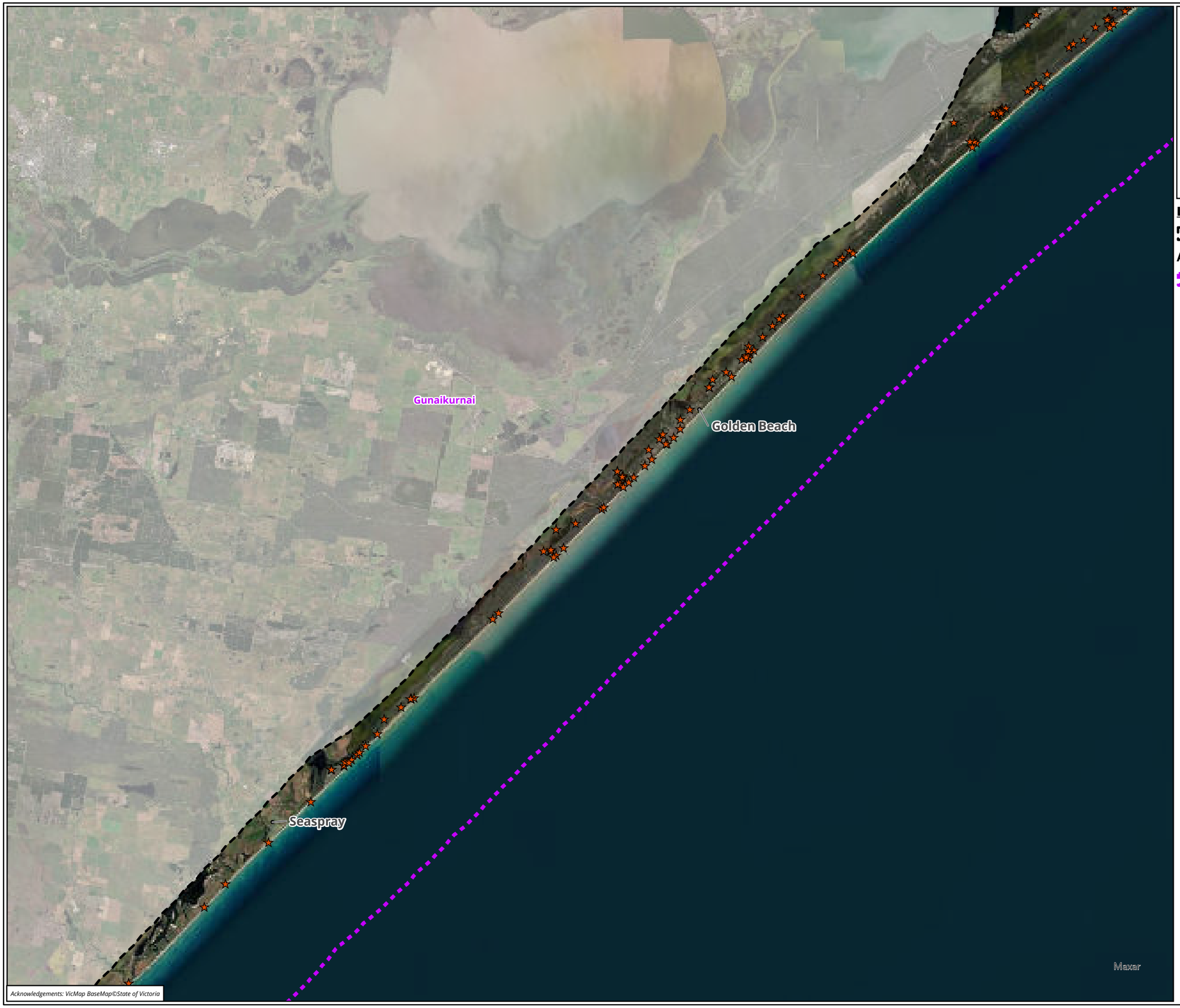

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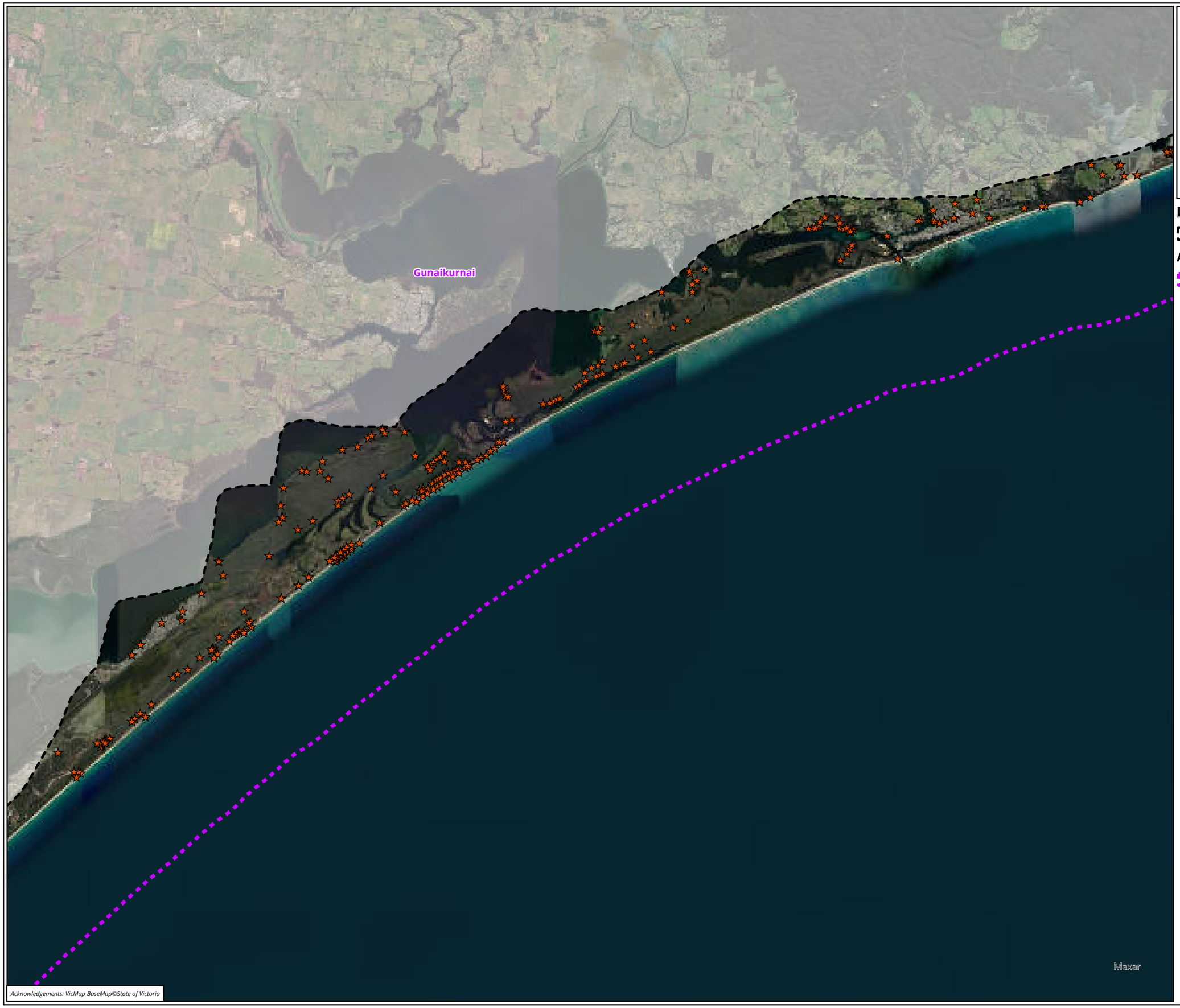

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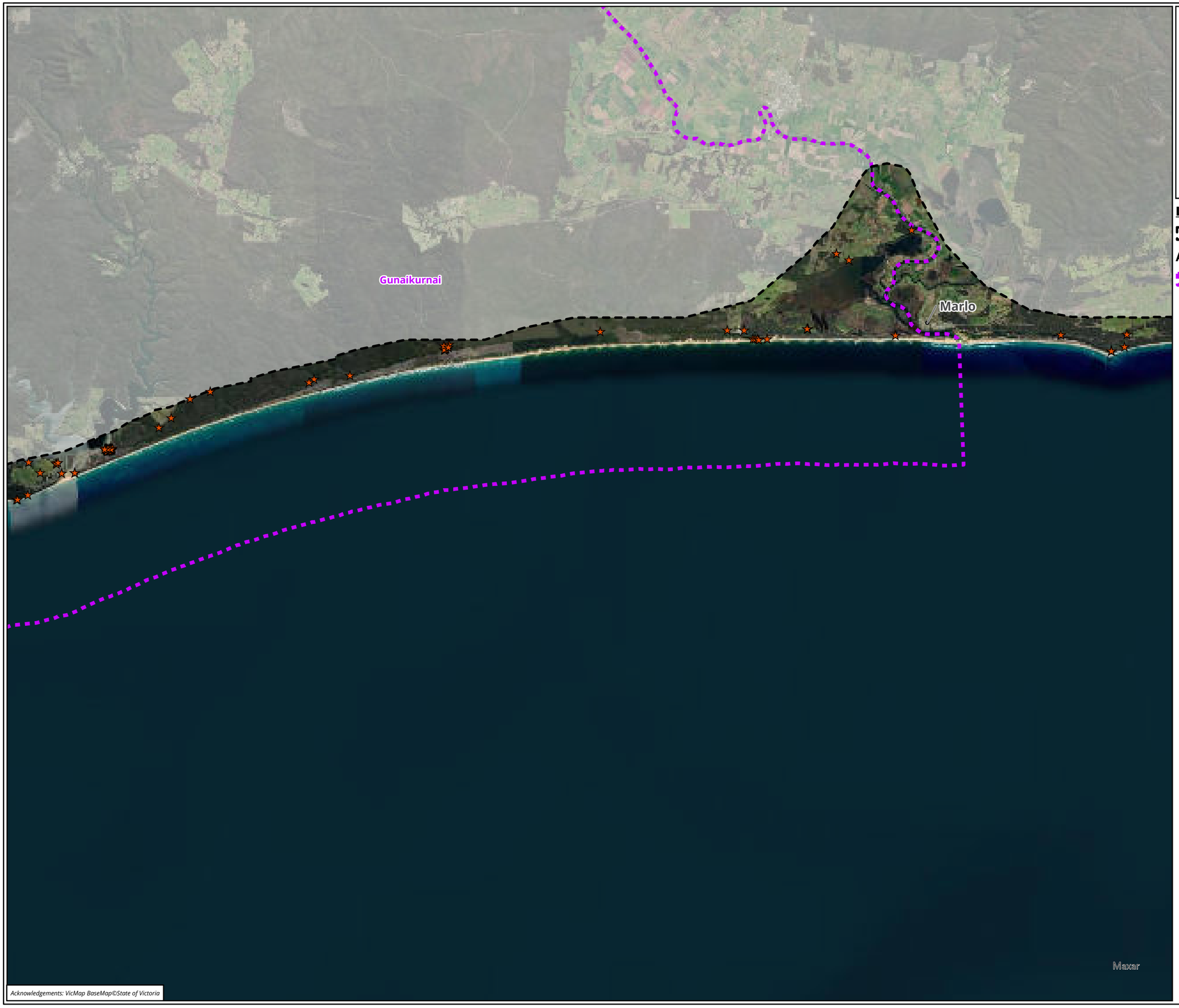

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VAHR Place

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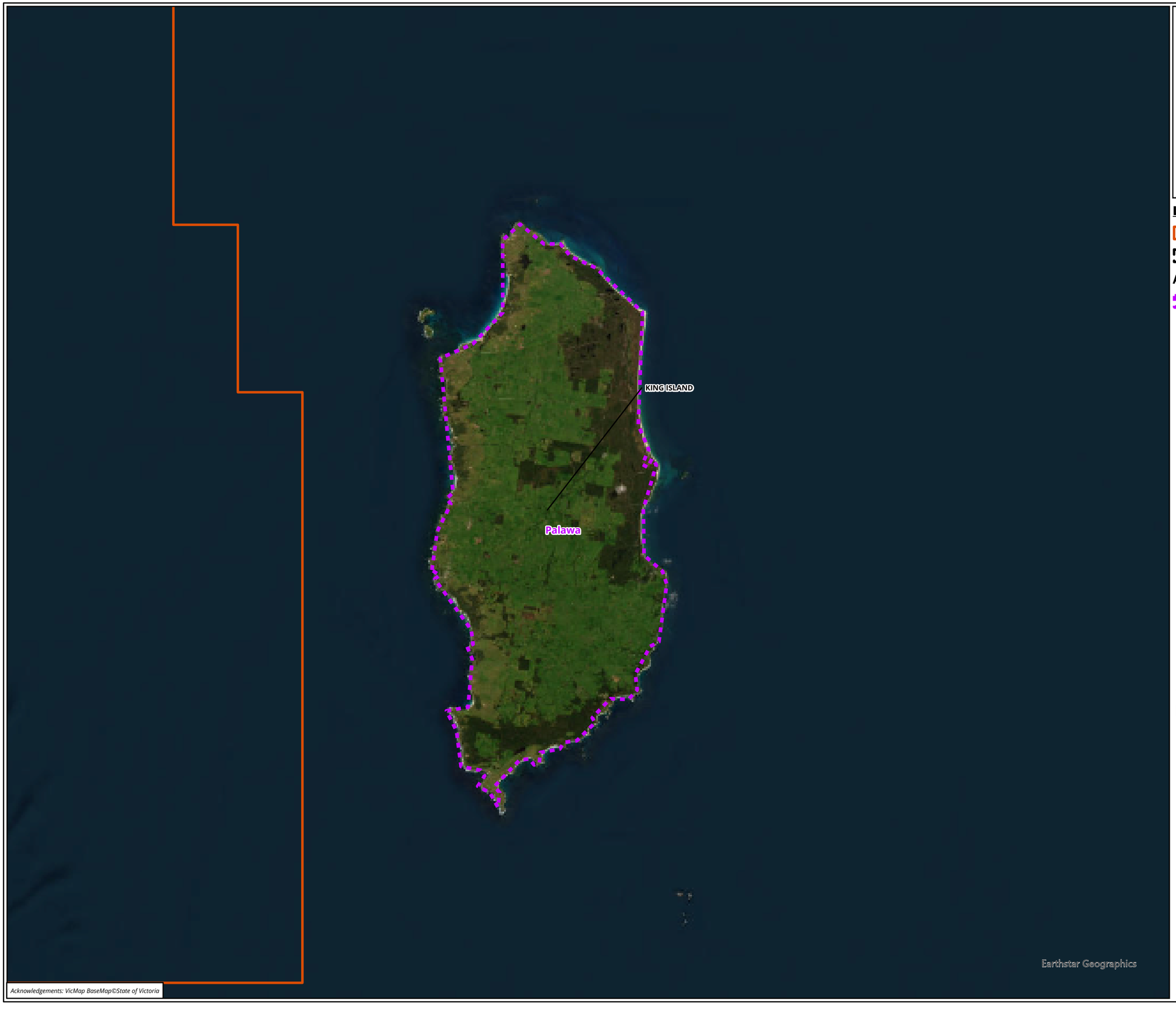

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- Activity Area
- Assessment area

Aborignal Cultural Heritage

- RAP groups
- VAHR Place

Figure x Location of Victorian Aboriginal Heritage Register places in the Assessment area

0 5 10 15 20 25

Kilometers

N

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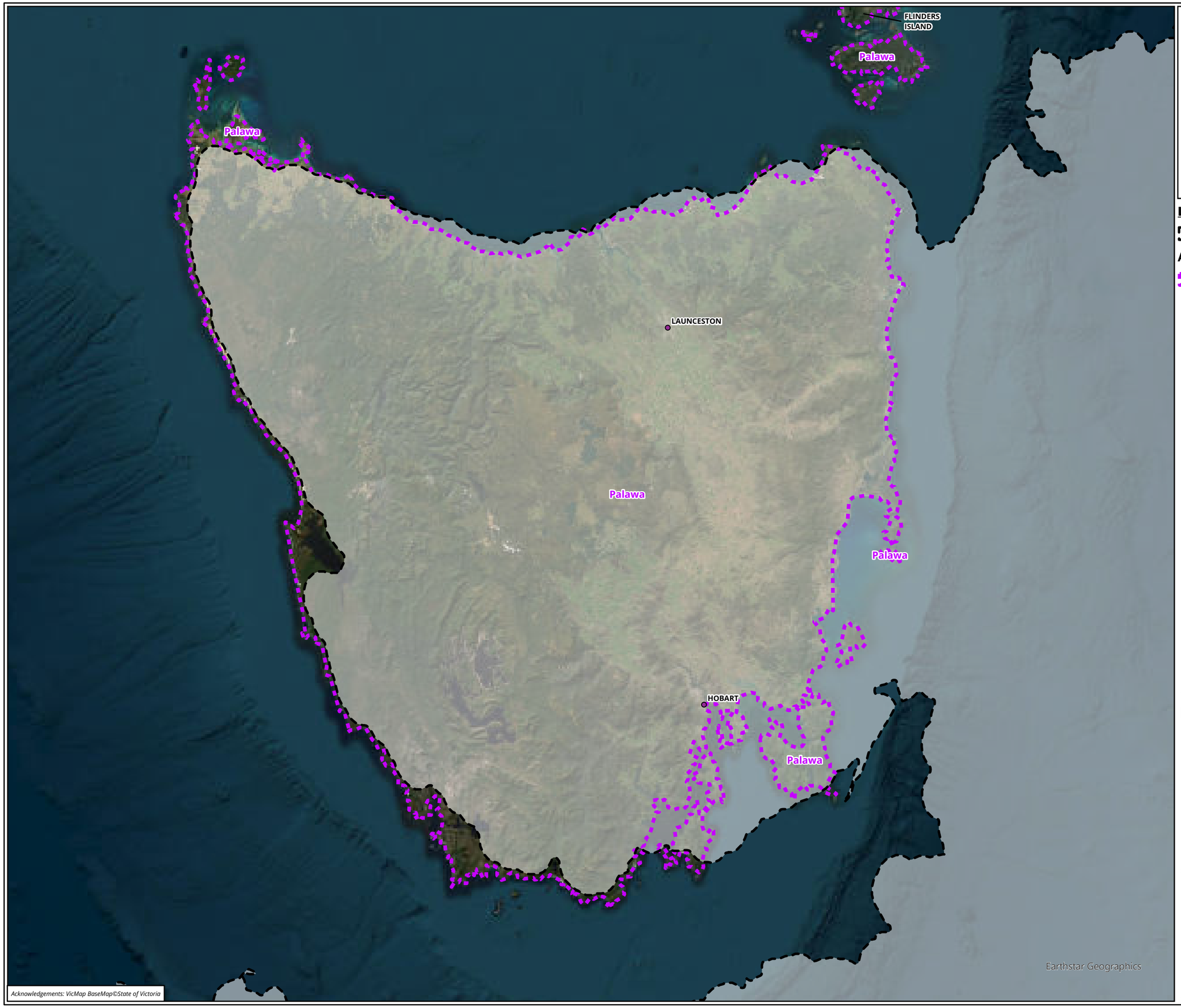

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RAP groups

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0 20 40 60 80 100

Kilometers

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Review of Oil Spill Modelling for the Regia 3D MSS

December 2023

S2 ENVIRONMENTAL CONSULTING
S2 Services

Table of Contents

1. Introduction 3
2. Review Recommendations 3
3. Regia MSS Spill Risk 4
4. Review Process 4
5. Review 4
6. References 8

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1. Introduction

This technical review of oil spill modelling has been prepared to support CGG Services (Australia) Pty Ltd (CGG) in its impact and risk assessment process for the for the Regia Marine Seismic Survey (Regia MSS).

The Regia MSS Preliminary Environmental Impact and Risk Assessment (PIERA) used an Environmental Planning Area set at 155 km around the Activity Planning Area. This distance was selected using professional judgement and a review of previous impact and risk assessments for similar activities in the region. Further justifying the distance, the NERA Reference Case: Consequences analysis of an accidental release of diesel (NERA 2018) found that diesel spills under 700m^3 were reliably predicted to disperse within 150 km. An additional 5 km was added to this range to ensure that coastal sensitivities were included in the search ranges for environmental values and sensitivities to inform the description of environment.

The PIERA recommended that following be undertaken: Review the NERA Reference Case 2018:1003 Consequence analysis of an accidental release of diesel and regionally relevant spill models from similar worst-case events to determine the applicability of the NERA Reference Case and, subsequently, the need for activity specific spill modelling. This report actions this recommendation to determine if the Environmental Planning Area is appropriate to approximate the spatial extent and variability of the receiving environment's contact with oil and subsequently inform risk evaluation and planning for oil spill response and monitoring, for the oil spill risk associated with the Regia MSS.

The initial spill modelling review was undertaken in April 2023 and updated in December 2023 prior to submission of the Regia MSS EP to NOPSEMA to consider any new oil spill modelling undertaken within the Otway Basin relevant to the review.

2. Review Recommendations

The following recommendations are made to CGG from this review:

- Basing the spill volume on the vessel's largest fuel tank is appropriate for the risk assessment.
- The NERA Reference Case distance of 150 km is appropriate for defining the furthest an oil spill could reach for spills up to 250 m^3 diesel spill that may occur within the Regia MSS Activity Planning Area.
- The Environmental Planning Area is appropriate for:
    - Estimating the spatial extent of oil exposure at the low thresholds (NOPSEMA 2019) for a 250 m^3 diesel spill within the Regia MSS Activity Planning Area.
    - Predicting oil exposure at King Island from a 250 m^3 diesel spill within the Regia MSS Activity Planning Area.
    - Predicting no oil exposure at the Tasmanian coast from a 250 m^3 diesel spill within the Regia MSS Activity Planning Area.
- CGG should keep the largest tank volume for vessels below 250 m^3.
- Once the seismic survey vessel and type of support vessels are contracted, undertake a review of the largest fuel tank volume. If the largest fuel tank volume is greater than 250 m^3 this oil spill modelling review should be redone to determine if the Environmental Planning Area is still

appropriate. If it is not a management of change should be undertaken as per CGG's Implementation Strategy for the Regia MSS.

- If the Regia MSS Activity Planning Area changes, this oil spill modelling review should be redone to determine if the Environmental Planning Area is still appropriate. If it is not a management of change should be undertaken as per CGG's Implementation Strategy for the Regia MSS.

3. Regia MSS Spill Risk

The Regia MSS PIERA identified that whilst undertaking the activity, unplanned events may occur which result in a discharge of marine diesel. The Regia MSS Description of the Activity details that the worse-case credible oil spill risk of a vessel collision could result in the loss of diesel fuel from the vessels largest fuel tank. This assumption aligns with AMSA's National Plan Technical Guidelines for Preparing Contingency Plans for Marine and Coastal Facilities (AMSA 2015) that recommend that the indicative maximum credible spill volume for a vessel collision is the volume of the largest fuel tank.

The Regia MSS Description of the Activity details that the survey will be conducted using a purpose-built seismic survey vessel supported by up to three support vessels. CGG provided information on the proposed seismic survey vessel and type of support vessels that are likely to be used for the Regia MSS and it was identified that the largest fuel tank was 257.4 m^3.

4. Review Process

The review process focussed on oil spill modelling that is publicly available that met the following requirements:

- Surface release of marine diesel oil.
- Modelling thresholds align with those in the NOPSEMA Oil Spill Modelling Environment Bulletin April 2019.
- Modelling was used in an environment plan available on the NOSPEMA website.
- Modelled location is within the Regia MSS Activity Planning Area or > 20 km of the Regia MSS Activity Planning Area where the metocean conditions would be similar.

5. Review

The oil spill modelling that met the criteria in Section B11-4 are detailed in Table B11-51-. Marine diesel oil spill volumes ranged from 200 m^3 to 375 m^3 with all models using a release rate over 6 hours.

Distances to the modelling thresholds ranged considerable with the furthest distances typically to the east of the spill release location. This aligns with the major ocean currents in South-eastern Australia where the Leeuwin current from Western Australia flows south-east across the Great Australian Bight and reaches the west coast of Tasmania as the Zeehan Current (CoA 2015a).

Larger volumes modelled typically resulted in greater distances with entrained hydrocarbons travelling the furthest.

The NERA Reference Case (NERA 2018) detailed that, except for one outlier, there was no surface impact above thresholds beyond 150 km from the source of the spill for spills up to 700 m^3. This does not align with the modelling reviewed for which surface oil travelled between 10 to 300 km for spill volumes up to 373 m^3. Though it is noted that the moderate threshold for surface oil (NOPSEMA 2019) was used in the NERA Reference Case which would result in a smaller distance.

The NERA Reference Case (NERA 2018) also used 500 ppb for water column consequences of hydrocarbon release which does not align with NOPSEMA (2019) for which the low thresholds of 10 ppb for dissolved and entrained hydrocarbons are recommended for determining the spatial extent that may be exposed to a measurable level of hydrocarbons.

Only one spill volume of 250 m^3 was modelled (RPS 2019a) at the Annie-1 well location in 70 m water depth and 15 km from the Victorian coastline. The outputs from this modelling are relevant to the Regia MSS Activity Planning Area nearshore component and would be valid to estimate the distance to surface, dissolved and entrained low thresholds and oil contact to the mainland coast. The distances to these thresholds are within the Environmental Planning Area except for:

- The surface oil distance to the east of the oil spill modelling location was 193 km which is greater than the 150 km used for the Environmental Planning Area. However, the modelling used a threshold value of 0.1 g/m^2 which is lower than the current modelling threshold of 1 g/m^2 (NOSPEMA 2019) Based on a lower threshold was used and that the modelling at Minerva for Woodside (~ 10 km east of the Annie location) in a similar water depth (60 m) and distance to the Victorian coast (9 km) had a furthest distance of 75 km to the east for the low threshold surface oil, the 150 km used for the Environmental Planning Area in the nearshore Regia MSS Activity Planning Area would be appropriate.
- The moderate threshold for entrained oil was used for the modelling. This threshold is appropriate for informing the risk evaluation, but NOPSEMA (2019) recommend that the low threshold be used to define the area that may be exposed to oil above background levels. The moderate threshold was reached at a maximum distance of 60 km so even if this distance was double it would still be within the 150 km used for the Environmental Planning Area.

However, as the Regia MSS Activity Planning Area extends out ~ 120 km from the Victorian mainland and ~100 km from King Island the Annie-1 location may not accurately predict oil exposure to King Island or Tasmania.

Based on the following modelling that was undertaken closer to King Island and the Tasmanian mainland than the Regia MSS Activity Planning Area, the Regia MSS Activity Planning Area is appropriate for predicting low shoreline exposure to King Island and no shoreline exposure to the Tasmanian mainland from a 250 m^3 diesel spill over 6 hours:

- The ConocoPhillips Australia SH1 Pty Ltd modelling at Permit T/49P, 70 km west of King Island and 50 km south of Cape Otway, for a 350 m^3 diesel spill over 6 hours predicted no shoreline oil exposure for the Tasmanian mainland and a maximum probability of shoreline accumulation at the low threshold of 3%.

- The Beach Energy (Operations) Limited modelling at the Thylacine field located 70 km south of Port Campbell and 90 km northwest of King Island, for a 200 m^3 diesel spill over 6 hours predicted no shoreline oil exposure for the Tasmanian mainland and a maximum probability of shoreline accumulation at the low threshold of 2%.
- The Beach Energy (Operations) Limited modelling at the Thylacine field located 70 km south of Port Campbell and 90 km northwest of King Island, for a 300 m^3 diesel spill over 6 hours predicted no shoreline oil exposure for the Tasmanian mainland and a maximum probability of shoreline accumulation at the low threshold of 4%.

Table B11-5-1: Oil Spill Modelling Outcomes

Company	EP	EP Status	Modelling Site	Approximate Modelling Location	Diesel Spill Volume	Water depth	Approximate Distance to Low Threshold			
							Surface Low - 1 g/m2	Shoreline Low - 10 g/m2	Dissolved Low- 10 ppb	Entrained Low - 10 ppb
ConocoPhillips Australia SH1 Pty Ltd	Otway Exploration Drilling Program Oil Spill Report – RPS 2023a	Public comment period recently closed	VIC/P79	50 km south of Port Campbell	350 m^3 over 6 hours	93 m	52.8 km east 27.9 km west	390 km east 170 km west	125 km east 50 km northwest	700 km east 260 km west
ConocoPhillips Australia SH1 Pty Ltd	Otway Exploration Drilling Program Oil Spill Report – RPS 2023a	Public comment period recently closed	VIC/P79	30 km south of Warrnambool	350 m^3 over 6 hours	74 m	59.9 km east 60 km west	430 km east 100 km west	159 km east 120 km west	446 km east 310 km east
ConocoPhillips Australia SH1 Pty Ltd	Otway Exploration Drilling Program Oil Spill Report – RPS 2023a	Public comment period recently closed	VIC/P79	25 km south of Yambuk	350 m^3 over 6 hours	66 m	51.8 km east 30 km west	500 km east 160 km west	121 km east 120 km west	489 km east 430 km west
ConocoPhillips Australia SH1 Pty Ltd	Otway Exploration Drilling Program Oil Spill Report – RPS 2023a	Public comment period recently closed	VIC/P79	10 km south of Yambuk	350 m^3 over 6 hours	45 m	62.3 km east 50 km west	470 km east 100 km west	119 km east 80 km west	598 km east 540 km west
ConocoPhillips Australia SH1 Pty Ltd	Otway Exploration Drilling Program Oil Spill Report – RPS 2023	Public comment period recently closed	Permit T/49P	70 km west of King Island 50 km south of Cape Otway	350 m^3 over 6 hours	93 m	49.8 km east 10 km west	160 km west 250 km east	92 km east 50 km west	648 km east 250 km west
Woodside Energy (Victoria) Pty Ltd	Minerva P&A Oil spill report not provided with EP	Under Assessment	Minerva	9 km southwest of Port Campbell	330 m^3 over 6 hours	60 m	75 km east 40 km west	200 km west 500 km east	150 km east 90 km west	450 km east 225 km west
Cooper Energy (CH) Pty. Ltd	Otway Offshore Operations - Casino, Netherby & Henry Revision Oil Spill Report – RPS 2019a	Under Assessment	Annie	15 km southeast of Port Campbell	250 m^3 over 6 hours	70 m	145 km west 193 km east	75 km west 75 km east	42 km west Low - 62 km east	Used 100 ppb 51 km northwest 60 km southeast
Beach Energy (Operations) Limited	Thylacine Installation and Commissioning Oil Spill Report – RPS 2022	Accepted	Thylacine	70 km south of Port Campbell 65 km southwest of Cape Otway 90 km northwest of King Island	300 m^3 over 6 hours	100 m	20 km west 39.3 km east	Discrete locations King Island Cape Otway	40 km west 90 km east	50 km west 230 km east
Beach Energy (Operations) Limited	Offshore Gas Victoria Geophysical and Geotechnical Seabed Survey Thylacine Installation and Commissioning Oil Spill Report – RPS 2022	Accepted	Thylacine	70 km south of Port Campbell 65 km southwest of Cape Otway 90 km northwest of King Island	200 m^3 over 6 hours	100 m	15 km west 36.5 km east	Discrete locations King Island	20 km west 60 km east	50 km west 180 km east
Beach Energy (Operations) Limited	Otway Offshore Operations Oil Spill Report – RPS 2019b	Accepted	Artisan	32 km south of Port Campbell	300 m^3 over 6 hours	60 m	93 km east 40 km west	No shoreline contact	Used 6 ppb 80 km west 160 km east	400 km east 400 km west
Beach Energy (Operations) Limited	Otway Phase 5 Early Dive Installation Campaign Oil Spill Report – RPS 2019a	Accepted	Thylacine	70 km south of Port Campbell 65 km southwest of Cape Otway 90 km northwest of King Island	300 m^3 over 6 hours	100 m	Applied the Artisan modelling from the Otway Offshore Operations EP			
ConocoPhillips Australia SH1 Pty Ltd	Sequoia 3D Marine Seismic Survey Oil Spill Report – RPS 2020	Accepted	Seismic Survey Operational Area	23.5 km west of King Island 26 km south of Victorian coast	373 m^3 over 6 hours	70 to 1,000 m	300 km east 20 km west	300 km east	251 km ENE	742 km ENE

6. References

AMSA. 2015. Technical Guidelines for Preparing Contingency Plans for Marine and Coastal Facilities. Australian Maritime Safety Authority

CoA. 2015a. South-East Marine Region Profile. As description of the ecosystems, conservation values and use of the South-east Marine Region. Commonwealth of Australia.

RPS. 2019a. Annie-1 Oil Spill Modelling. Report MAQ0748J.

RPS. 2019b Beach Energy Artisan-1 Exploration Well Oil Spill Modelling. Report MAQ0828J.

RPS. 2020. Sequoia 3D Marine Seismic Survey Oil Spill Modelling. Report MAQ0953J.

RPS. 2022. Thylacine Installation and Commissioning – Phase 5 Oil Spill Modelling. Report MAQ1217J.

RPS. 2023. ConocoPhillips Exploration Permit T/49P Marine Diesel Spill Modelling. Report MAQ1155J.

REGIA
Marine Seismic Survey

Regia MSS Maps

Appendix B12: REG-EP-040-B12

Rev 4

December 2025

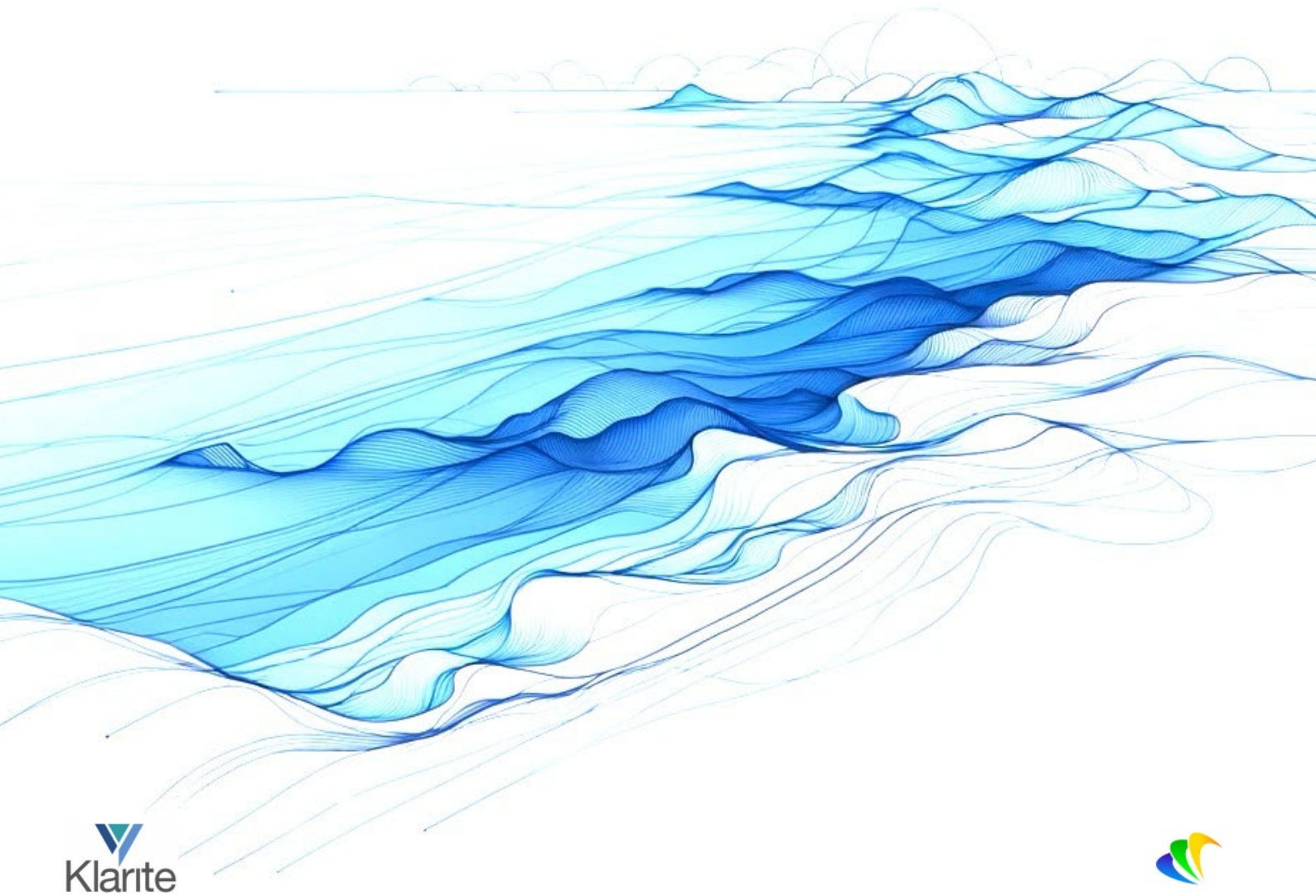

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Table of Contents

1 Regia MSS Map Register 3

2 Public Comment 7

3 Maps 8

1 Regia MSS Map Register

Revisions highlighted in blue represent updates to existing maps as well as new added maps; those in orange indicate maps with no changes from last submission.

Document Number	Title	REV
MAP-REG-EPM-001	Southern Right Whale Reproductive BIA with 15km Buffer	E
MAP-REG-EPM-003	Bonney Coast Upwelling Key Ecological Feature	F
MAP-REG-EPM-004	West Tasmanian Canyons Key Ecological Feature	C
MAP-REG-EPM-015	Pygmy Blue Whale Biologically Important Areas (Distribution)	C
MAP-REG-EPM-016	Pygmy Blue Whale Biologically Important Areas (Foraging)	C
MAP-REG-EPM-024	Australian Sea Lion Foraging	B
MAP-REG-EPM-027	White Shark Biologically Important Areas - Foraging	C
MAP-REG-EPM-028	White Shark Biologically Important Areas - Distribution Low Density	C
MAP-REG-EPM-029	White Shark Biologically Important Areas - Known Distribution	C
MAP-REG-EPM-030	Fisher One Impact Management Zone	D
MAP-REG-EPM-031	50m Increment Bathymetry	C
MAP-REG-EPM-032	Giant Crab Fishery - Days Fished (Total) - 2011-2022	D
MAP-REG-EPM-033	Giant Crab Fishery - 2011-2022 - Fished Blocks	C
MAP-REG-EPM-034	Giant Crab Fishery - Days Fished (Total) - 2018-2022	D
MAP-REG-EPM-035	Giant Crab 2018-2022 - Fished Blocks	B
MAP-REG-EPM-036	Rock Lobster - Days Fished (Total) - 2018-2022	D
MAP-REG-EPM-037	Rock Lobster 2018-2022 - Fished Blocks	B
MAP-REG-EPM-038	Rock Lobster - Days Fished (Total) - 2011-2022	D
MAP-REG-EPM-039	Rock Lobster 2011-2022 - Fished Blocks	B
MAP-REG-EPM-040	Base Map	B
MAP-REG-EPM-041	Operational Area Co-ordinates	B
MAP-REG-EPM-042	Active Source Area Co-ordinates	B
MAP-REG-EPM-043	Activity Planning Area Co-ordinates	B
MAP-REG-EPM-045	NOPIMS 2D Seismic Survey Lines (1960 - 2023)	B
MAP-REG-EPM-046	NOPIMS 3D Seismic Survey (1960 - 2023)	B
MAP-REG-EPM-047	12 Apostles Marine Park 5km Buffer - Distance from Active Source Area	C
MAP-REG-EPM-048	200m Depth Contour	B
MAP-REG-EPM-050	Orange Roughy Study: New Timing	B
MAP-REG-EPM-051	Rock lobster - Fished Blocks 2011-2021 with 50m Increment Bathymetry	B
MAP-REG-EPM-054	Giant Crab Fishery - Fished Blocks - 2011-2022 with 50m Increment Bathymetry	C
MAP-REG-EPM-055	5M Bathymetry and Rock Lobster Fishery - Days Fished (Total) - 2011-2022	C
MAP-REG-EPM-058	Orange Bellied Parrot Migration BIAs	B
MAP-REG-EPM-059	Antipodean Albatross Biologically Important Areas	B
MAP-REG-EPM-060	Black Browed Albatross Biologically Important Areas	B
MAP-REG-EPM-061	Campbell Albatross Biologically Important Areas	B

Document Number	Title	REV
MAP-REG-EPM-062	Common Diving Petrel Biologically Important Areas	B
MAP-REG-EPM-063	Indian Yellow Nosed Albatross Biologically Important Areas	B
MAP-REG-EPM-064	Little Penguin Biologically Important Areas and Colonies	C
MAP-REG-EPM-065	Short Tailed Shearwater Biologically Important Areas	B
MAP-REG-EPM-066	Shy Albatross Foraging Biologically Important Areas	B
MAP-REG-EPM-067	Wedge Tailed Shearwater Biologically Important Areas	B
MAP-REG-EPM-068	Pygmy Blue Whale Biologically Important Areas (Known Foraging)	C
MAP-REG-EPM-069	Southern Right Whale Reproductive BIA	D
MAP-REG-EPM-070	5m Bathymetry & Rock Lobster Fishing Days - Investigator	B
MAP-REG-EPM-071	Buller's Albatross Biologically Important Areas	B
MAP-REG-EPM-072	Wandering Albatross Biologically Important Areas	B
MAP-REG-EPM-073	Australasian Gannet Biologically Important Areas	B
MAP-REG-EPM-074	Black Faced Corrmorant Biologically Important Areas	B
MAP-REG-EPM-075	White Face Storm Petrel Biologically Important Areas	B
MAP-REG-EPM-076	Native Title and Registered Aboriginal parties	B
MAP-REG-EPM-077	White Shark Biologically Important Areas - Distribution	C
MAP-REG-EPM-078	Australian Marine Parks (Active Source Area Distances)	D
MAP-REG-EPM-079	State Marine Protected Areas	B
MAP-REG-EPM-080	Initial Planning Areas	A
MAP-REG-EPM-081	Key Ecological Features	B
MAP-REG-EPM-082	Active Source Area & Titles	B
MAP-REG-EPM-083	Operational Area & Environmental Planning Area	B
MAP-REG-EPM-084	Regia Marine Seismic Survey (Map for EP Submission)	B
MAP-REG-EPM-085	Southern Right Whale Reproductive & Migration BIAs & Noise EMBAs	C
MAP-REG-EPM-086	Australian Marine Parks - Distances from Operational area	C
MAP-REG-EPM-087	12 Apostles Marine Park 5km Buffer - distance from operational area	B
MAP-REG-EPM-088	Survey Acquisition Area Coordinate	B
MAP-REG-EPM-089	Initial Sound Modelling Receiver and Impulse sites	B
MAP-REG-EPM-090	Secondary Sound Modelling Receiver and Impulse Sites	B
MAP-REG-EPM-091	EPA overlap with Point Nepean and Mornington Peninsula	A
MAP-REG-EPM-092	Native Title Determinations with Environmental Planning Area	B
MAP-REG-EPM-093	Activity Planning Area & Operational Area	A
MAP-REG-EPM-094	UXOs	A
MAP-REG-EPM-095	Rock Lobster Fishery Max Annual Days Fished 2011-2022	A
MAP-REG-EPM-096	Giant Crab Fishery Max Annual Days Fished 2011-2022	A
MAP-REG-EPM-097	Bass Strait Central Zone Scallop Fishery 2010-2023	B
MAP-REG-EPM-098	Eastern Tuna And Billfish Fishery 2010-2023	B
MAP-REG-EPM-099	Small Pelagic Fishery 2010 - 2023	B
MAP-REG-EPM-100	Southern Bluefin Tuna Fishery Purse Seine Sector 2010 - 2023	B
MAP-REG-EPM-101	Southern and Eastern Scalefish and Shark Fishery SSKK 2010 - 2023	B
MAP-REG-EPM-102	Southern and Eastern Scalefish and Shark Fishery SSKN 2010 - 2023	B
MAP-REG-EPM-103	Southern and Eastern Scalefish and Shark Fishery SCTR 2010 - 2023	B

Document Number	Title	REV
MAP-REG-EPM-104	Southern and Eastern Scalefish and Shark Fishery SCDS 2010 - 2023	B
MAP-REG-EPM-105	Southern and Eastern Scalefish and Shark Fishery SSCK 2010 - 2023	B
MAP-REG-EPM-106	Southern Squid Jig Fishery 2010 - 2023	B
MAP-REG-EPM-107	Southern and Eastern Scalefish and Shark Fishery SCSQ 2010 - 2023	B
MAP-REG-EPM-108	Western Tuna and Billfish Fishery 2010 - 2023	B
MAP-REG-EPM-109	Giant Crab Fishery - Blocks - 2018-2022	A
MAP-REG-EPM-110	Giant Crab Fishery - Max Annual Vessels - 2011-2022	A
MAP-REG-EPM-111	Rock Lobster Fishery - Max Annual Vessels - 2011-2022	A
MAP-REG-EPM-112	Ocean General Fishery Blocks 2011 - 2022	A
MAP-REG-EPM-113	Ocean General Fishery Days Fished (Total) 2011 - 2022	A
MAP-REG-EPM-114	Ocean General Fishery Max Annual Days Fished 2011 - 2022	A
MAP-REG-EPM-115	Ocean General Fishery Max Annual Vessels 2011 - 2022	A
MAP-REG-EPM-116	Octopus Fishery Blocks 2020 - 2022	A
MAP-REG-EPM-117	Octopus Fishery Days Fished (Total) 2020 - 2022	A
MAP-REG-EPM-118	Octopus Fishery Max Annual Days Fished 2020 - 2022	A
MAP-REG-EPM-119	Octopus Fishery Max Annual Vessels 2020 - 2022	A
MAP-REG-EPM-120	Ocean Wrasse Fishery Blocks 2011 - 2022	A
MAP-REG-EPM-121	Ocean Wrasse Fishery Days Fished (Total) 2011 - 2022	A
MAP-REG-EPM-122	Ocean Wrasse Fishery Max Annual Days Fished 2011 - 2022	A
MAP-REG-EPM-123	Ocean Wrasse Fishery Max Annual Vessels 2011 - 2022	A
MAP-REG-EPM-124	Australian Grayling Geographic Range	A
MAP-REG-EPM-125	Bathymetry Contours -30m, -50m, -100m, -200m, -250m	A
MAP-REG-EPM-126	Eastern Tuna And Billfish Fishery 2010-2023	A
MAP-REG-EPM-127	Small Pelagic Fishery 2010-2023	A
MAP-REG-EPM-128	Southern Bluefin Tuna Fishery Purse Seine Sector - 2010-2023	A
MAP-REG-EPM-129	Southern and Eastern Scalefish and Shark Fishery SSKK - 2010-2023	A
MAP-REG-EPM-130	Southern and Eastern Scalefish and Shark Fishery SSKN - 2010-2023	A
MAP-REG-EPM-131	Southern and Eastern Scalefish and Shark Fishery SCTR - 2010-2023	A
MAP-REG-EPM-132	Southern and Eastern Scalefish and Shark Fishery SCDS - 2010-2023	A
MAP-REG-EPM-133	Southern and Eastern Scalefish and Shark Fishery SSCK - 2010-2023	A
MAP-REG-EPM-134	Southern Squid Jig Fishery SSJF - 2010-2023	A
MAP-REG-EPM-135	-200m Bathymetry and SESSF SCTR 2010-2023	A
MAP-REG-EPM-136	-30m Bathymetry	A
MAP-REG-EPM-137	Sail Lines Numbered	A
MAP-REG-EPM-138	Western Tuna and Billfish Fishery - 2010-2023	A
MAP-REG-EPM-139	Bass Strait Central Zone Scallop Fishery 2010-2023	A
MAP-REG-EPM-140	Southern and Eastern Scalefish and Shark Fishery SCSQ 2010 - 2023	A
MAP-REG-EPM-162	Relevant Activity Areas	A
MAP-REG-EPM-168	Operational Area & Supporting Operations Area	A
MAP-REG-EPM-169	Cumulative Activities	A
MAP-REG-EPM-180	Optimal Weather Deployment Plan Coverage	A
MAP-REG-EPM-181	Sub-Optimal Weather Deployment Plan Coverage	A

Document Number	Title	REV
MAP-REG-EPM-182	No-Fly Weather Plan Coverage	A
MAP-REG-EPM-183	Restar Procedure	A
MAP-REG-EPM-184	Blue Whale Historial November Data	A
MAP-REG-EPM-185	Blue Whale Historial December Data	A
MAP-REG-EPM-186	Deployment for Drift Recording	A
MAP-REG-EPM-187	Sites, 7, 10, 15 - 120dB	A
MAP-REG-EPM-188	Sites, 7, 10, 15 - 140dB	A
MAP-REG-EPM-189	Sites, 7, 10, 15 - 160dB	A
MAP-REG-EPM-190	Acoustic Modelling Sites	A
MAP-REG-EPM-191	Blue Whale Foraging BIA & Noise EMBAs	A
MAP-REG-EPM-192	SRW Restart Procedure	A
MAP-REG-EPM-193	SRW Shutdown Area	A

2 Public Comment

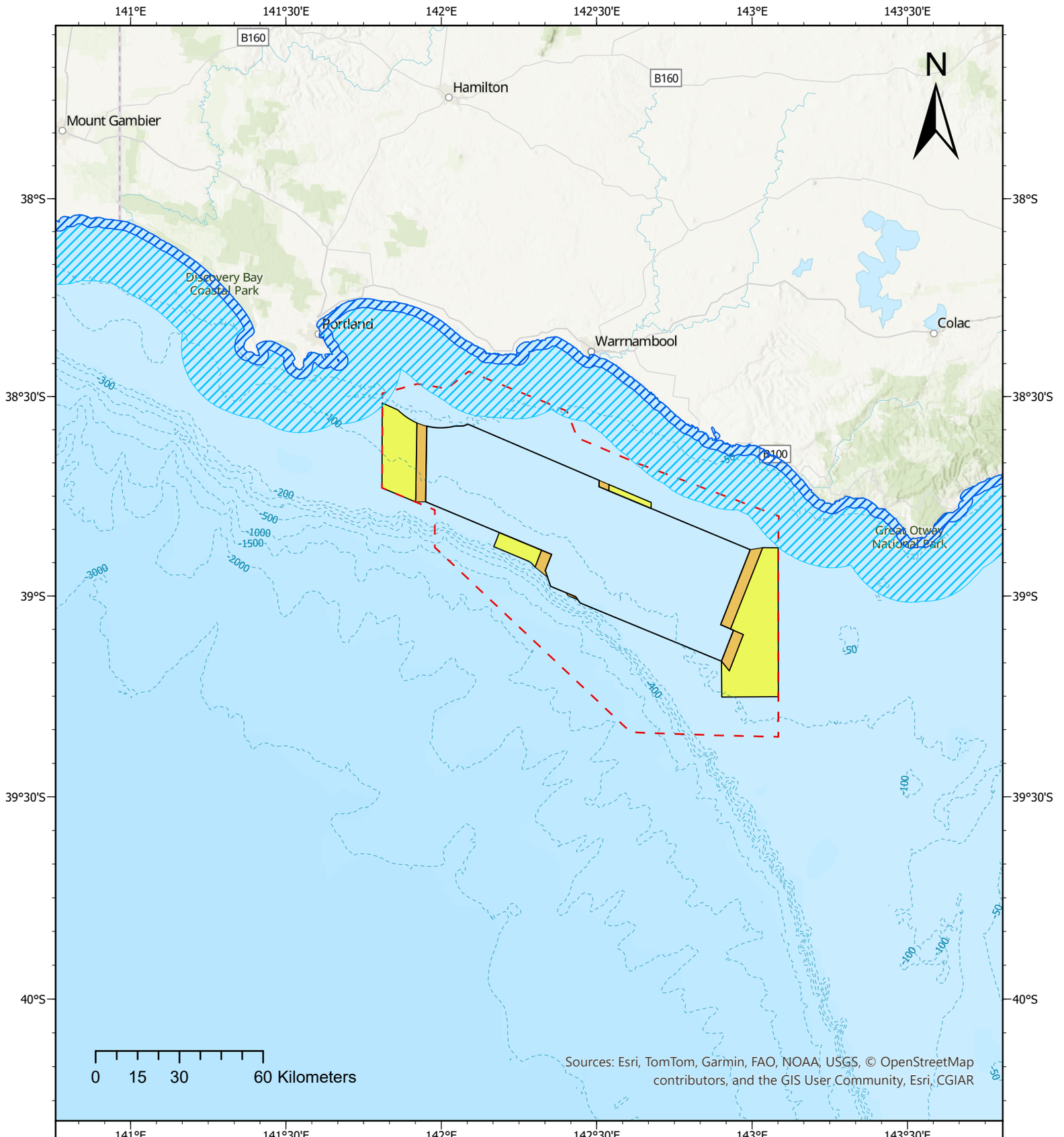
The following feedback was received during the public comment period starting 25 January 2024 which ran for 30-days. Table B12-1 shows how this feedback has been incorporated into the environmental assessments.

Table B12-1 - Public comment input into the preparation of the EP

Matter	Matter ID	Changes made arising from public comment
Matter: Unacceptable impacts and risks to Marine Parks and protected areas	E01	CGG has considered these claims and has updated figures in Appendix B12 to include distances from operational and activity action zone areas to marine parks, reserves, and KEFs thereby providing further context of separation distances; and has calculated the percentage overlap of the Regia Operational Area with Bonney Coast Upwelling KEF.
Matter: Acknowledgement of breeding colonies	B02	The noise EMBA has been added to Figure MAP-REG-EPM-064 to show that the declared little penguin BIAs occur outside of the noise EMBA.
Matter: Surveying previously surveyed areas is unnecessary	I24	CGG has considered these claims and is satisfied that the concerns raised have been adequately addressed in the EP, for the reasons outlined above but has undertaken to update EP Appendix B12 (Regia MSS Maps), namely Figures MAP-REG-EPM-052 (2D NOPIMS) and MAP-REG-EPM-053 (3D Surveys) to show the overlap of the operational and activity action zone and previous survey data in response to these claims.

3 Maps

All maps can be navigated by using the bookmarks tab.



Title - Southern Right Whale Reproductive BIA with 15km Buffer
Document Number - MAP-REG-EPM-001_E

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Mitigation Source Area
- Active Source Area
- Southern Right Whale Reproduction BIA
- 15km Buffer from BIA

Spatial Reference
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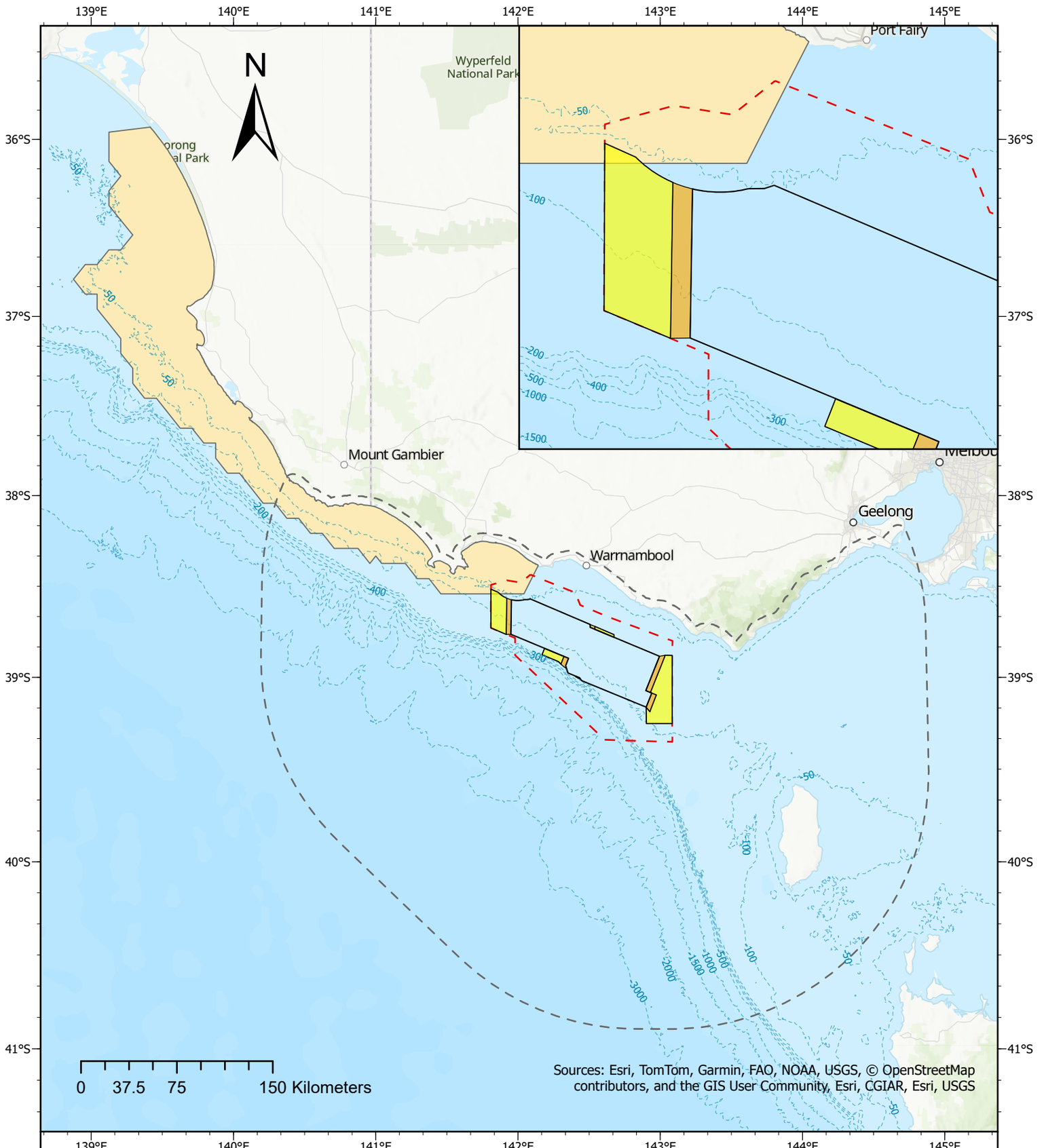

Title - Bonney Coast Upwelling Key Ecological Feature
Document Number - MAP-REG-EPM-003_F

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- Bonney Coast Upwelling Key Ecological Feature

Spatial Reference
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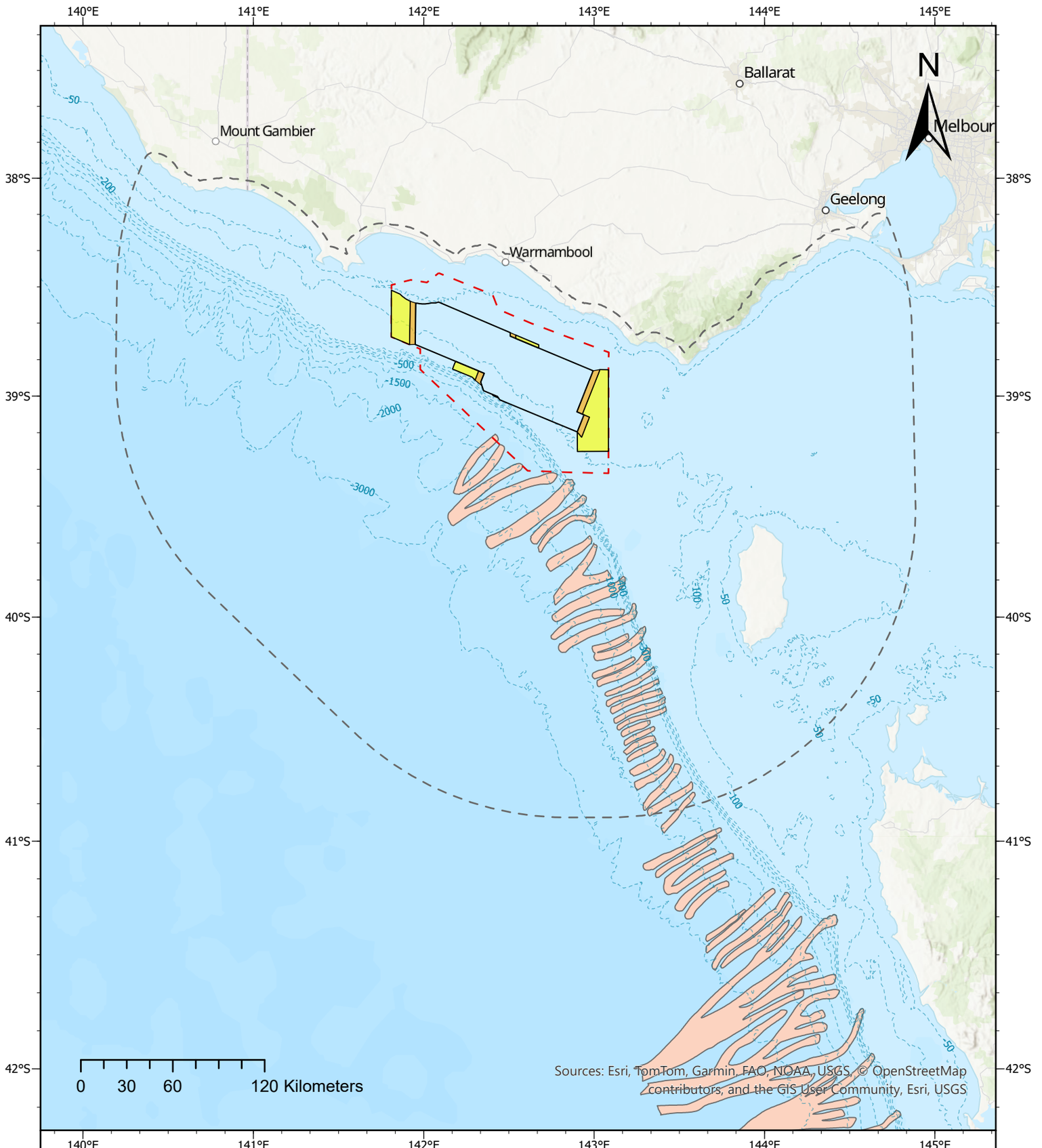

Title - West Tasmanian Canyons Key Ecological Feature
Document Number - MAP-REG-EPM-004_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- West Tasmanian Canyons Key Ecological Feature

Spatial Reference
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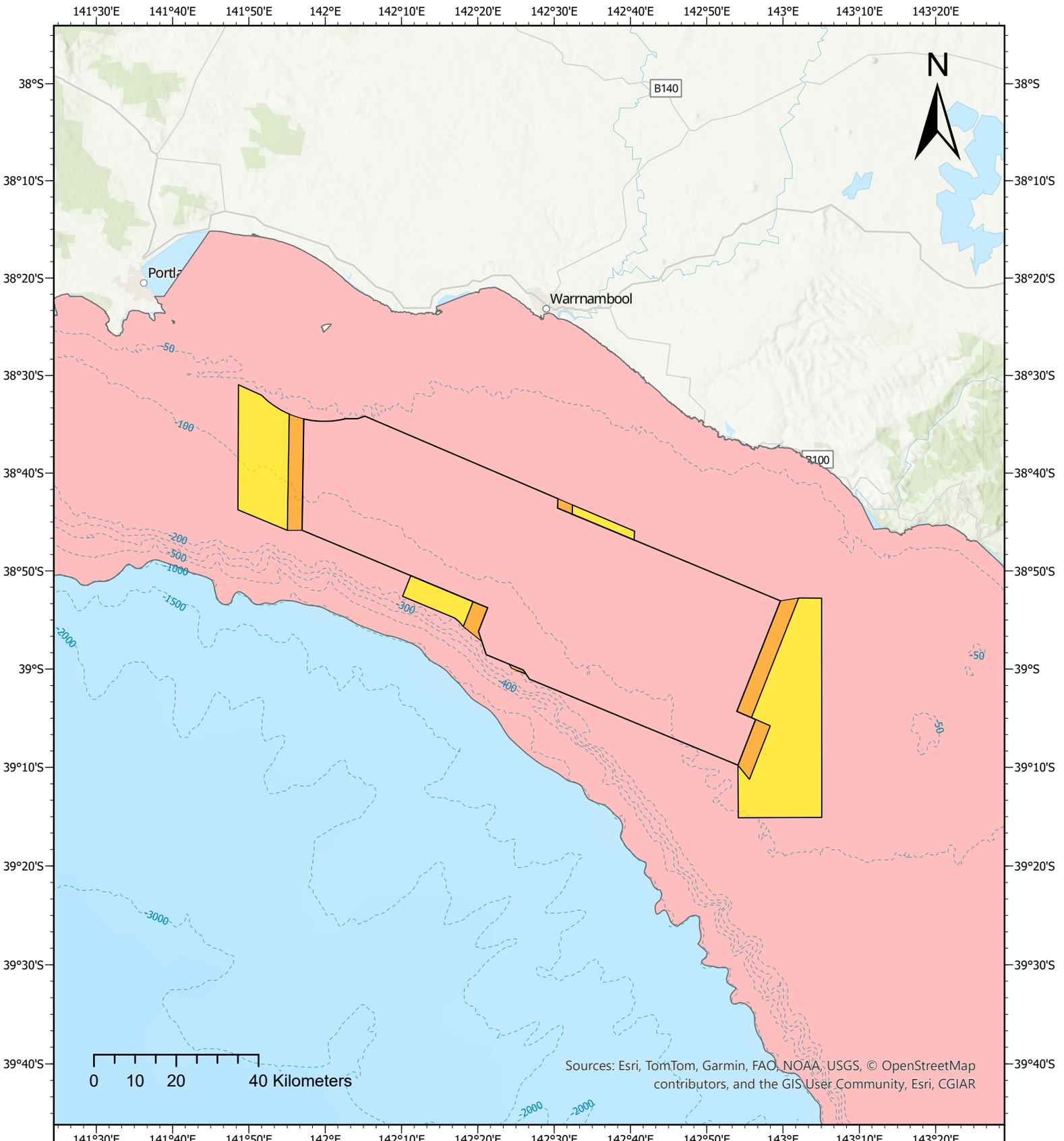

Title - Pygmy Blue Whale Biologically Important Areas (Distribution)
Document Number - MAP-REG-EPM-015_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Pygmy Blue Whale Distribution

Spatial Reference
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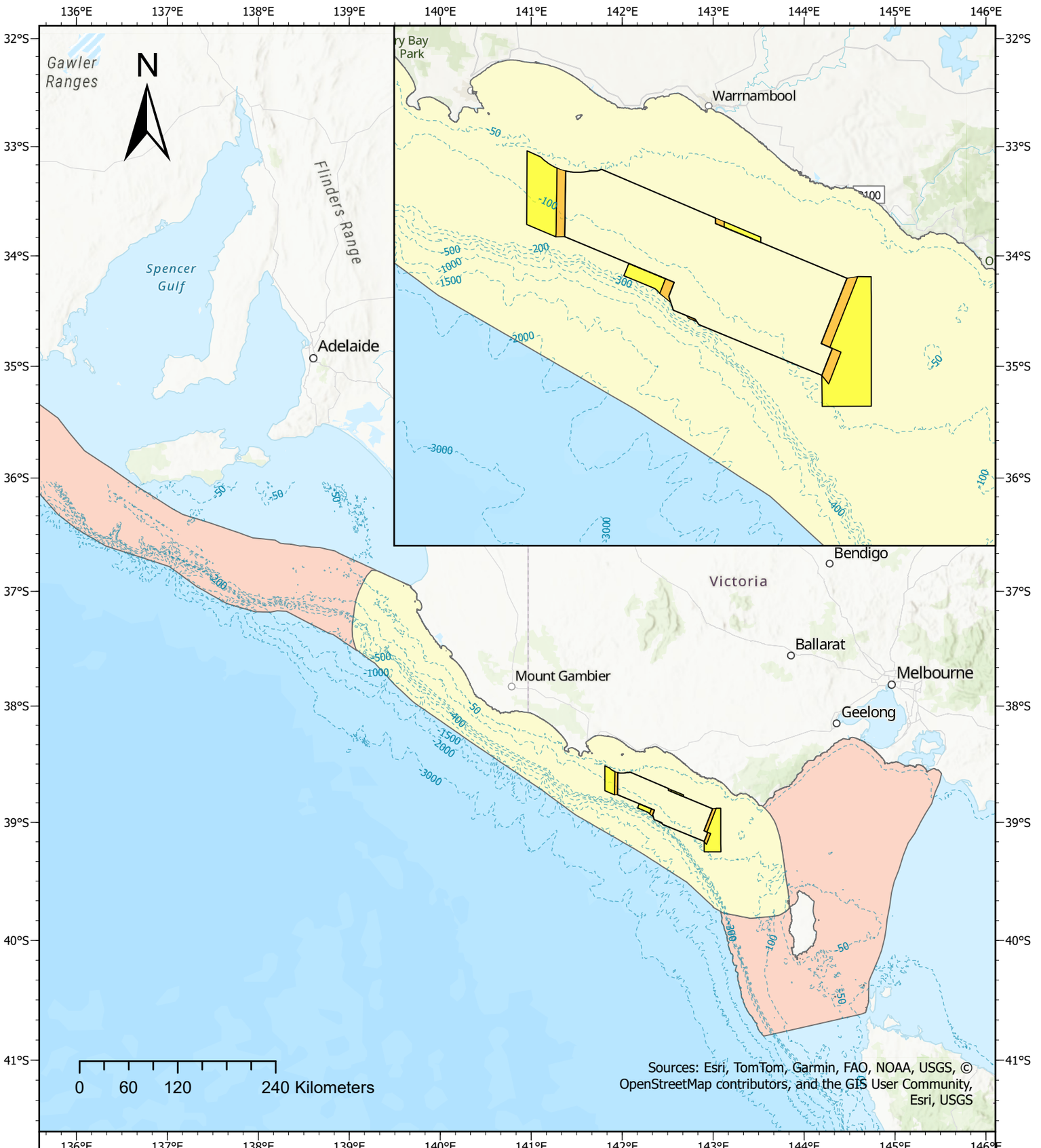

Title - Pygmy Blue Whale Biologically Important Areas (Foraging)
Document Number - MAP-REG-EPM-016_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Pygmy Blue Whale Foraging Area 2
- Pygmy Blue Whale Foraging (abundant food source / annual high use area)

Spatial Reference
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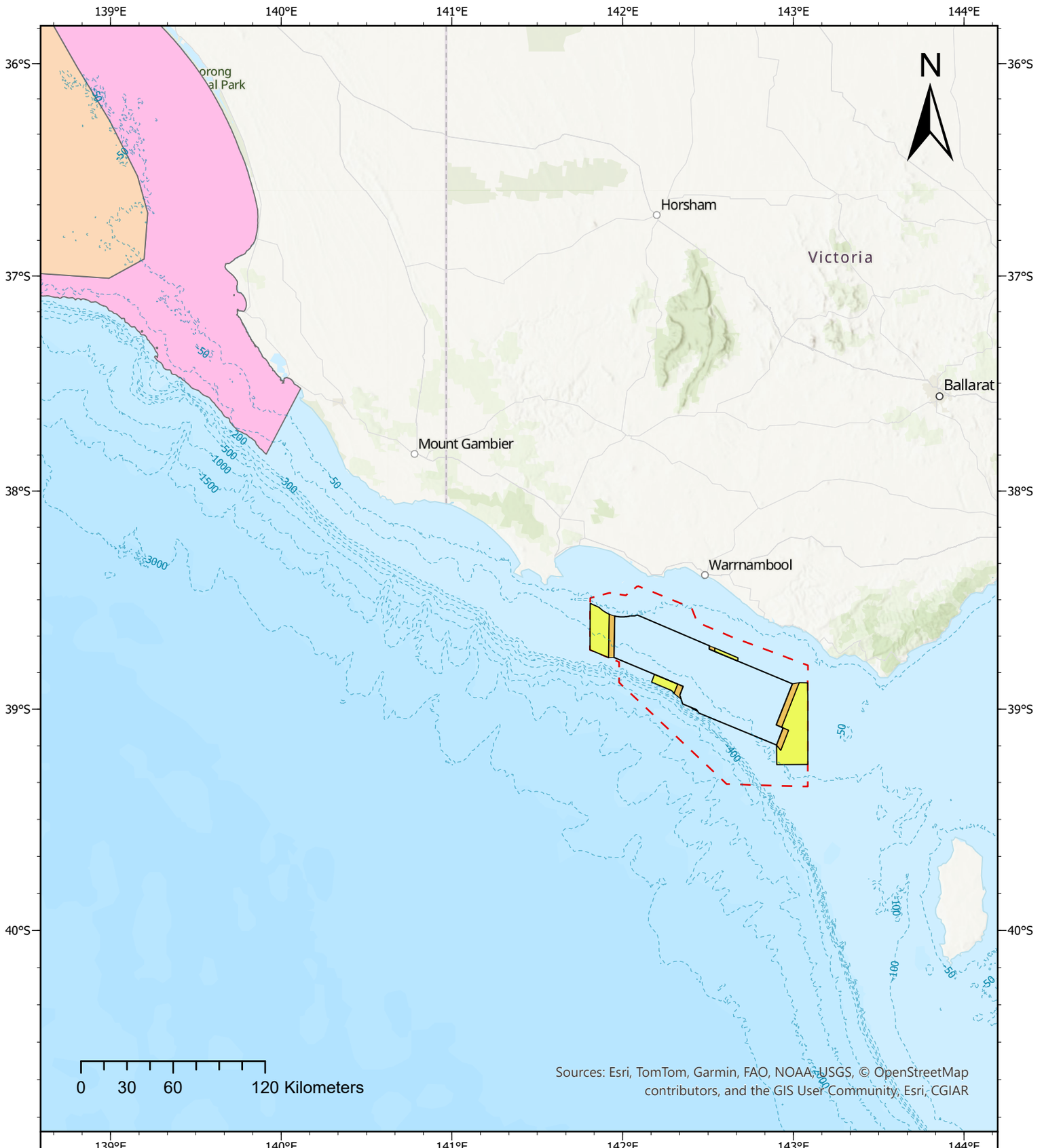

Title - Australian Sea Lion Foraging
Document Number - MAP-REG-EPM-024_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Australian Sea Lion Foraging male/female
- Australian Sea Lion Male Foraging

Spatial Reference
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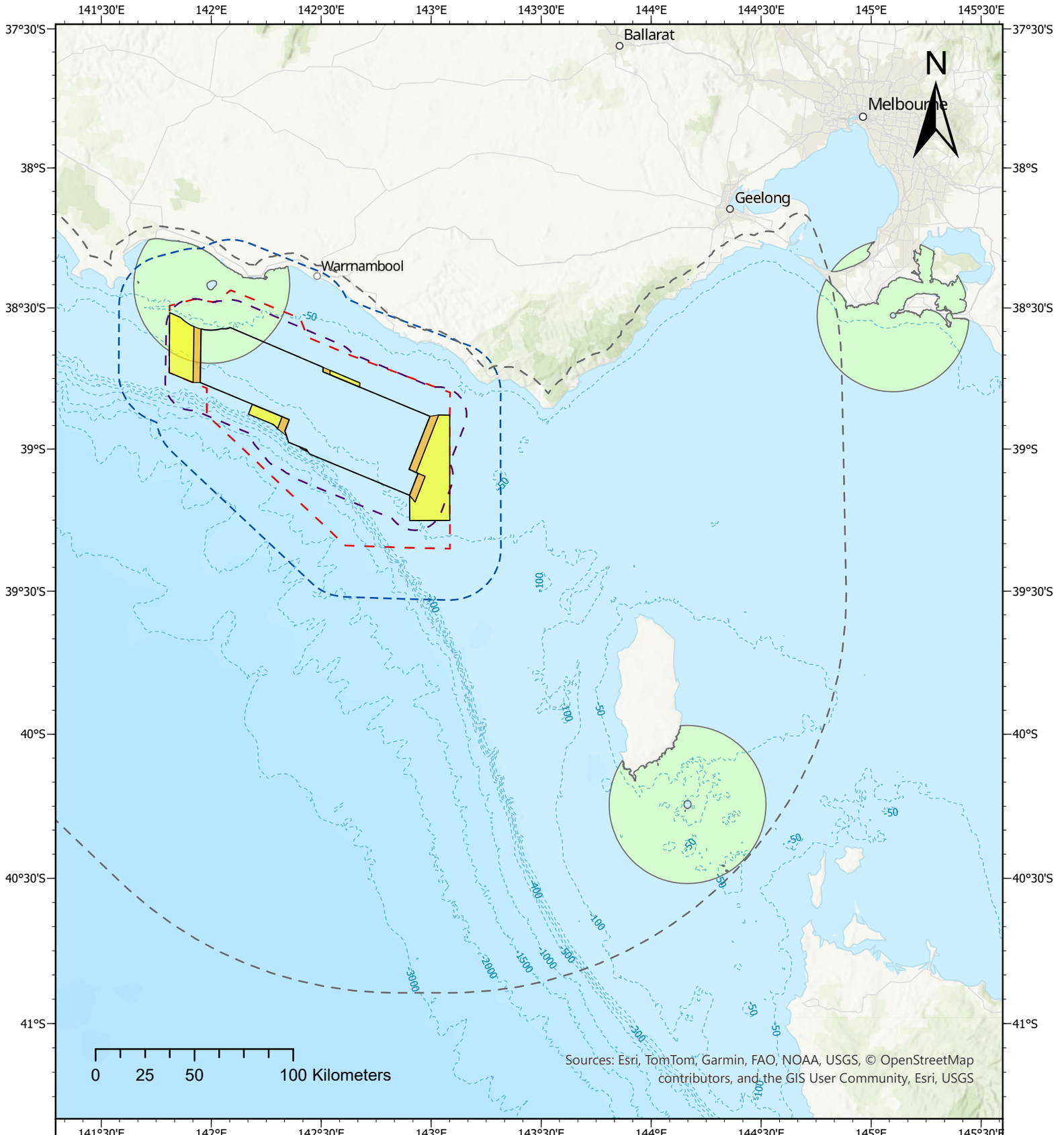

Title - White Shark Biologically Important Areas - Foraging
Document Number - MAP-REG-EPM-027_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- White Shark Foraging
- 20km Light EMBA
- Environmental Planning Area
- 11km Fish Sound EMBA

Spatial Reference
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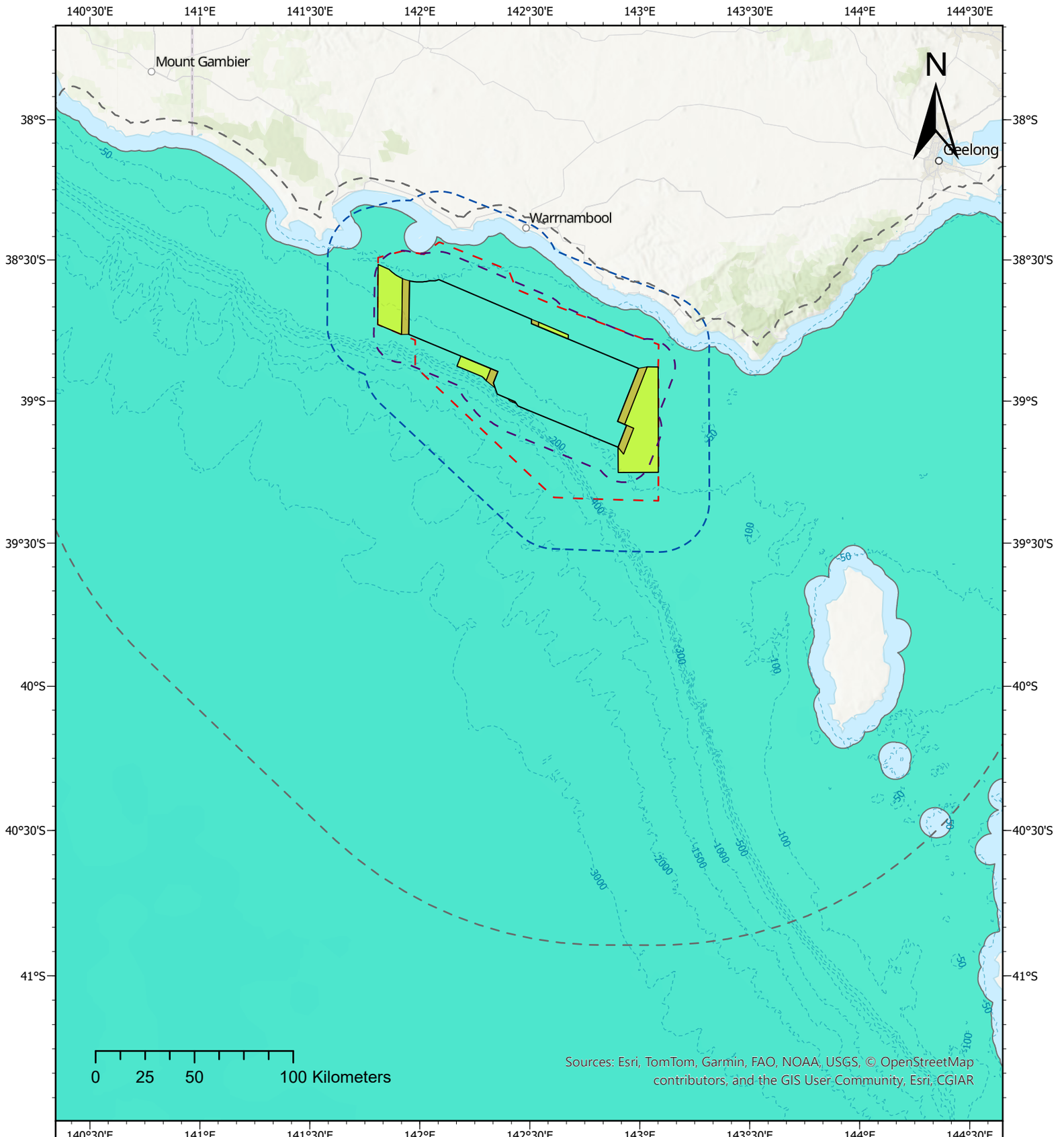
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Title - White Shark Biologically Important Areas - Distribution Low Density
Document Number - MAP-REG-EPM-028_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- White Shark Distribution Low Density
- 20km Light EMBA
- Environmental Planning Area
- 11km Fish Sound EMBA

Spatial Reference
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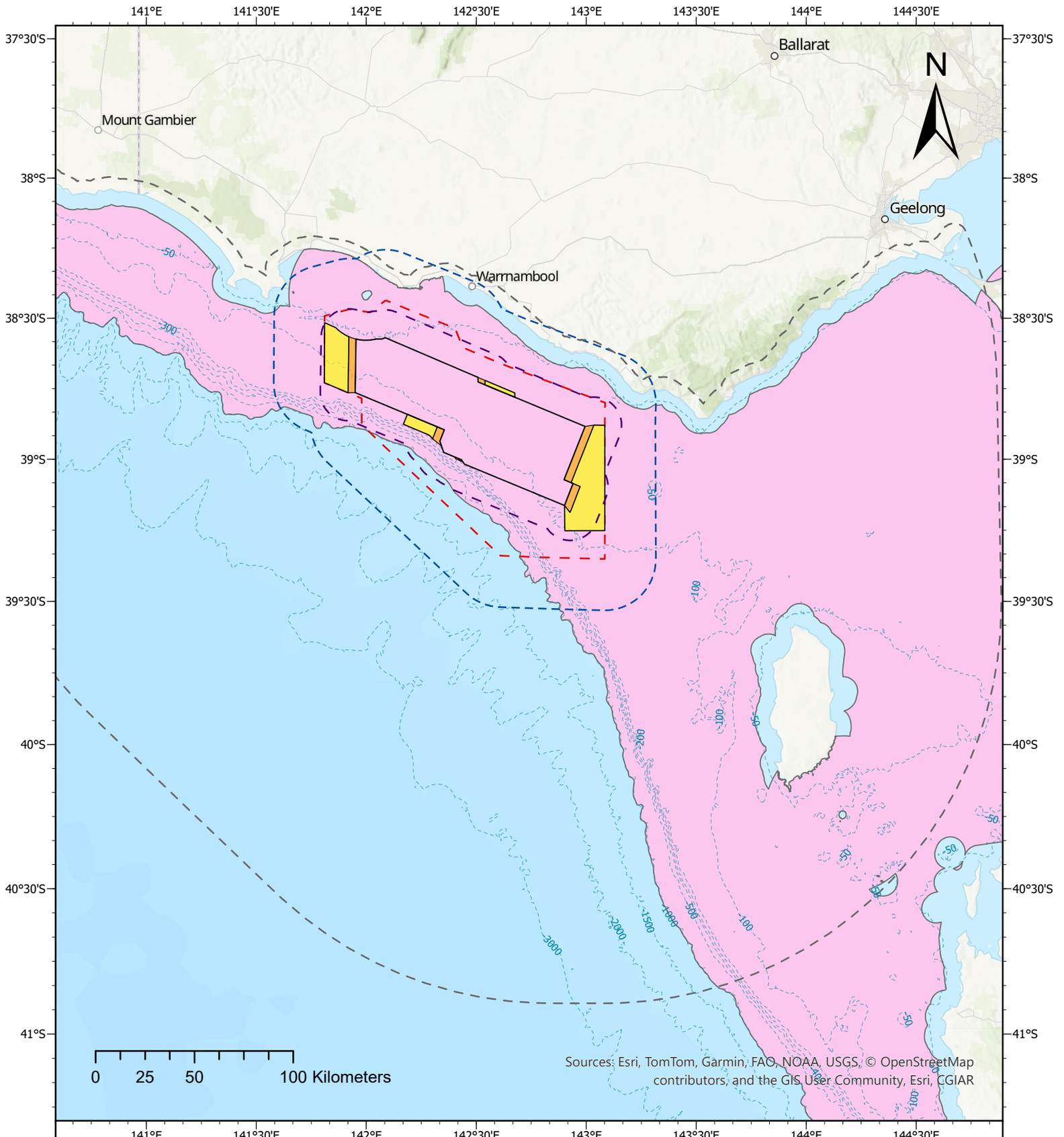
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



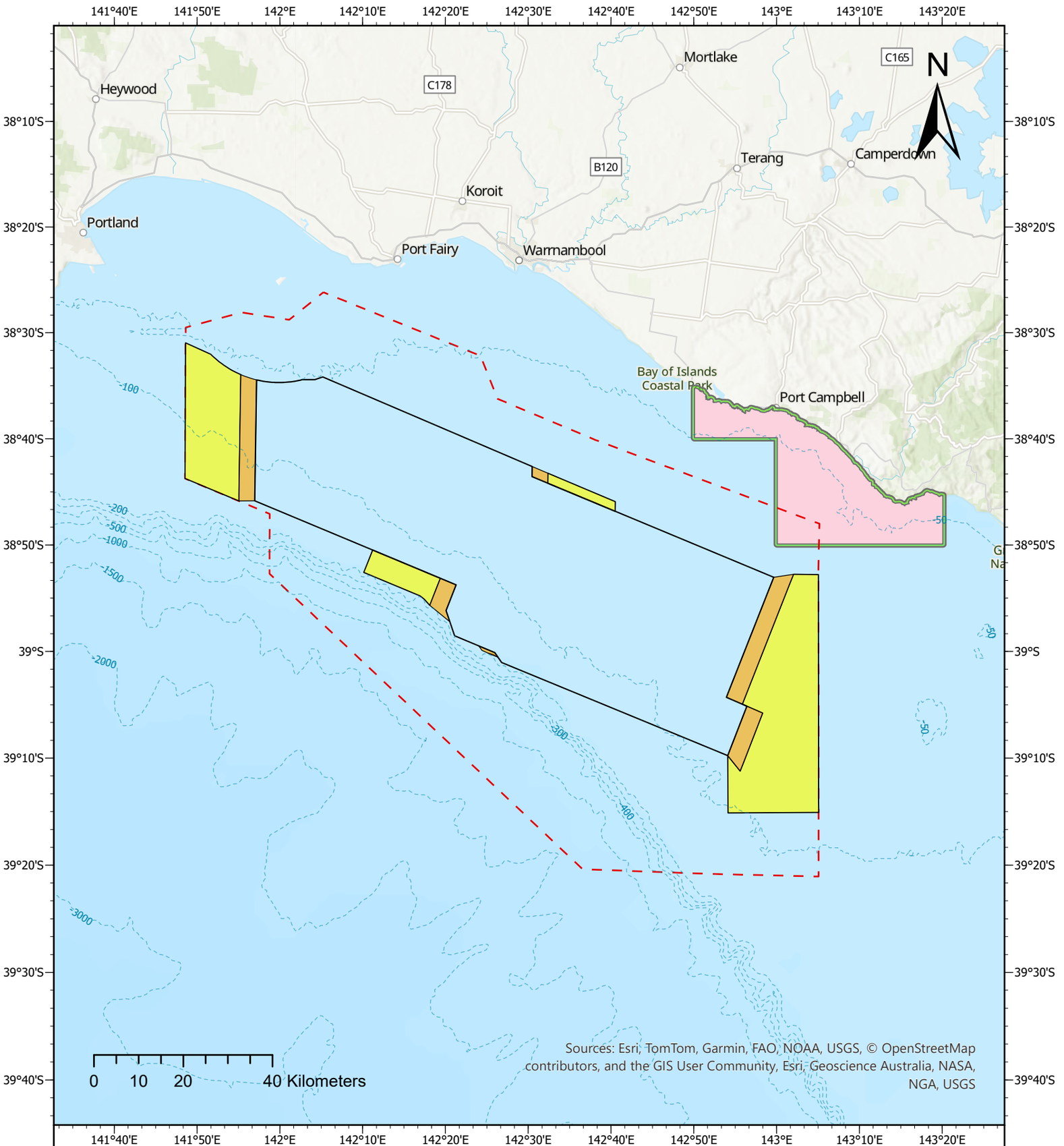
Title - White Shark Biologically Important Areas - Known Distribution
Document Number - MAP-REG-EPM-029_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- White Shark Known Distribution
- 20km Light EMBA
- Environmental Planning Area
- 11km Fish Sound EMBA

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



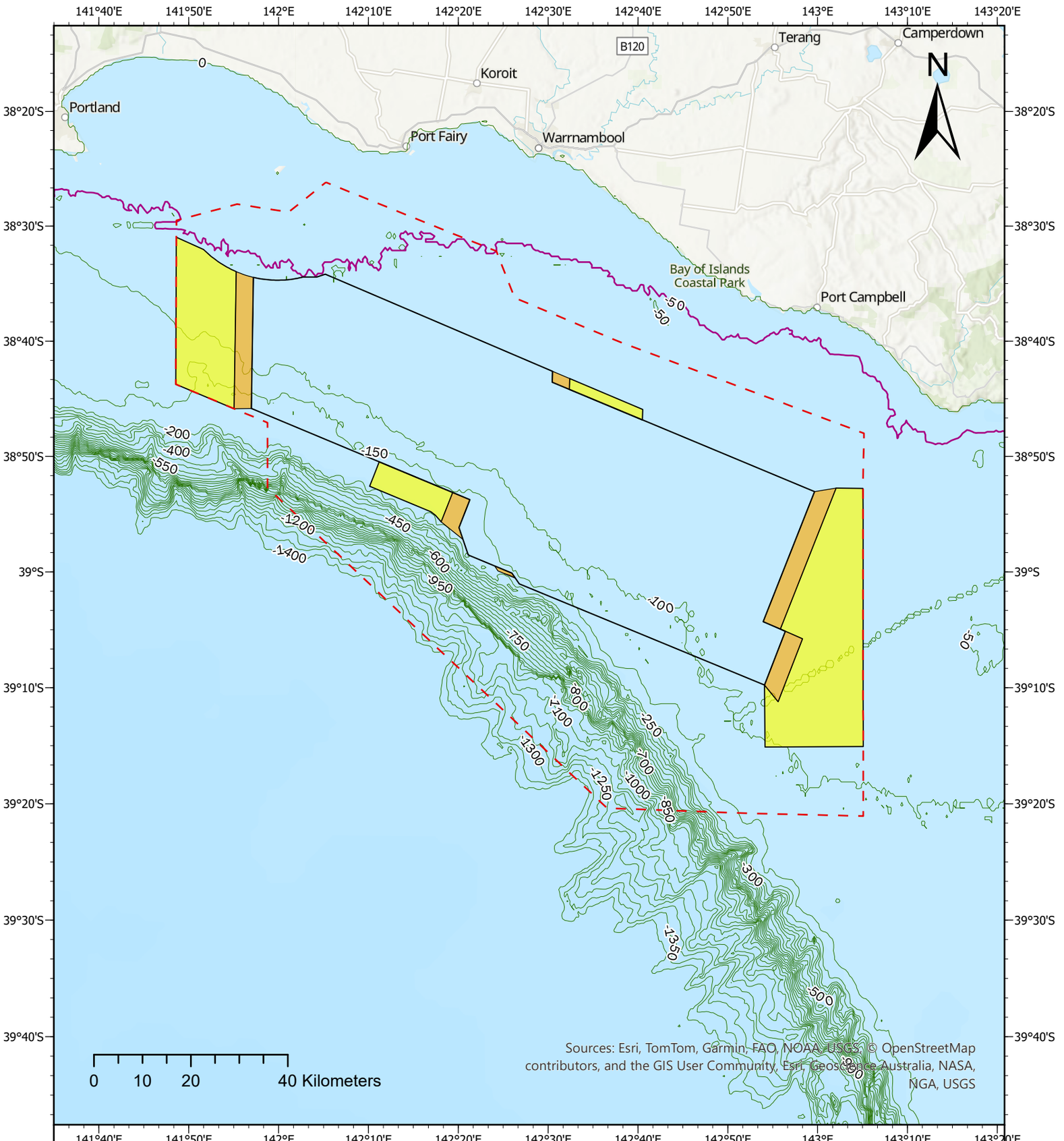
Title - Fisher One Impact Management Zone
Document Number - MAP-REG-EPM-030_D

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Fisher One Impact Management Zone
- Fisher One Impact Zone 500m Buffer

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



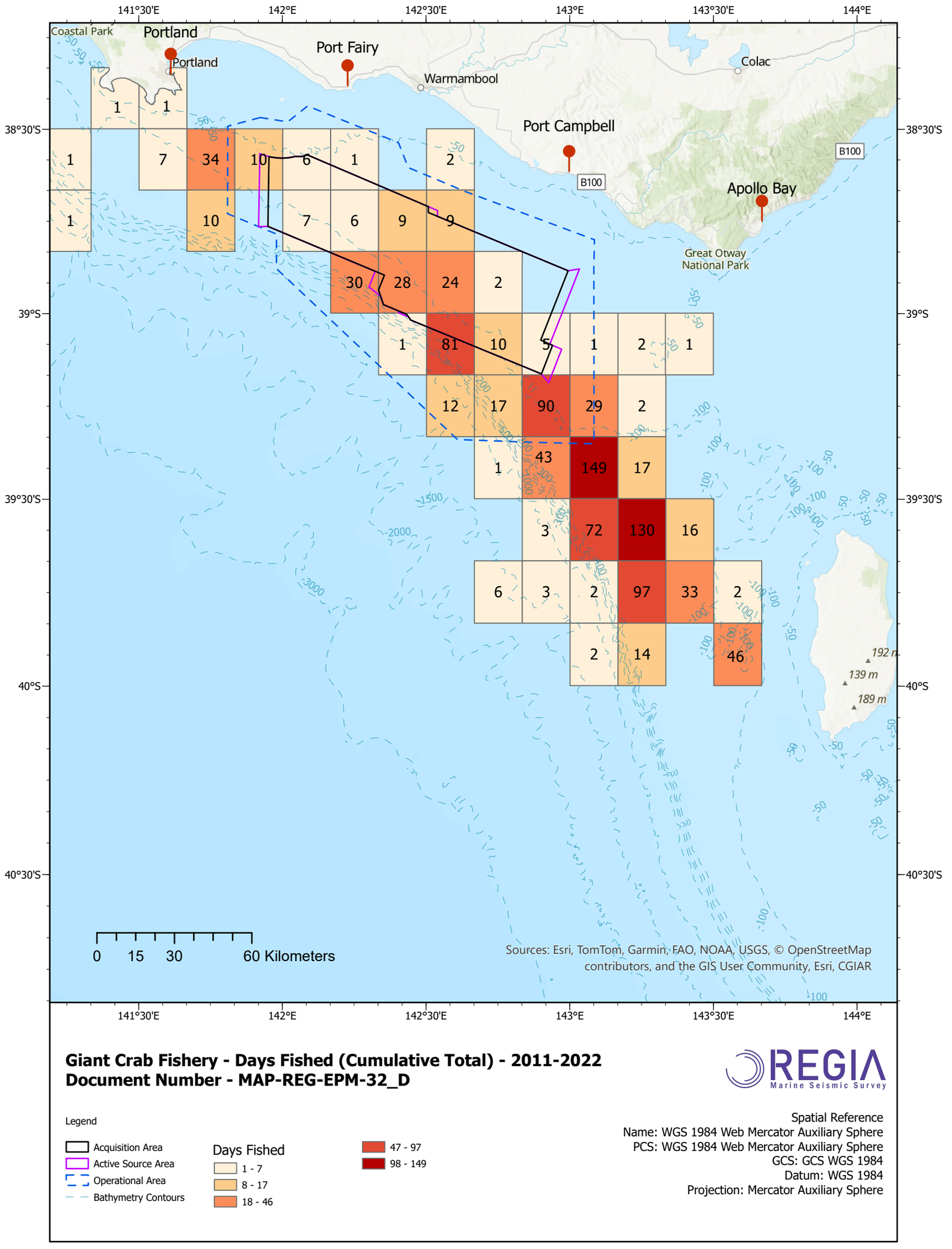
Title - 50m Increment Bathymetry
Document Number - MAP-REG-EPM-031_C

REGIA Marine Seismic Survey

Legend

- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 50m Contour
- 50m Bathymetry

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Giant Crab Fishery - Days Fished (Cumulative Total) - 2011-2022
Document Number - MAP-REG-EPM-32_D

REGIA Marine Seismic Survey

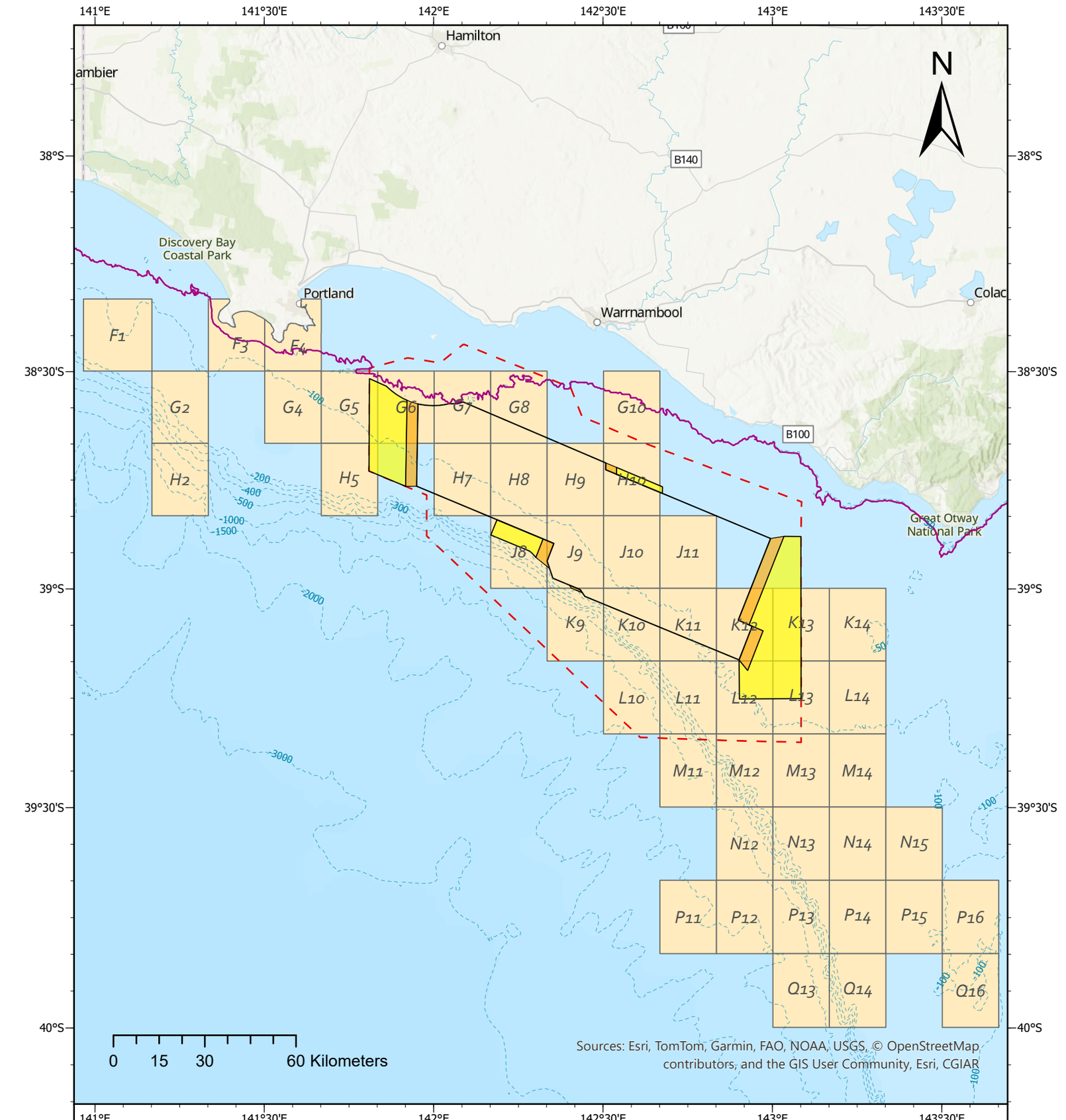
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Days Fished

- 1 - 7
- 8 - 17
- 18 - 46
- 47 - 97
- 98 - 149

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



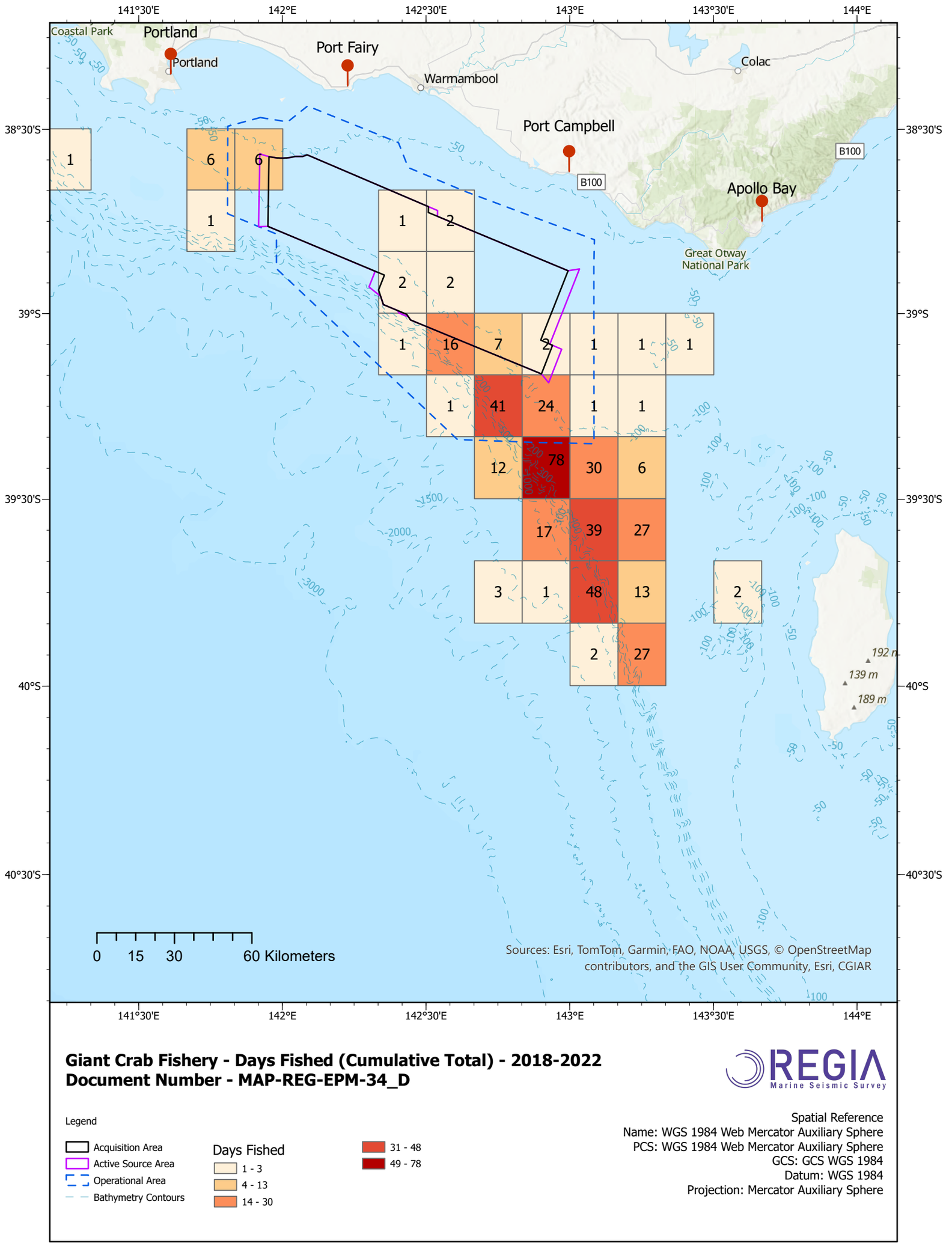
Title - Giant Crab 2011 2021 - Fished Blocks
Document Number - MAP-REG-EPM-033_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 50m Contour
- Giant Crab 2011 2021 FD

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Giant Crab Fishery - Days Fished (Cumulative Total) - 2018-2022
Document Number - MAP-REG-EPM-34_D

REGIA Marine Seismic Survey

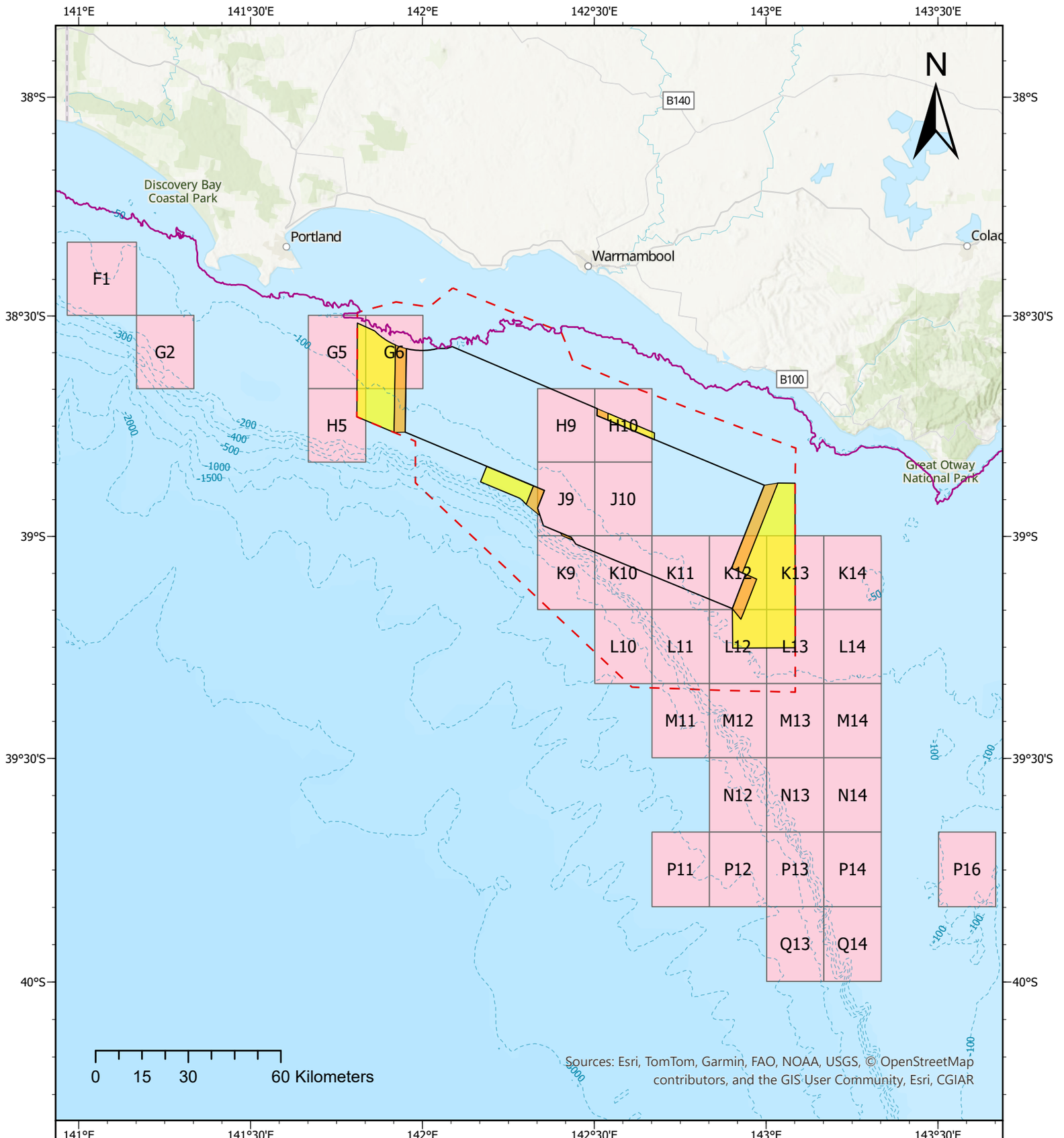
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Days Fished

- 1 - 3
- 4 - 13
- 14 - 30
- 31 - 48
- 49 - 78

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



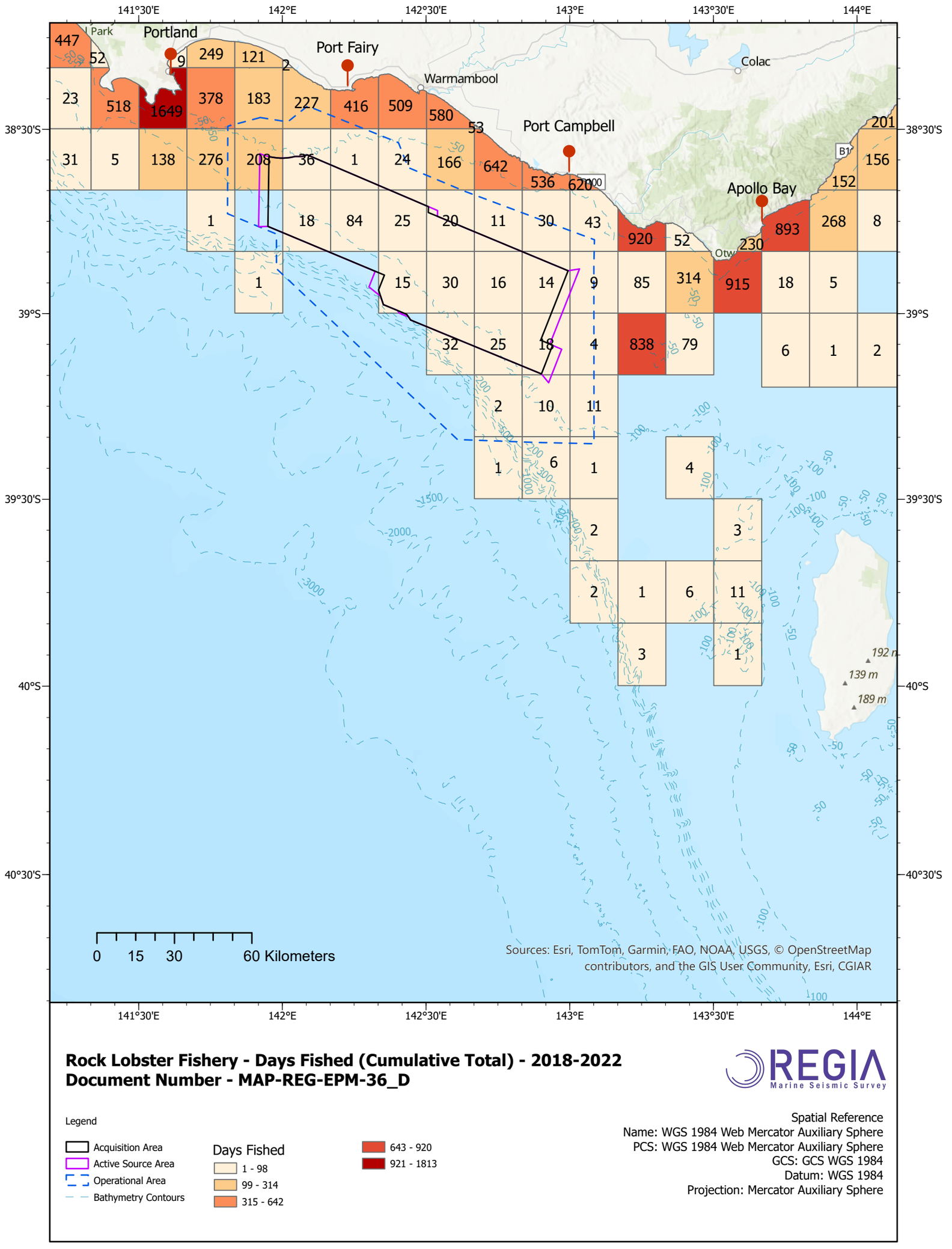
Title - Giant Crab 2018-2022 - Fished Blocks
Document Number - MAP-REG-EPM-035_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 50m Contour
- Giant Crab 2018-2022-FD

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Rock Lobster Fishery - Days Fished (Cumulative Total) - 2018-2022
Document Number - MAP-REG-EPM-36_D

REGIA Marine Seismic Survey

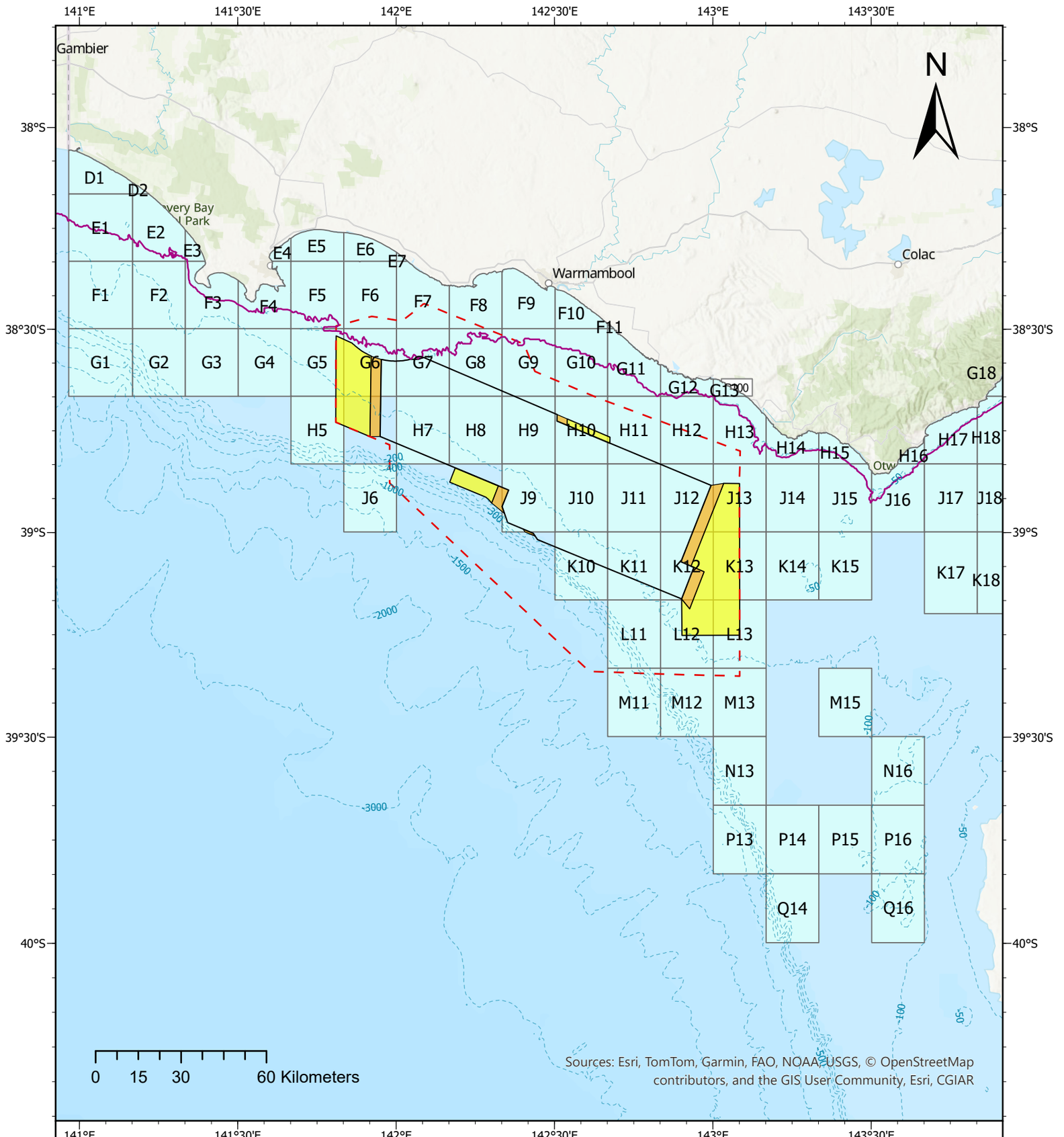
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Days Fished

- 1 - 98
- 99 - 314
- 315 - 642
- 643 - 920
- 921 - 1813

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



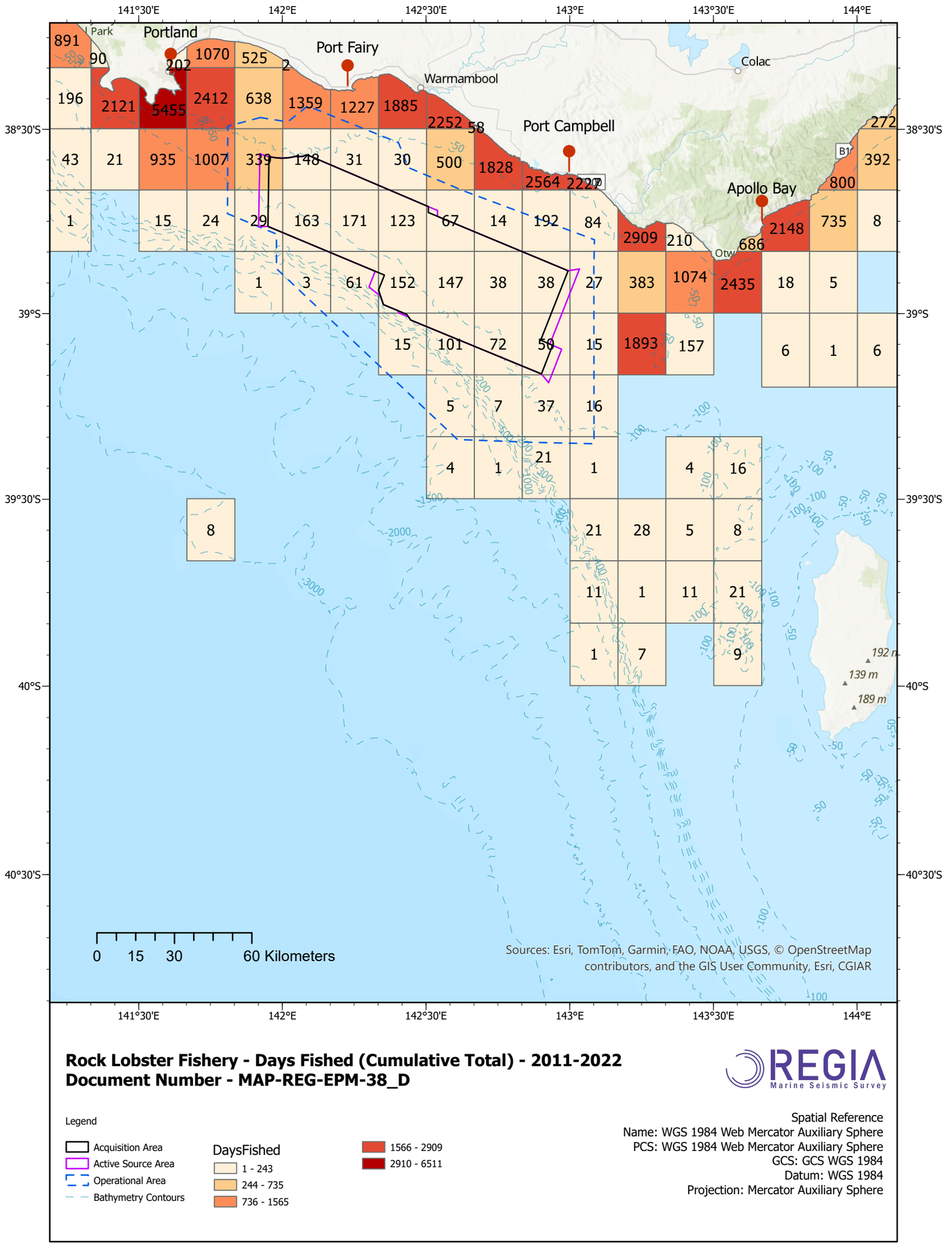
Title - Rock Lobster 2018-2022 - Fished Blocks
Document Number - MAP-REG-EPM-037_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 50m Contour
- Rock Lobster 2018-2022_RFI

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Rock Lobster Fishery - Days Fished (Cumulative Total) - 2011-2022
Document Number - MAP-REG-EPM-38_D

REGIA Marine Seismic Survey

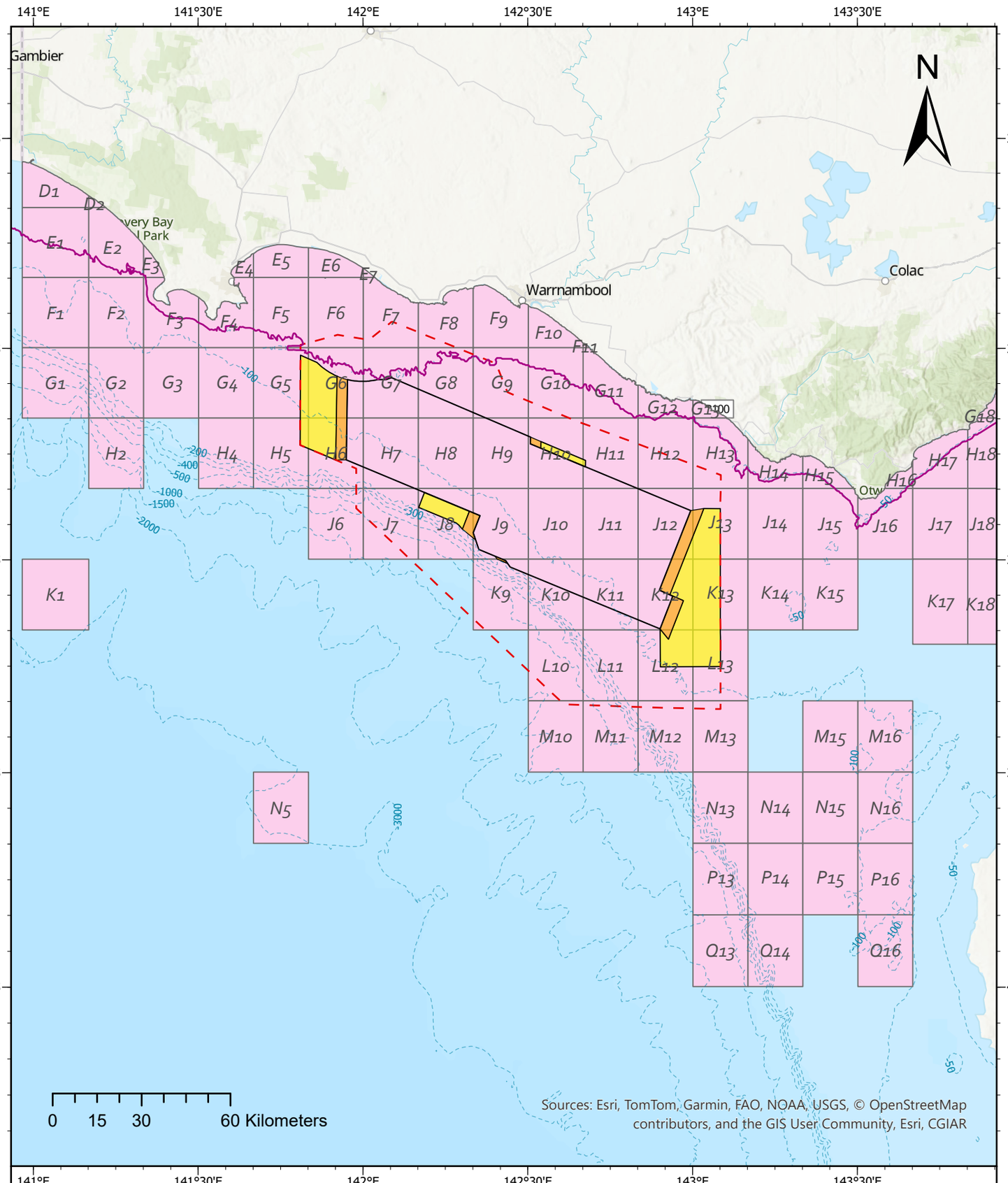
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

DaysFished

- 1 - 243
- 244 - 735
- 736 - 1565
- 1566 - 2909
- 2910 - 6511

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



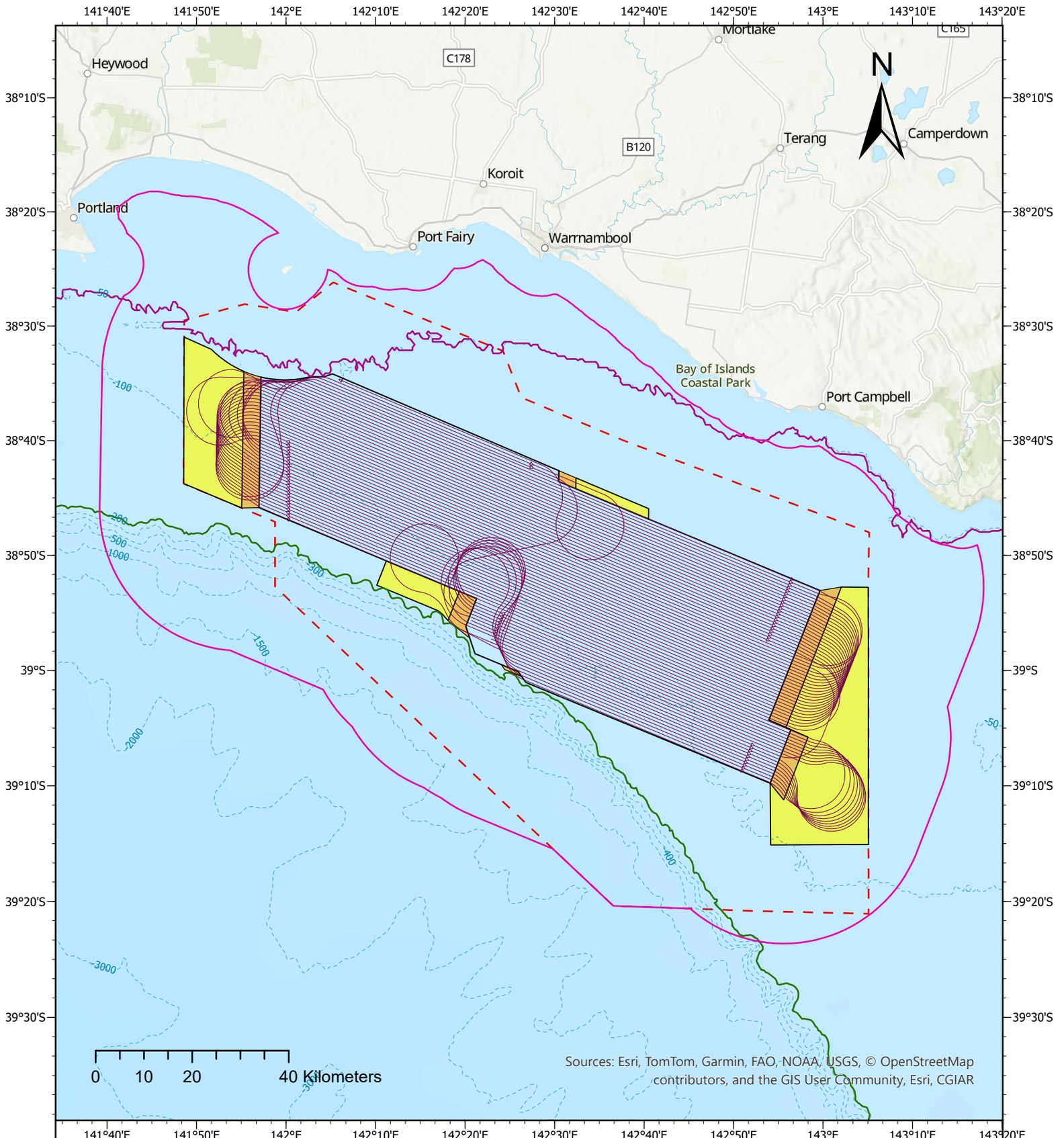
Title - Rock Lobster 2011-2022 - Fished Blocks
Document Number - MAP-REG-EPM-039_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 50m Contour
- Rock Lobster 2011-2022_RFI

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



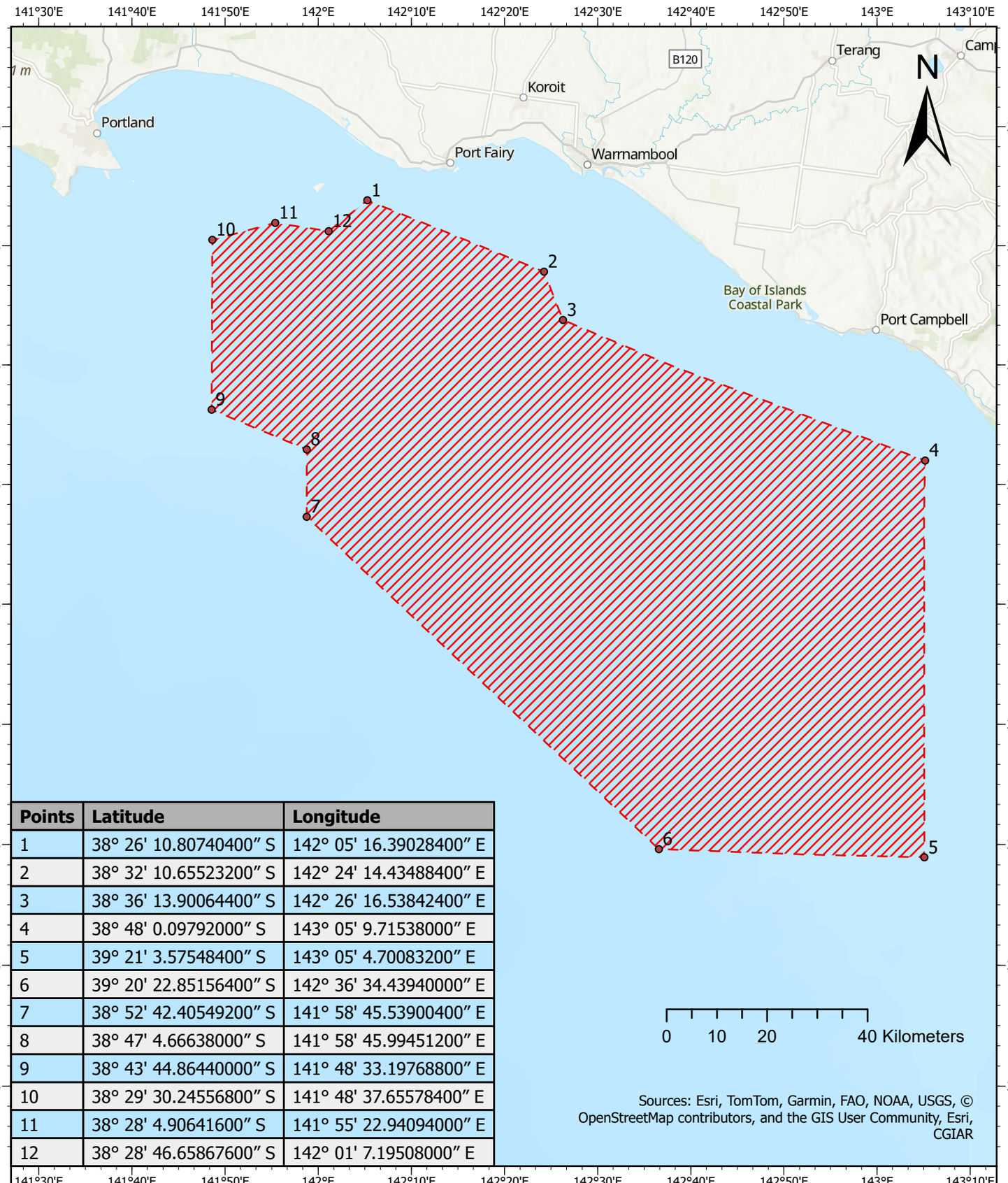
Title - Base Map
Document Number - MAP-REG-EPM-040_B

REGIA
Marine Seismic Survey

Legend

- Bathymetry Contours
- Indicative Sail Lines
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 50m Contour
- 200m Contour
- Support Operations Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Points	Latitude	Longitude
1	38° 26' 10.80740400" S	142° 05' 16.39028400" E
2	38° 32' 10.65523200" S	142° 24' 14.43488400" E
3	38° 36' 13.90064400" S	142° 26' 16.53842400" E
4	38° 48' 0.09792000" S	143° 05' 9.71538000" E
5	39° 21' 3.57548400" S	143° 05' 4.70083200" E
6	39° 20' 22.85156400" S	142° 36' 34.43940000" E
7	38° 52' 42.40549200" S	141° 58' 45.53900400" E
8	38° 47' 4.66638000" S	141° 58' 45.99451200" E
9	38° 43' 44.86440000" S	141° 48' 33.19768800" E
10	38° 29' 30.24556800" S	141° 48' 37.65578400" E
11	38° 28' 4.90641600" S	141° 55' 22.94094000" E
12	38° 28' 46.65867600" S	142° 01' 7.19508000" E

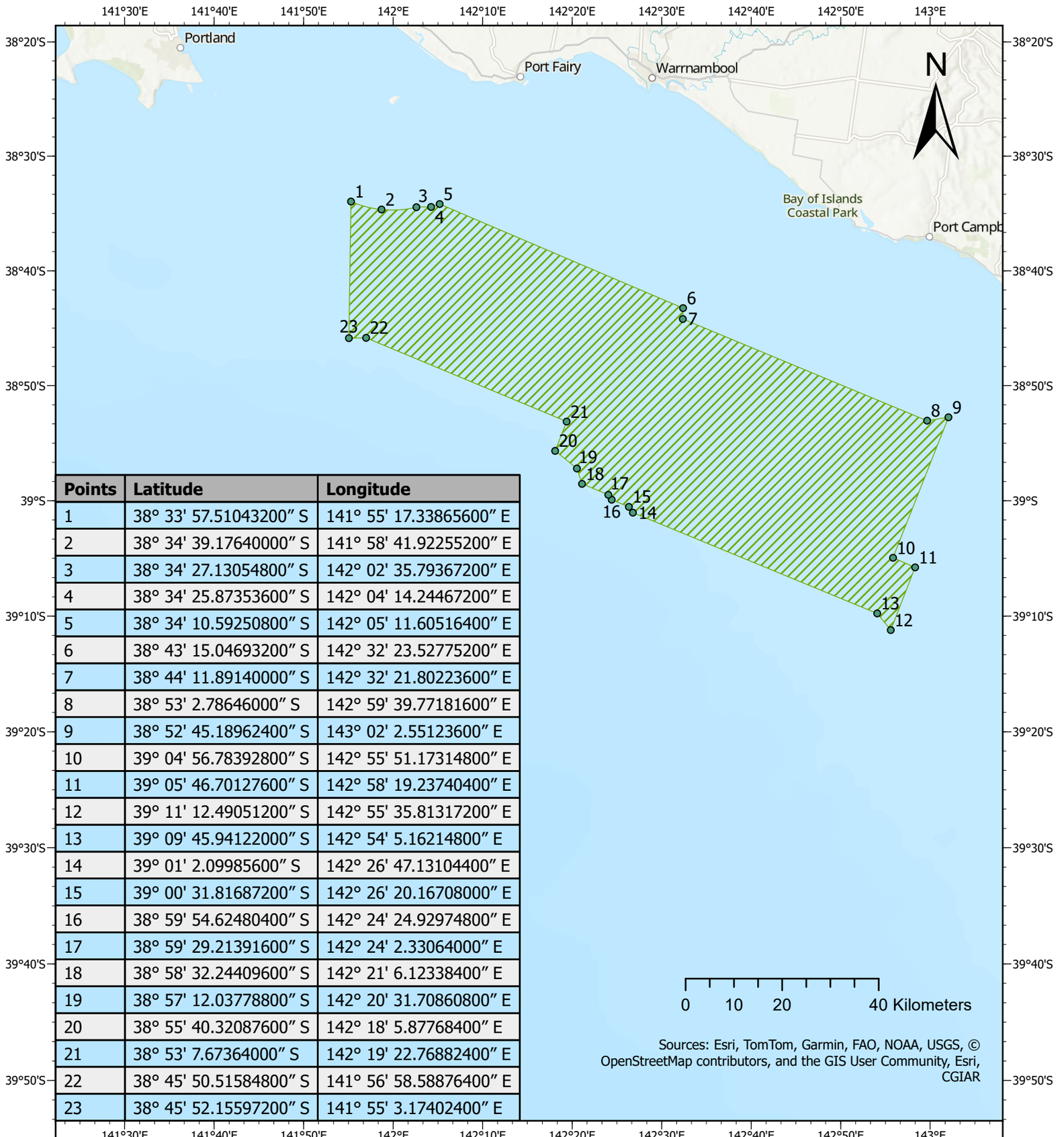
Title - Operational Area Co-ordinates
Document Number - MAP-REG-EPM-041_B

REGIA Marine Seismic Survey

Legend

Operational Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Points	Latitude	Longitude
1	38° 33' 57.51043200" S	141° 55' 17.33865600" E
2	38° 34' 39.17640000" S	141° 58' 41.92255200" E
3	38° 34' 27.13054800" S	142° 02' 35.79367200" E
4	38° 34' 25.87353600" S	142° 04' 14.24467200" E
5	38° 34' 10.59250800" S	142° 05' 11.60516400" E
6	38° 43' 15.04693200" S	142° 32' 23.52775200" E
7	38° 44' 11.89140000" S	142° 32' 21.80223600" E
8	38° 53' 2.78646000" S	142° 59' 39.77181600" E
9	38° 52' 45.18962400" S	143° 02' 2.55123600" E
10	39° 04' 56.78392800" S	142° 55' 51.17314800" E
11	39° 05' 46.70127600" S	142° 58' 19.23740400" E
12	39° 11' 12.49051200" S	142° 55' 35.81317200" E
13	39° 09' 45.94122000" S	142° 54' 5.16214800" E
14	39° 01' 2.09985600" S	142° 26' 47.13104400" E
15	39° 00' 31.81687200" S	142° 26' 20.16708000" E
16	38° 59' 54.62480400" S	142° 24' 24.92974800" E
17	38° 59' 29.21391600" S	142° 24' 2.33064000" E
18	38° 58' 32.24409600" S	142° 21' 6.12338400" E
19	38° 57' 12.03778800" S	142° 20' 31.70860800" E
20	38° 55' 40.32087600" S	142° 18' 5.87768400" E
21	38° 53' 7.67364000" S	142° 19' 22.76882400" E
22	38° 45' 50.51584800" S	141° 56' 58.58876400" E
23	38° 45' 52.15597200" S	141° 55' 3.17402400" E

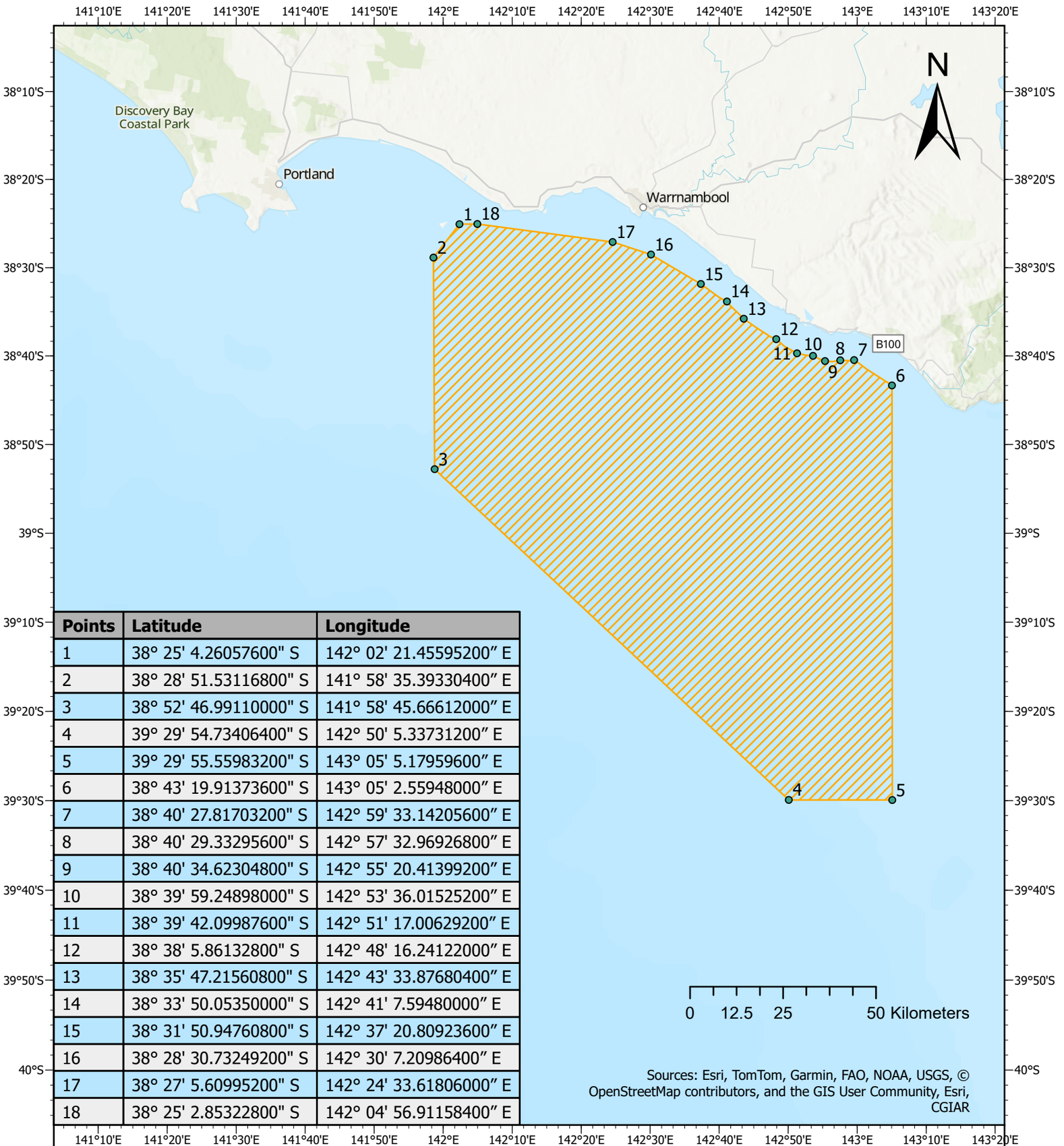
Title - Active Source Area Co-ordinates
Document Number - MAP-REG-EPM-042_B

REGIA Marine Seismic Survey

Legend

Active Source Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Points	Latitude	Longitude
1	38° 25' 4.26057600" S	142° 02' 21.45595200" E
2	38° 28' 51.53116800" S	141° 58' 35.39330400" E
3	38° 52' 46.99110000" S	141° 58' 45.66612000" E
4	39° 29' 54.73406400" S	142° 50' 5.33731200" E
5	39° 29' 55.55983200" S	143° 05' 5.17959600" E
6	38° 43' 19.91373600" S	143° 05' 2.55948000" E
7	38° 40' 27.81703200" S	142° 59' 33.14205600" E
8	38° 40' 29.33295600" S	142° 57' 32.96926800" E
9	38° 40' 34.62304800" S	142° 55' 20.41399200" E
10	38° 39' 59.24898000" S	142° 53' 36.01525200" E
11	38° 39' 42.09987600" S	142° 51' 17.00629200" E
12	38° 38' 5.86132800" S	142° 48' 16.24122000" E
13	38° 35' 47.21560800" S	142° 43' 33.87680400" E
14	38° 33' 50.05350000" S	142° 41' 7.59480000" E
15	38° 31' 50.94760800" S	142° 37' 20.80923600" E
16	38° 28' 30.73249200" S	142° 30' 7.20986400" E
17	38° 27' 5.60995200" S	142° 24' 33.61806000" E
18	38° 25' 2.85322800" S	142° 04' 56.91158400" E

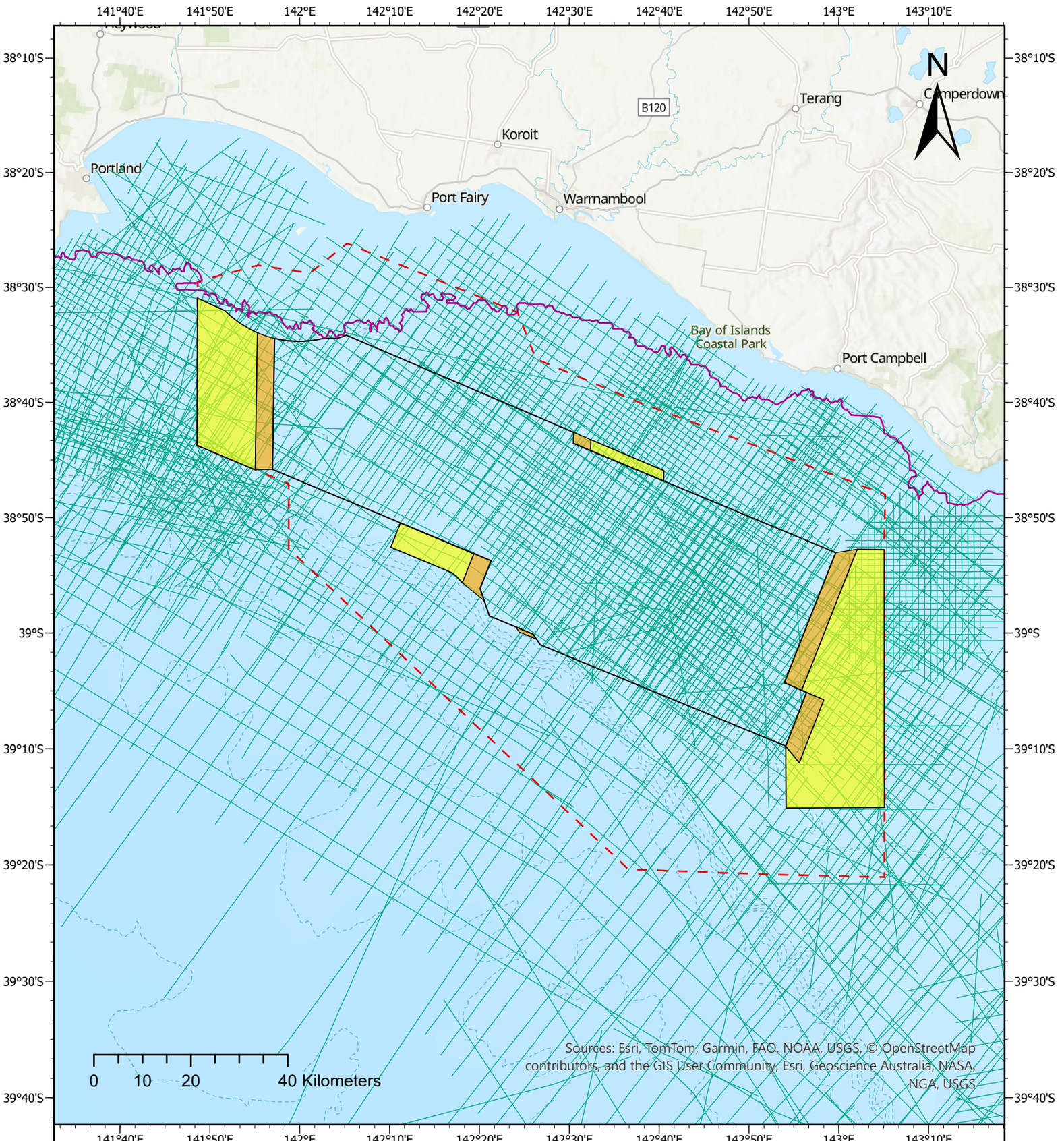
Title - Activity Planning Area Co-ordinates
Document Number - MAP-REG-EPM-043_B

REGIA Marine Seismic Survey

Legend

Activity Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



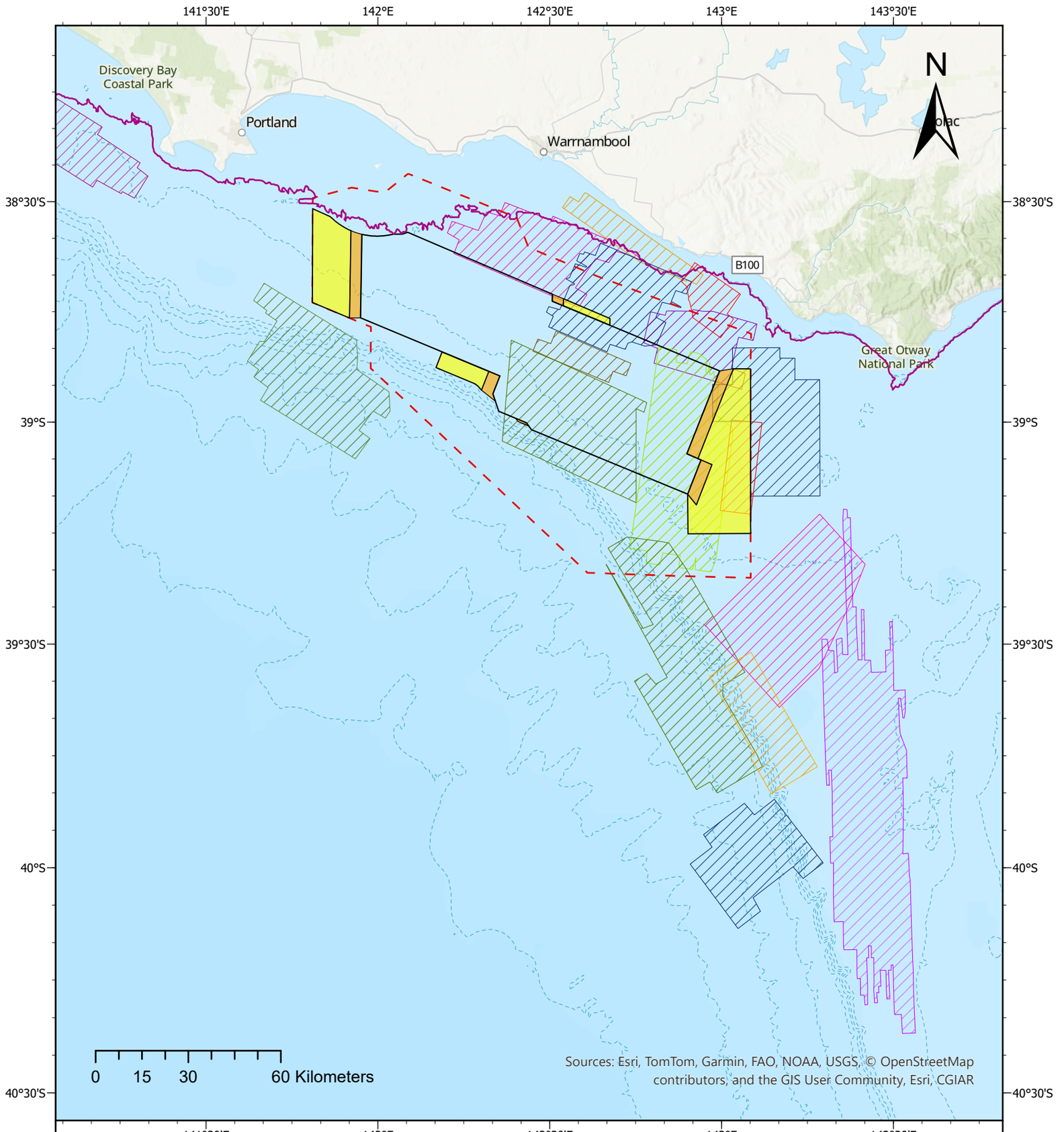
Title - NOPIMS 2D Seismic Survey Lines (1960-2023)
Document Number - MAP-REG-EPM-045_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- NOPIMS 2DSeismic Survey Lines
- 50m Contour

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



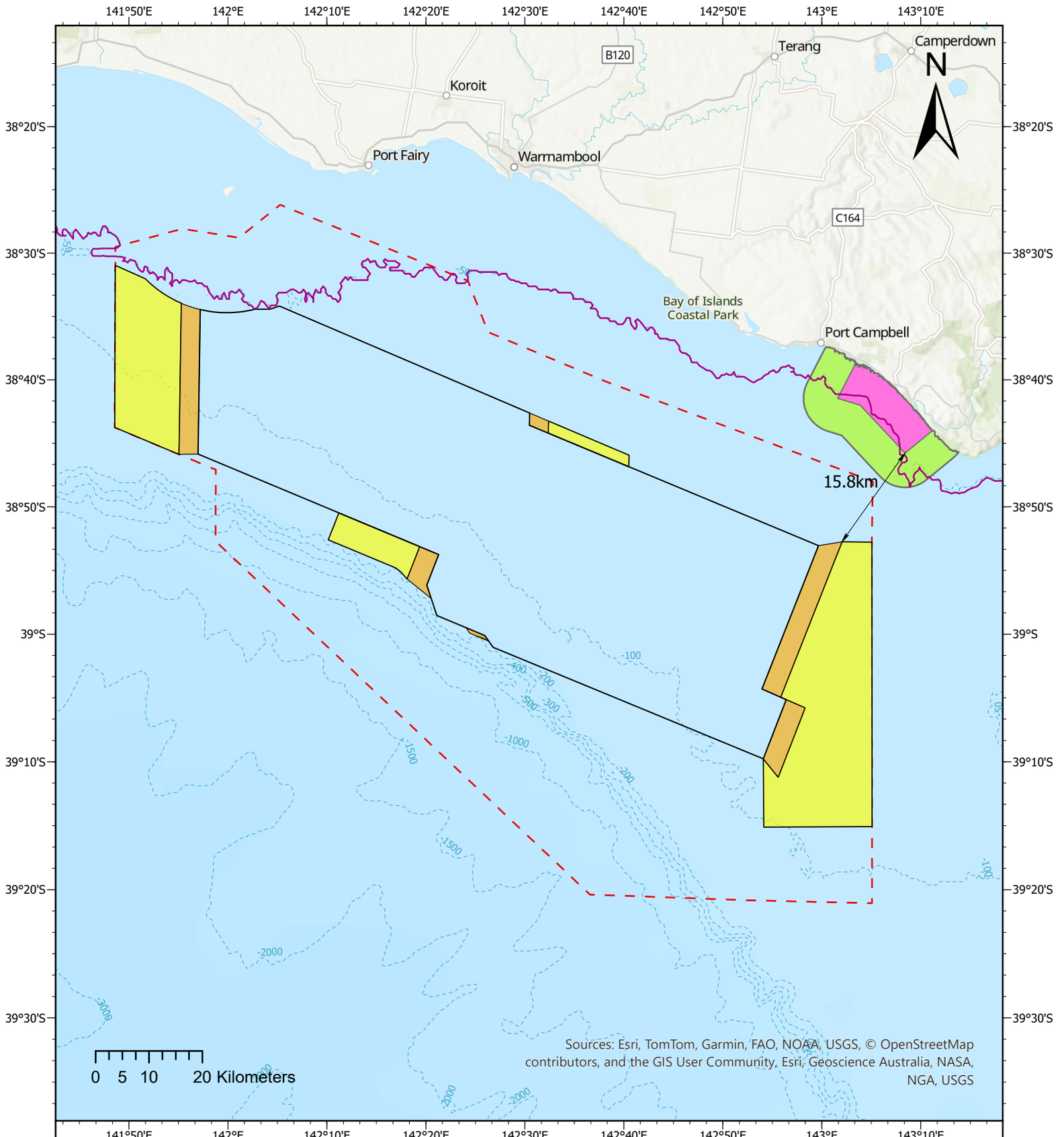
Title - NOPIMS 3D Seismic Survey (1960 - 2023)
Document Number - MAP-REG-EPM-046_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 50m Contour
- Wolseley 3D MSS
- Sequoia 3D MSS 2021
- OS02 3D MSS
- Bernoulli 3D MSS
- Torquay OTE12 3D MSS 2013
- Brandt 3D MSS
- Bellerive 3D MSS
- Flanagan 3D MSS 2014
- Aragorn 3D MSS
- Astrolabe 3D MSS 2013
- Crowes Foot 3D MSS 2016
- Investigator MSS
- Schomberg 3D MSS
- LaBella 3D MSS 2013
- Hercules 3D MSS
- OH94 Minerva 2D_3D MSS
- Casino 3D (OSTR-01) MSS
- Antares 3D MSS
- Champion South 3D MSS

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



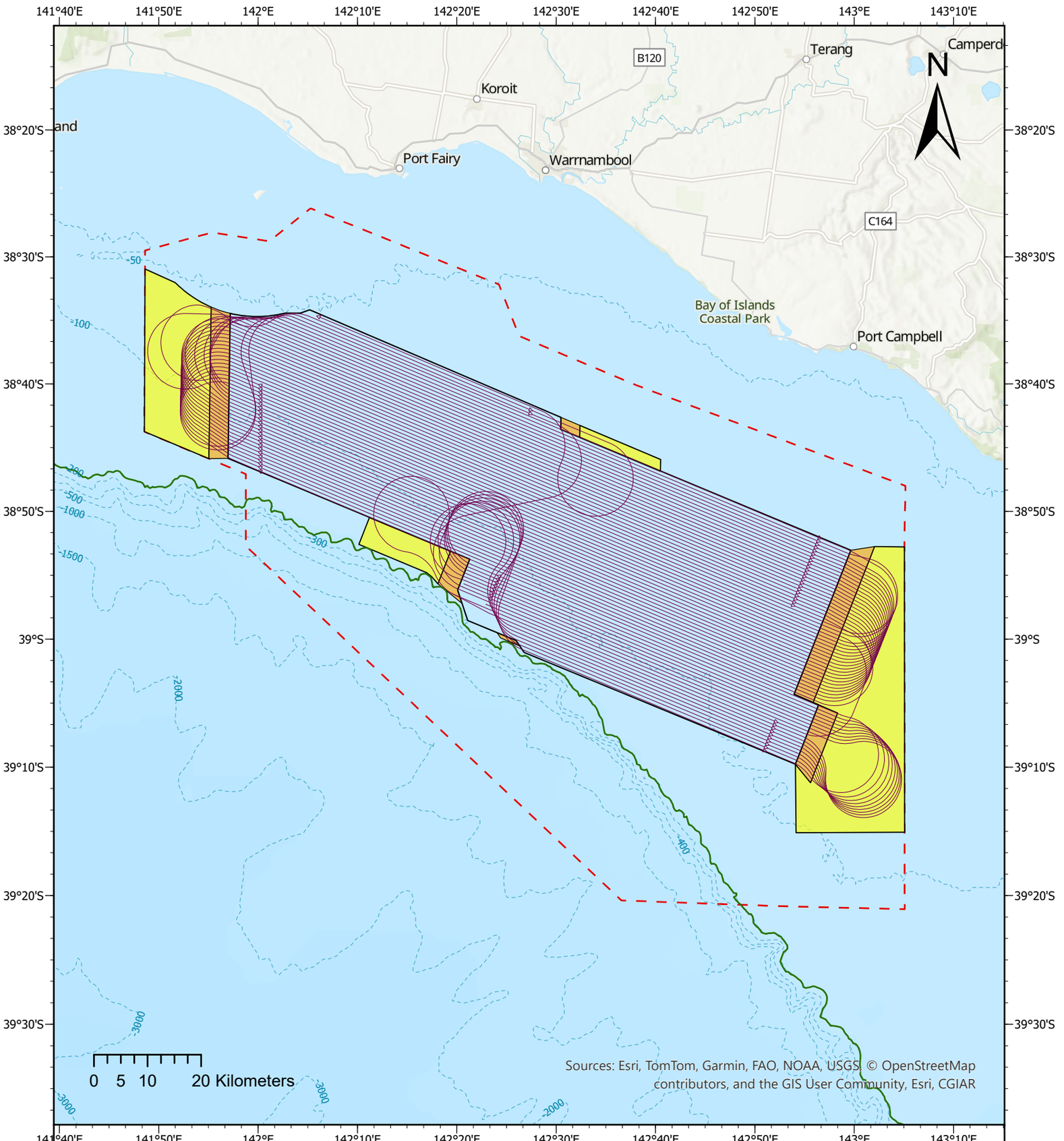
Title - 12 Apostles Marine Park 5km Buffer - Distance from Active Source Area
Document Number - MAP-REG-EPM-047_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 50m Contour
- 12 Apostles Marine Park
- 12 Apostles 5km Buffer

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



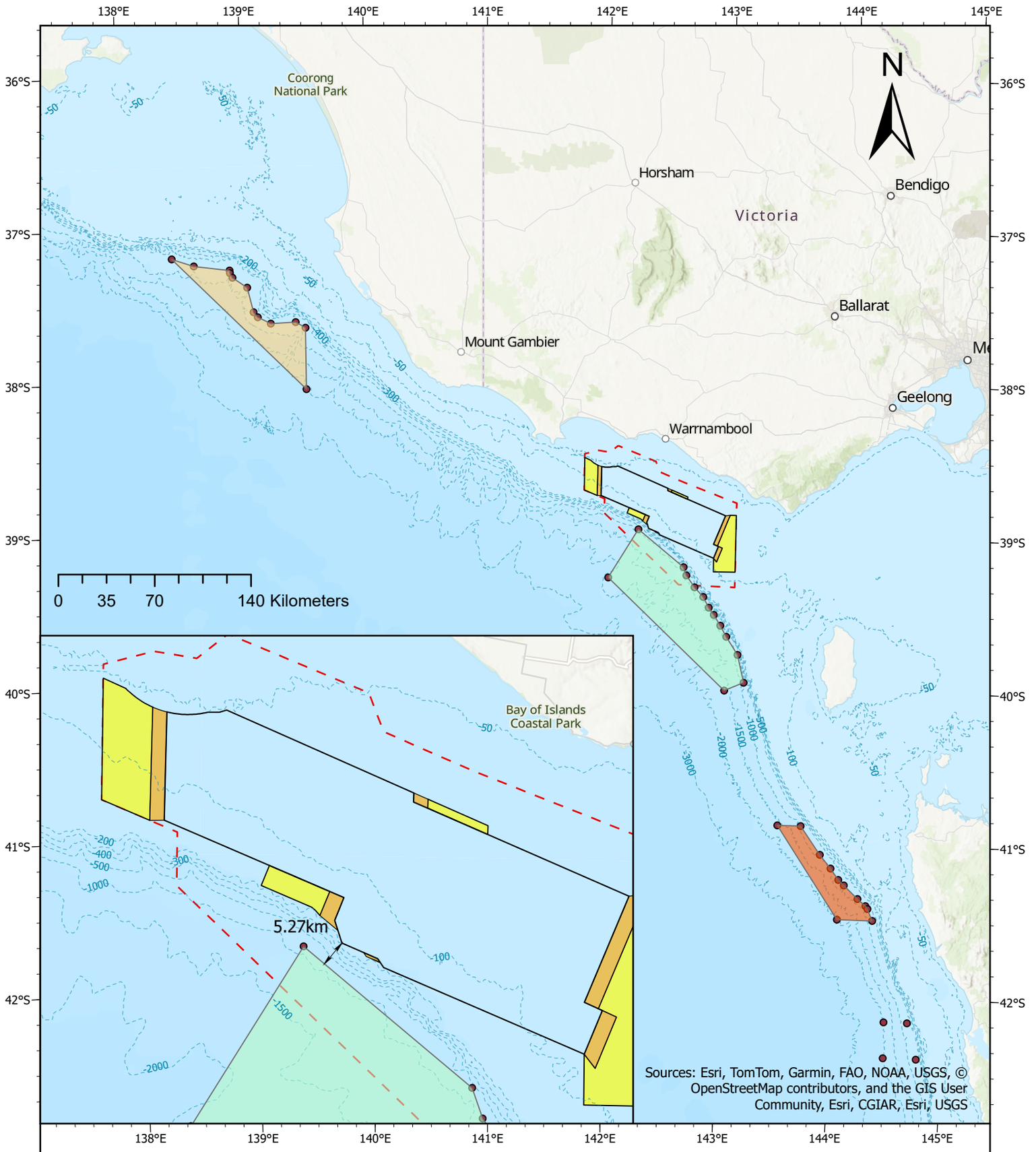
Title - 200m Depth Contour
Document Number - MAP-REG-EPM-048_B

REGIA Marine Seismic Survey

Legend

- Indicative Sail Lines
- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 200m Contour

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



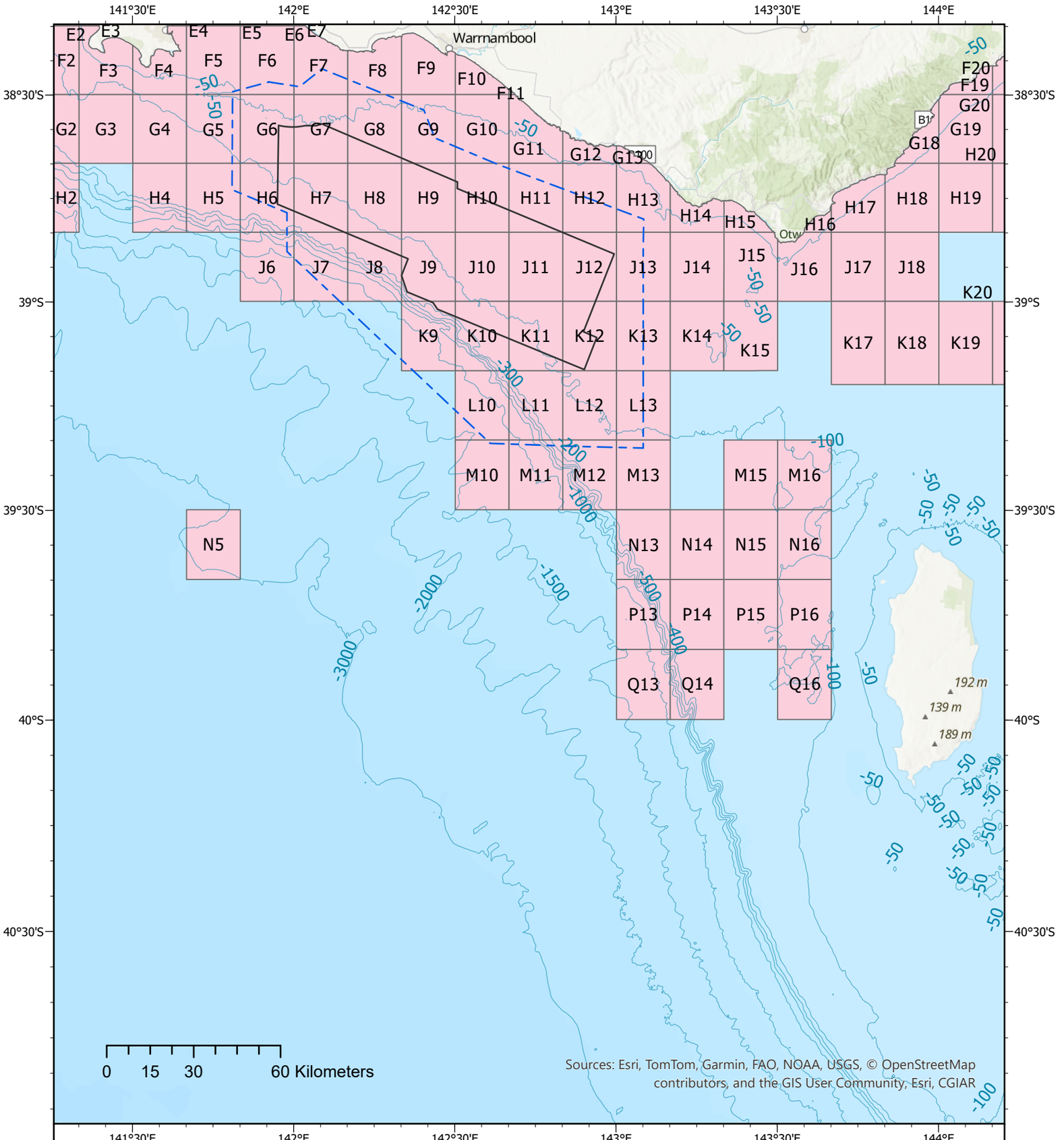
Title - Orange Roughy Study: New Timing
Document Number - MAP-REG-EPM-050_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Orange Roughy Study
- Central Sampling Area
- Southern Sampling Area
- Northern Sampling Area

Spatial Reference
Name: GDA 1994 MGA Zone 54
PCS: GDA 1994 MGA Zone 54
GCS: GCS GDA 1994
Datum: GDA 1994
Projection: Transverse Mercator



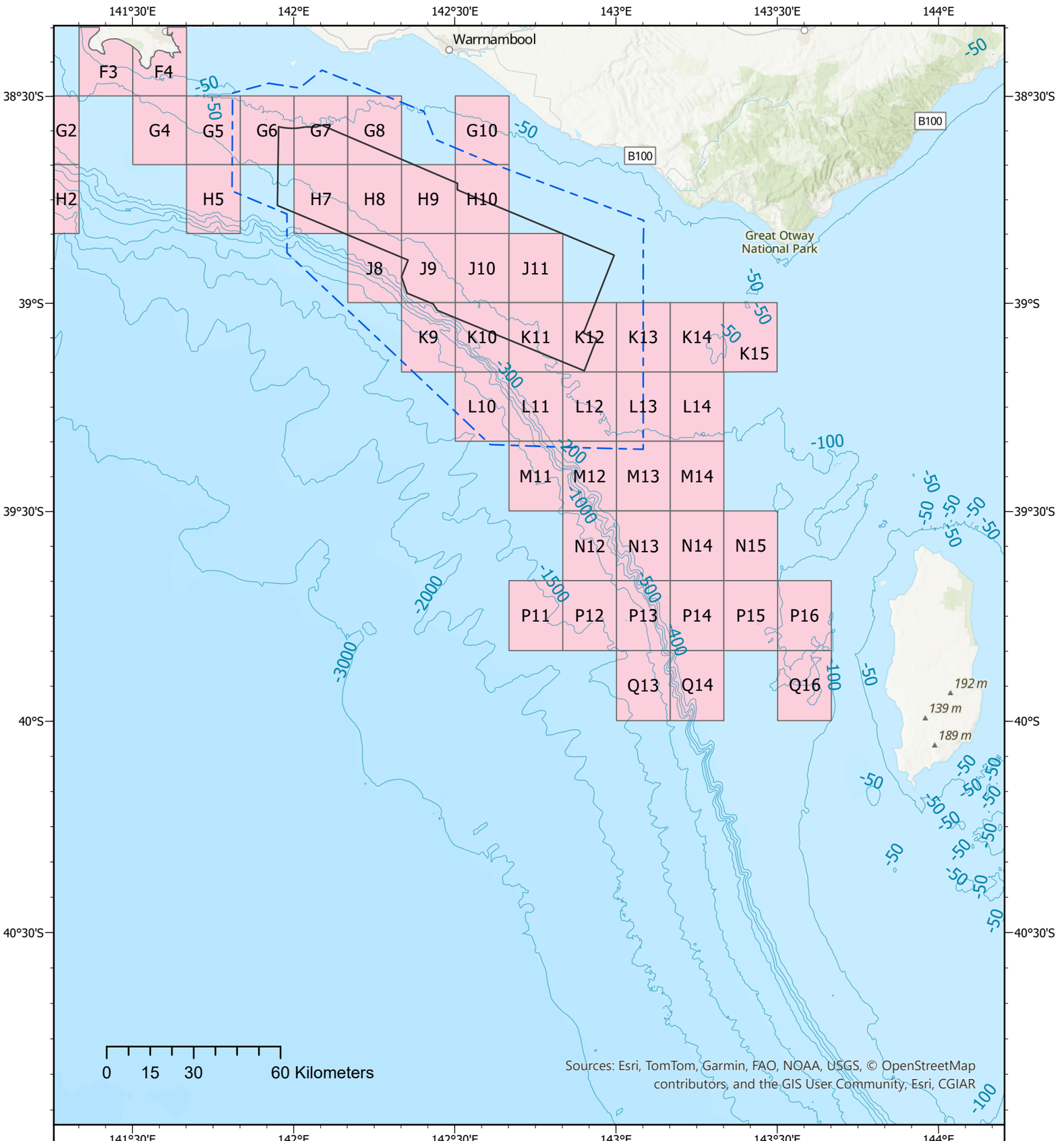
Rock Lobster Fishery - Blocks - 2011-2022 with Bathymetry
Document Number - MAP-REG-EPM-51_B

REGIA Marine Seismic Survey

Legend

- Survey Acquisition Area
- Operational Area
- Bathymetry Contours
- Rock Lobster Fishery - Blocks - 2011-2022

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



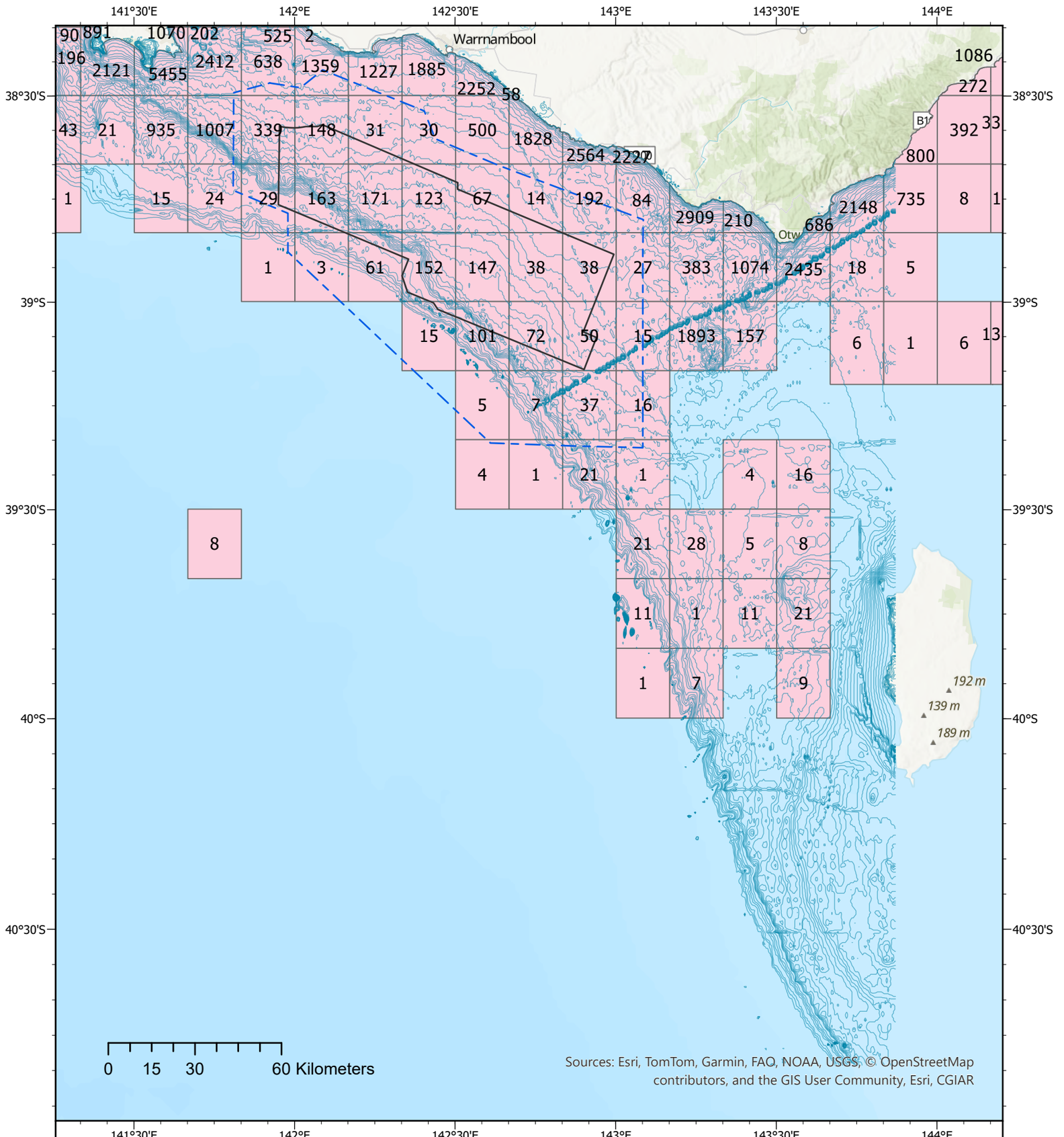
Giant Crab Fishery - Blocks - 2011-2022 with Bathymetry
Document Number - MAP-REG-EPM-54_C

REGIA Marine Seismic Survey

Legend

- Survey Acquisition Area
- Operational Area
- Giant Crab Fishery - Blocks - 2011-2022
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



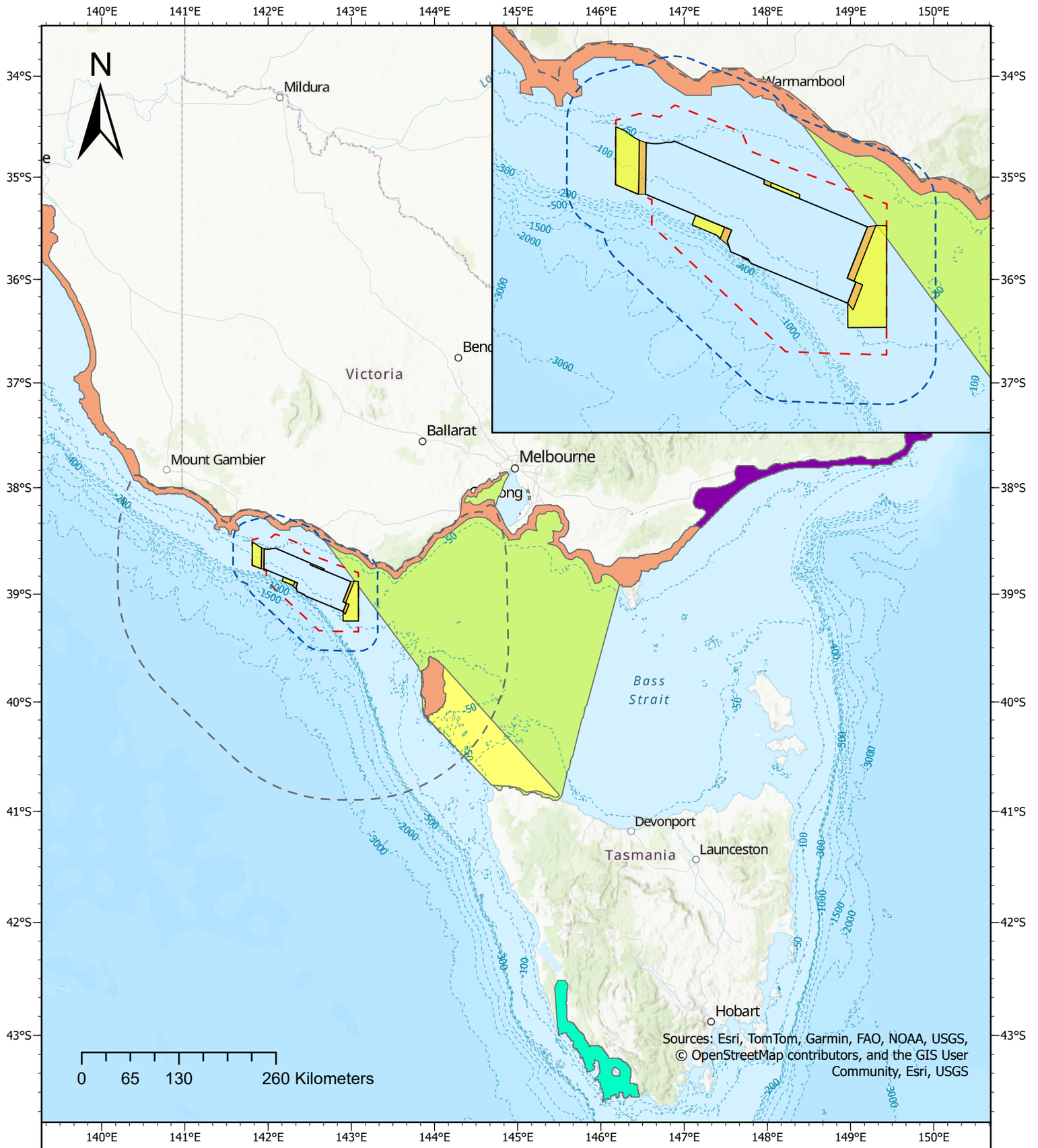
5m Bathymetry and Rock Lobster Fishery - Days Fished (Total) - 2011-2022
Document Number - MAP-REG-EPM-55_C

REGIA Marine Seismic Survey

Legend

- Survey Acquisition Area
- Operational Area
- Rock Lobster Fishery - Days Fished (Total) - 2011-2022
- 5m Bathymetry

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



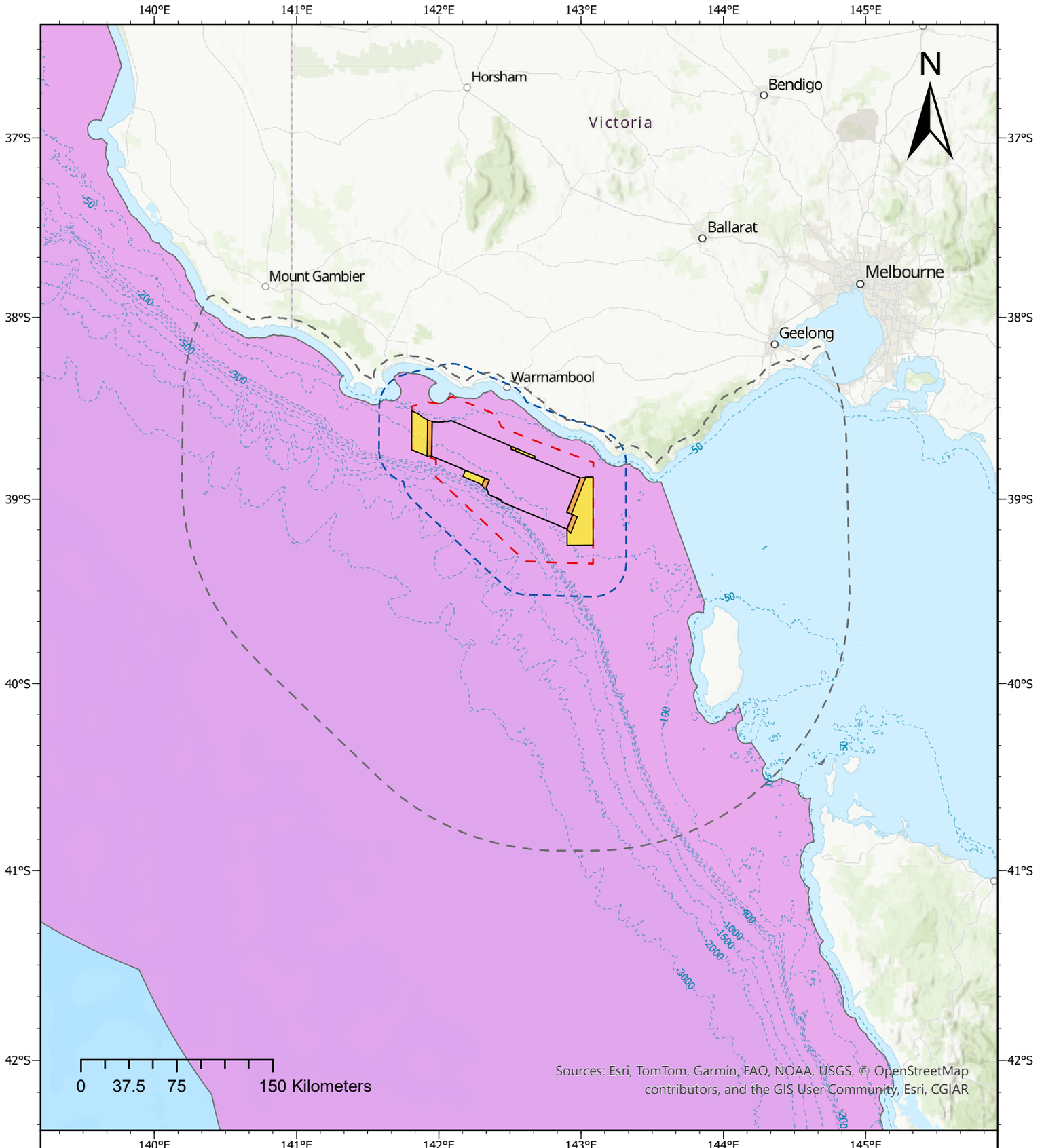
Title - Orange Bellied Parrot Migration BIAs
Document Number - MAP-REG-EPM-058_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 20km Light EMBA
- Non Breeding Range
- Infrequent Non Breeding
- Migration Route
- Breeding Range
- Probable Migration
- Environmental Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



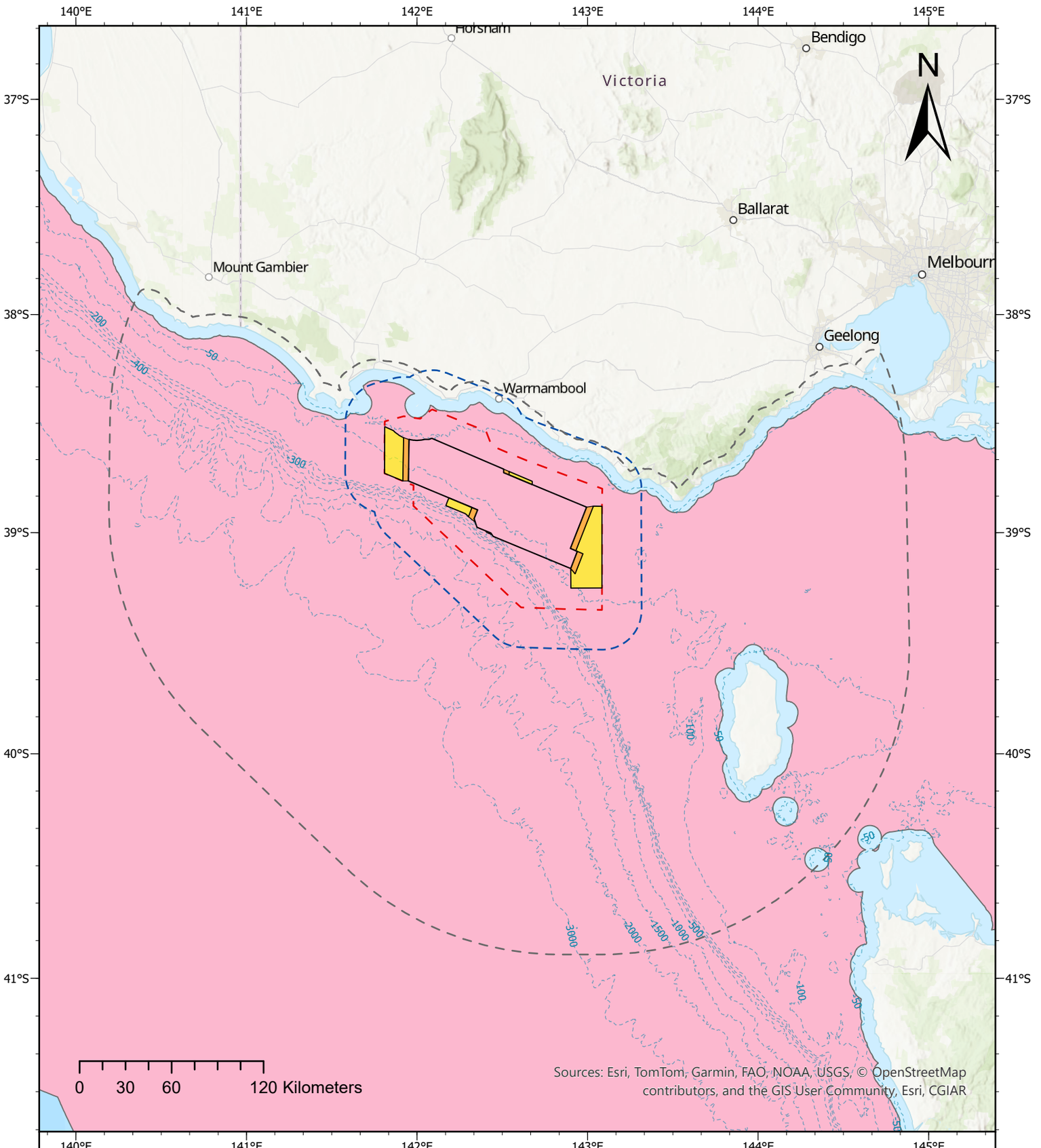
Title - Antipodean Albatross Biologically Important Areas
Document Number - MAP-REG-EPM-059_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 20km Light EMBA
- Antipodean Albatross - Foraging
- Environmental Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



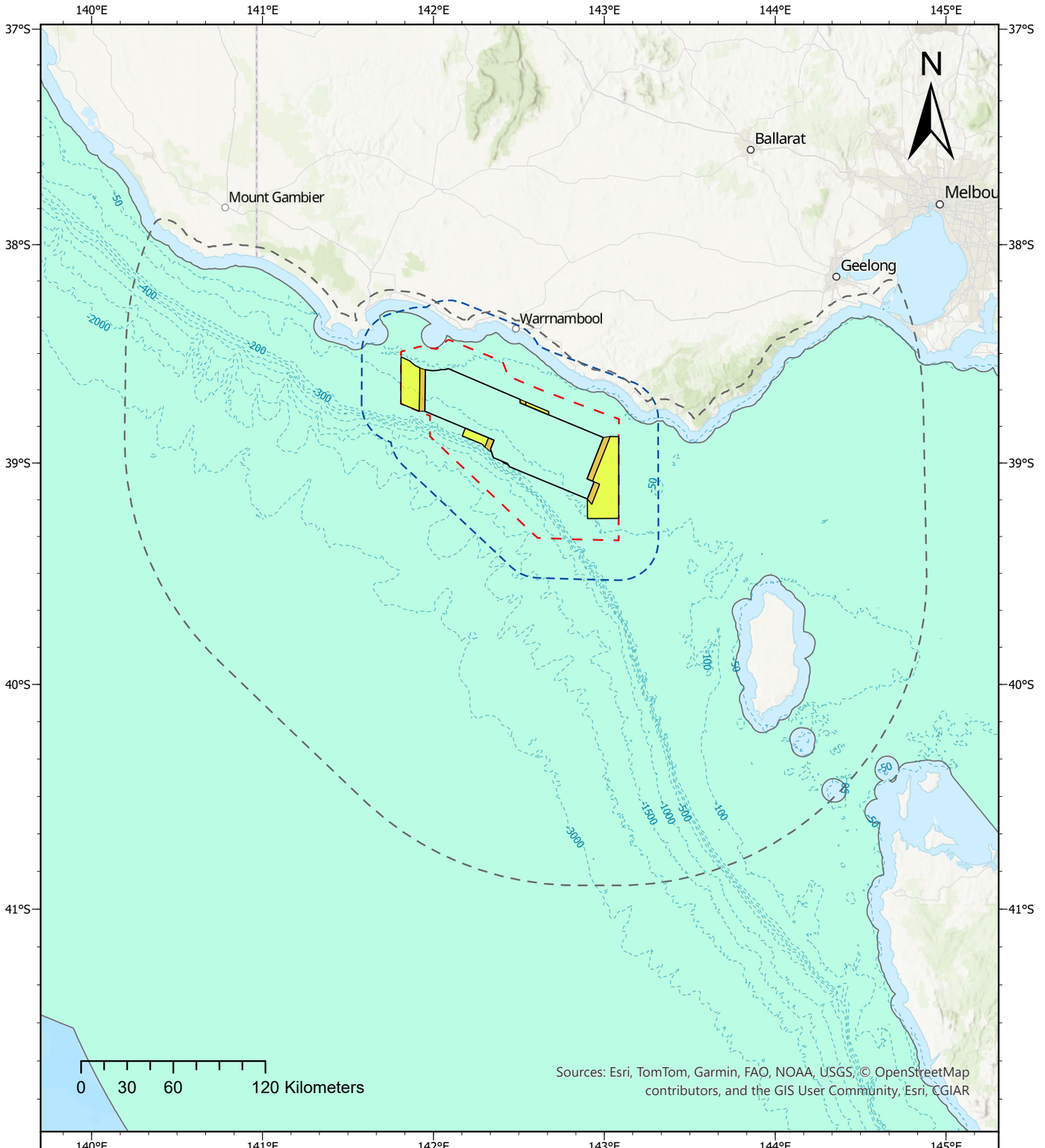
Title - Black Browed Albatross Biologically Important Areas
Document Number - MAP-REG-EPM-060_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- 20km Light EMBA
- Black Browed Albatross Foraging

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



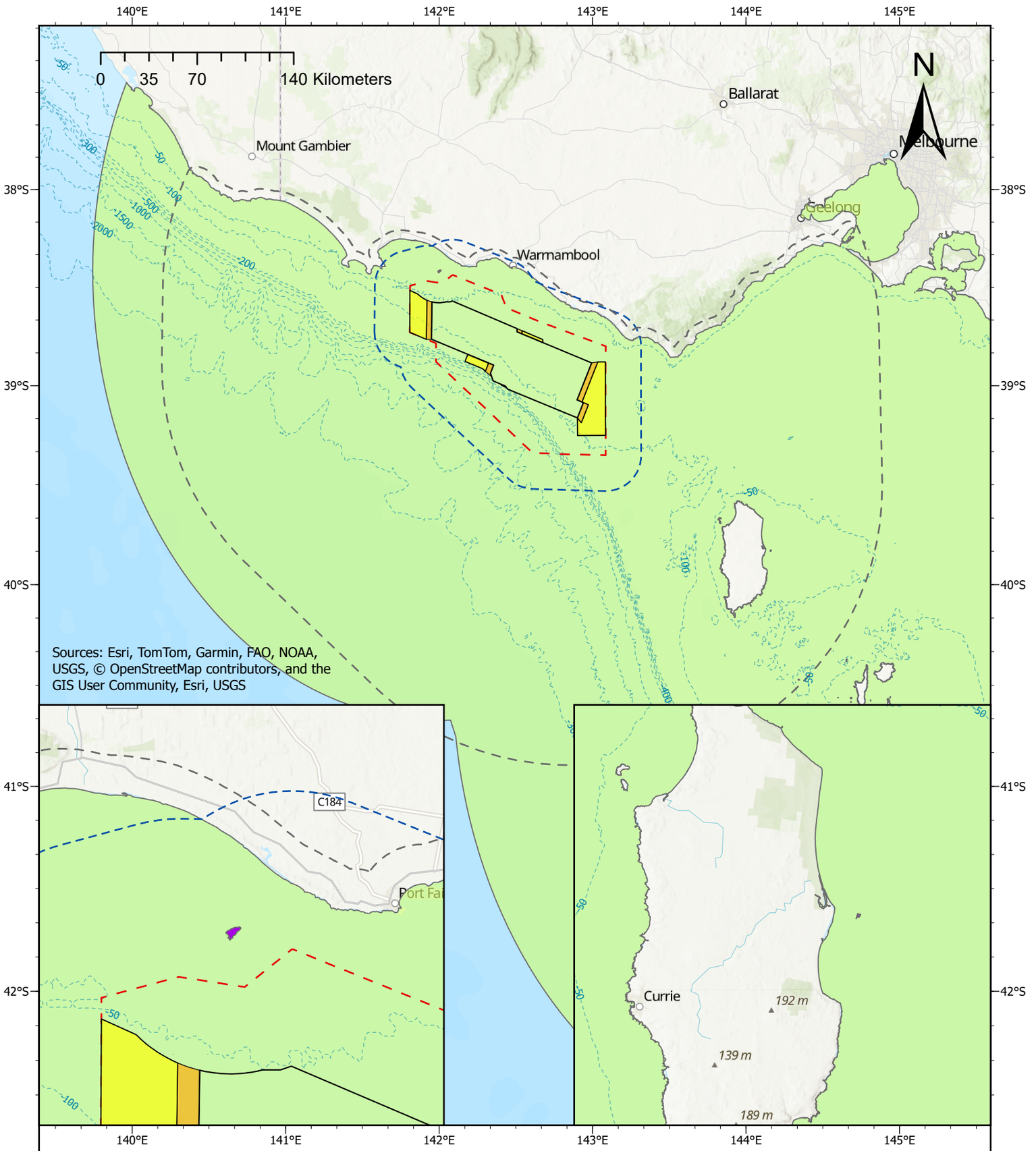
Title - Campbell Albatross Biologically Important Areas
Document Number - MAP-REG-EPM-061_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 20km Light EMBA
- Campbell Albatross Foraging
- Environmental Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



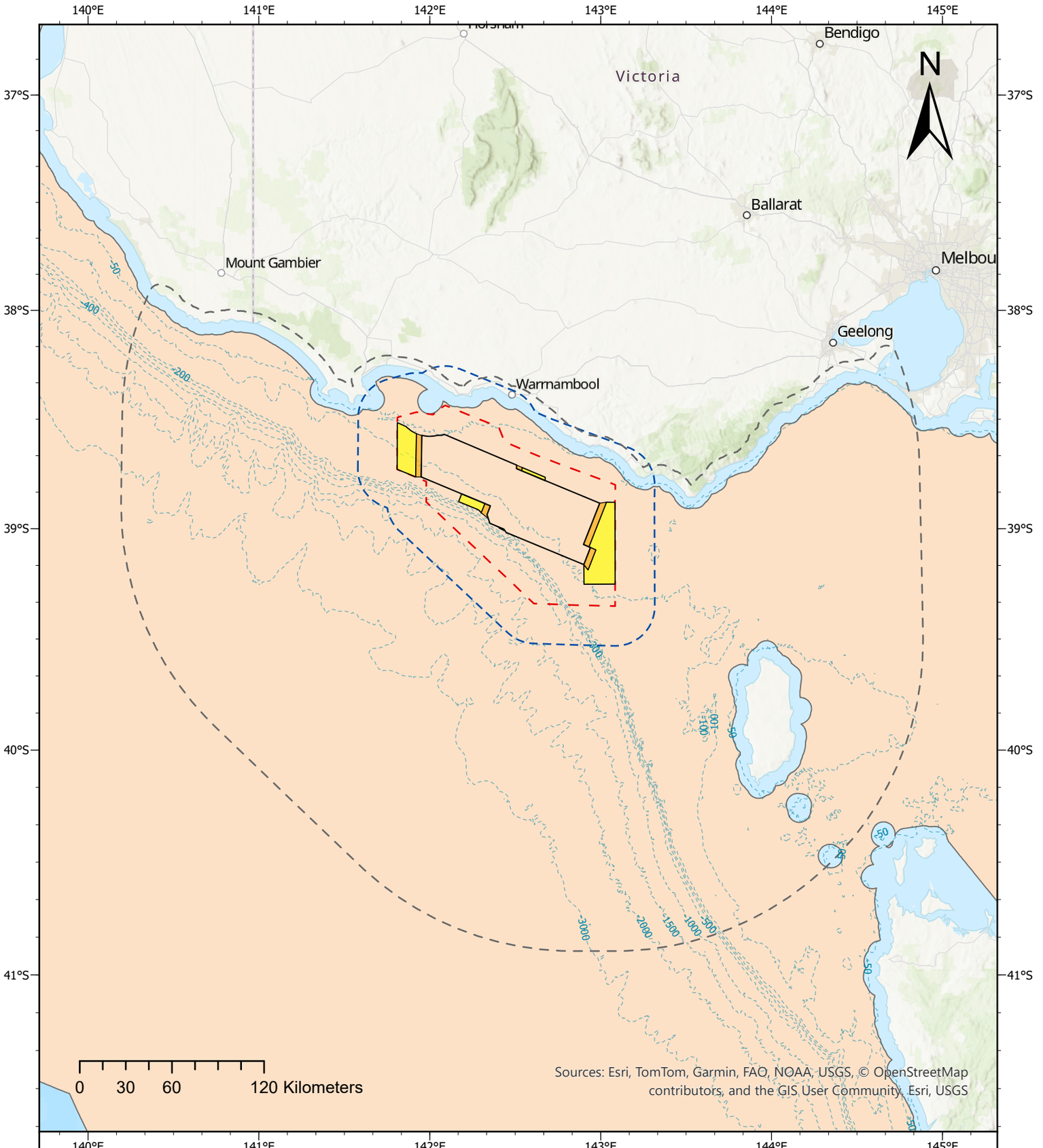
Title - Common Diving Petrel Biologically Important Areas
Document Number - MAP-REG-EPM-062_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- 20km Light EMBA
- Common Diving Petrel Breeding
- Common Diving Petrel Foraging

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



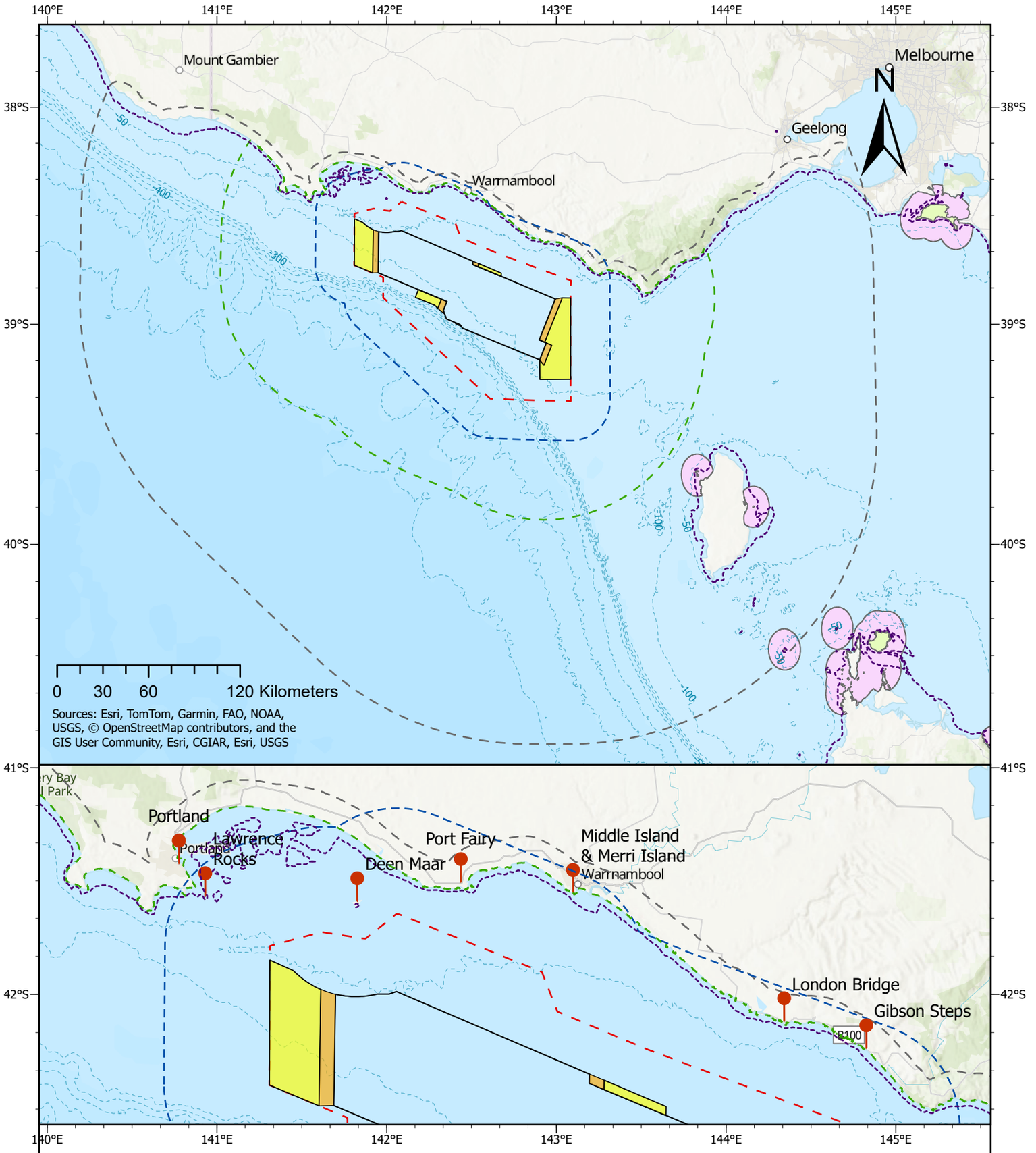
Title - Indian Yellow Nosed Albatross Biologically Important Areas
Document Number - MAP-REG-EPM-063_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- 20km Light EMBA
- Indian Yellow Nosed Albatross Foraging

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



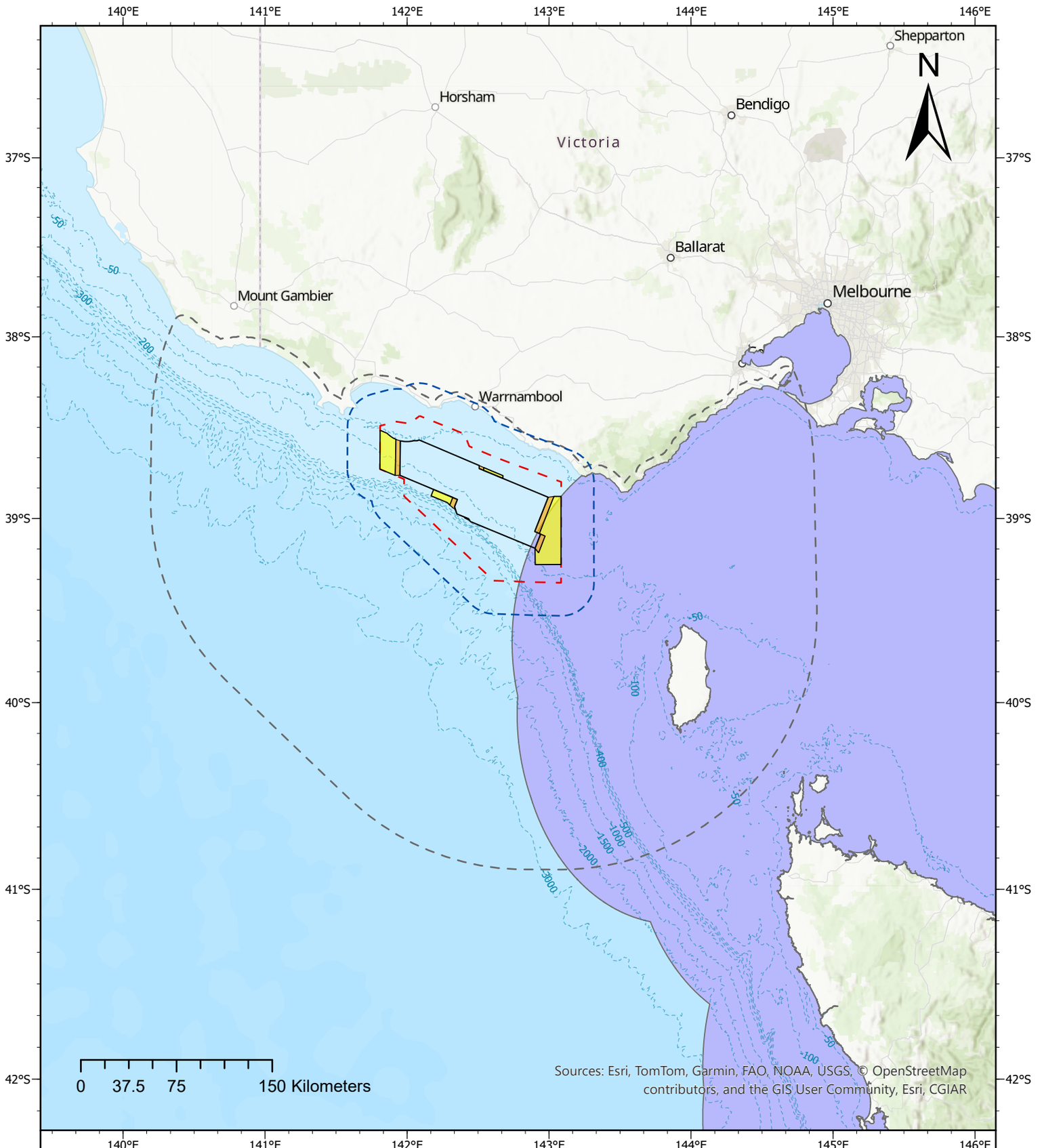
Title - Little Penguin Biologically Important Areas and Colonies
Document Number - MAP-REG-EPM-064_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 20km Light EMBA
- 78km 120db Sound EMBA
- Environmental Planning Area
- Little Penguin Breeding
- Little Penguin Foraging
- 20m Bathymetry Contour

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



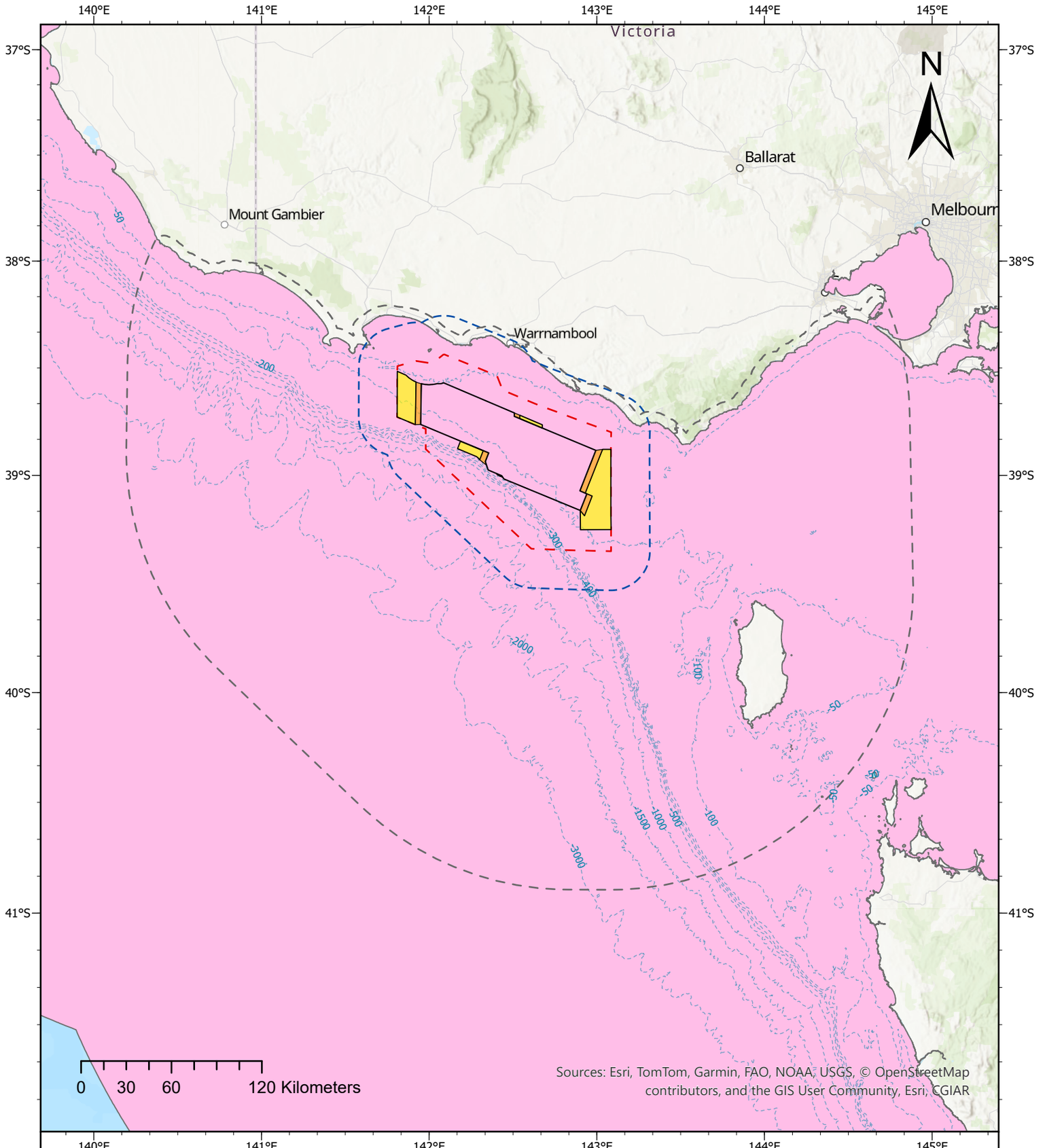
Title - Short Tailed Shearwater Biologically Important Areas
Document Number - MAP-REG-EPM-065_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 20km Light EMBA
- Environmental Planning Area
- Short Tailed Shearwater Foraging

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



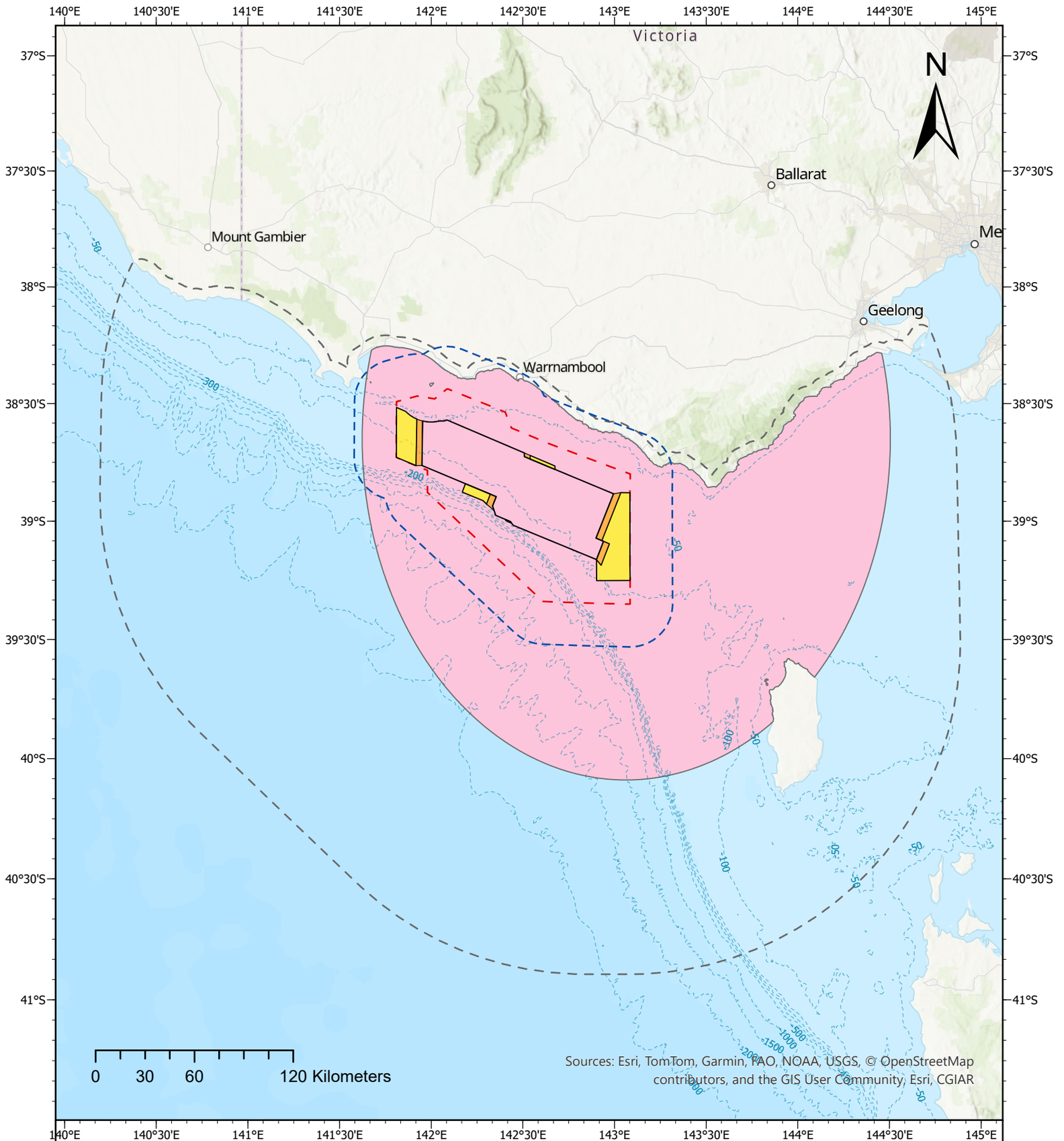
Title - Shy Albatross Foraging Biologically Important Areas
Document Number - MAP-REG-EPM-066_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- 20km Light EMBA
- Shy Albatross Foraging Likely

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



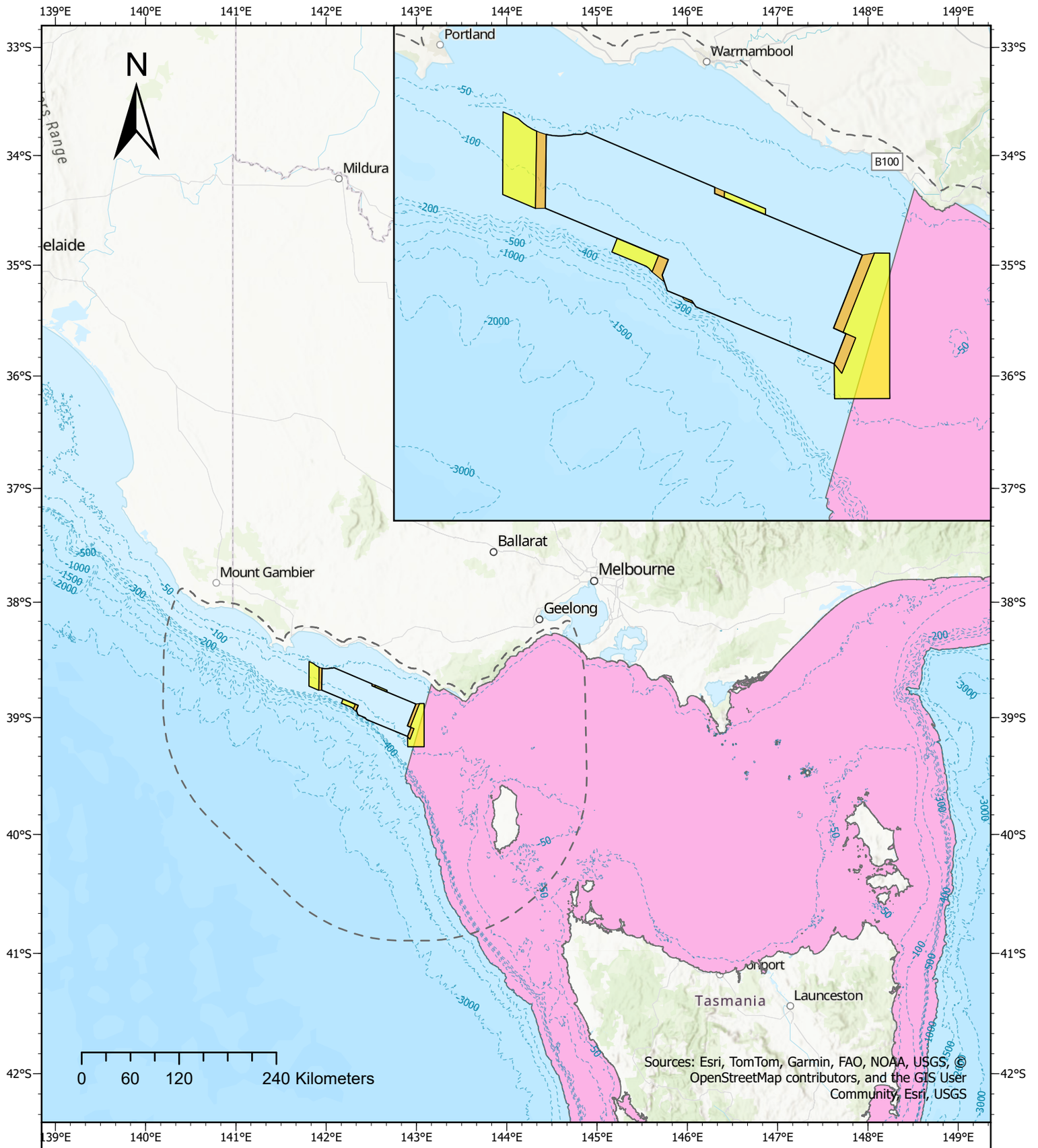
Title - Wedge Tailed Shearwater Biologically Important Areas
Document Number - MAP-REG-EPM-067_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 20km Light EMBA
- Environmental Planning Area
- Wedge Tailed Shearwater Foraging

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



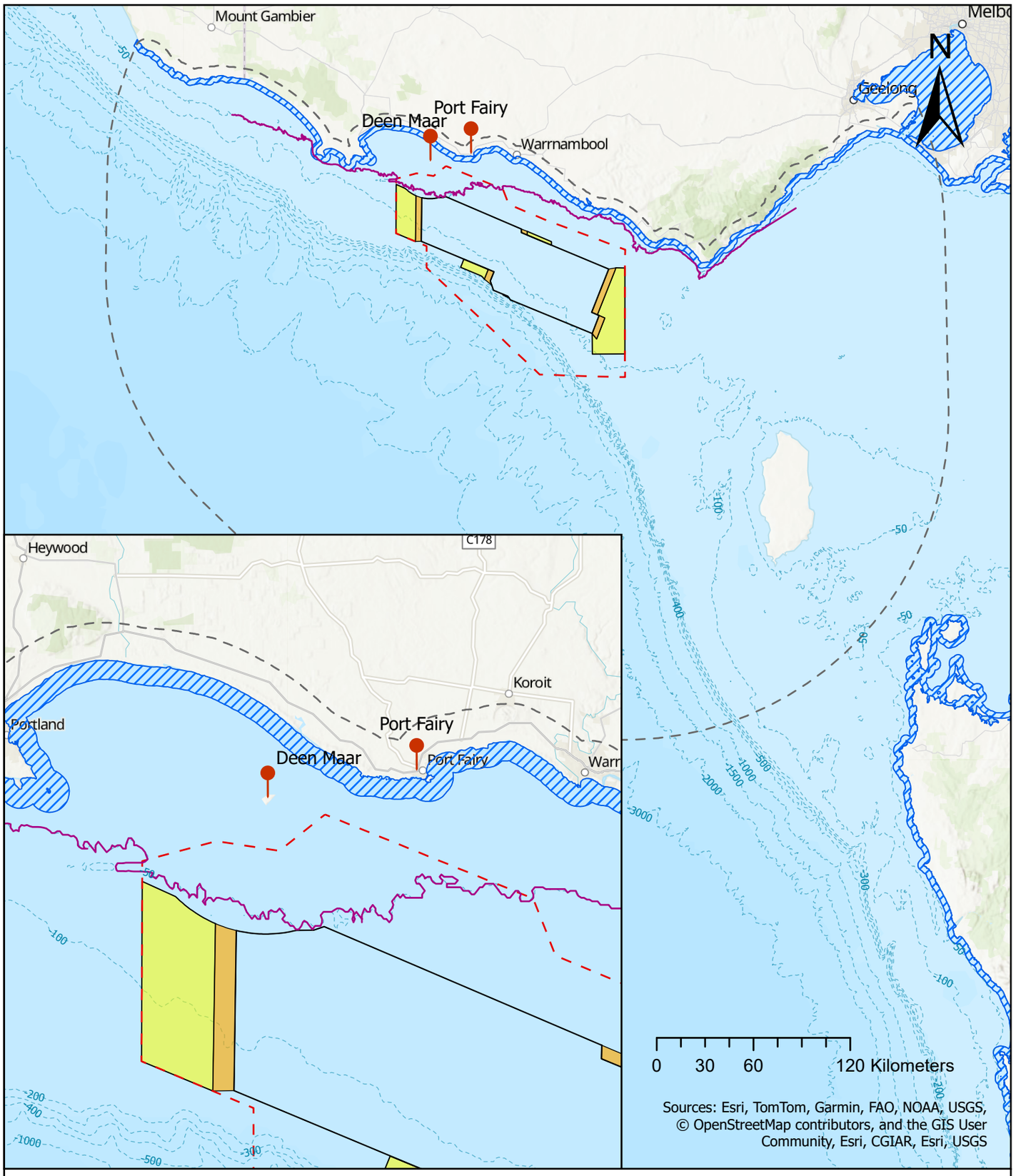
Title - Pygmy Blue Whale Biologically Important Areas (Known Foraging)
Document Number - MAP-REG-EPM-068_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- Pygmy Blue Whale Known Foraging Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



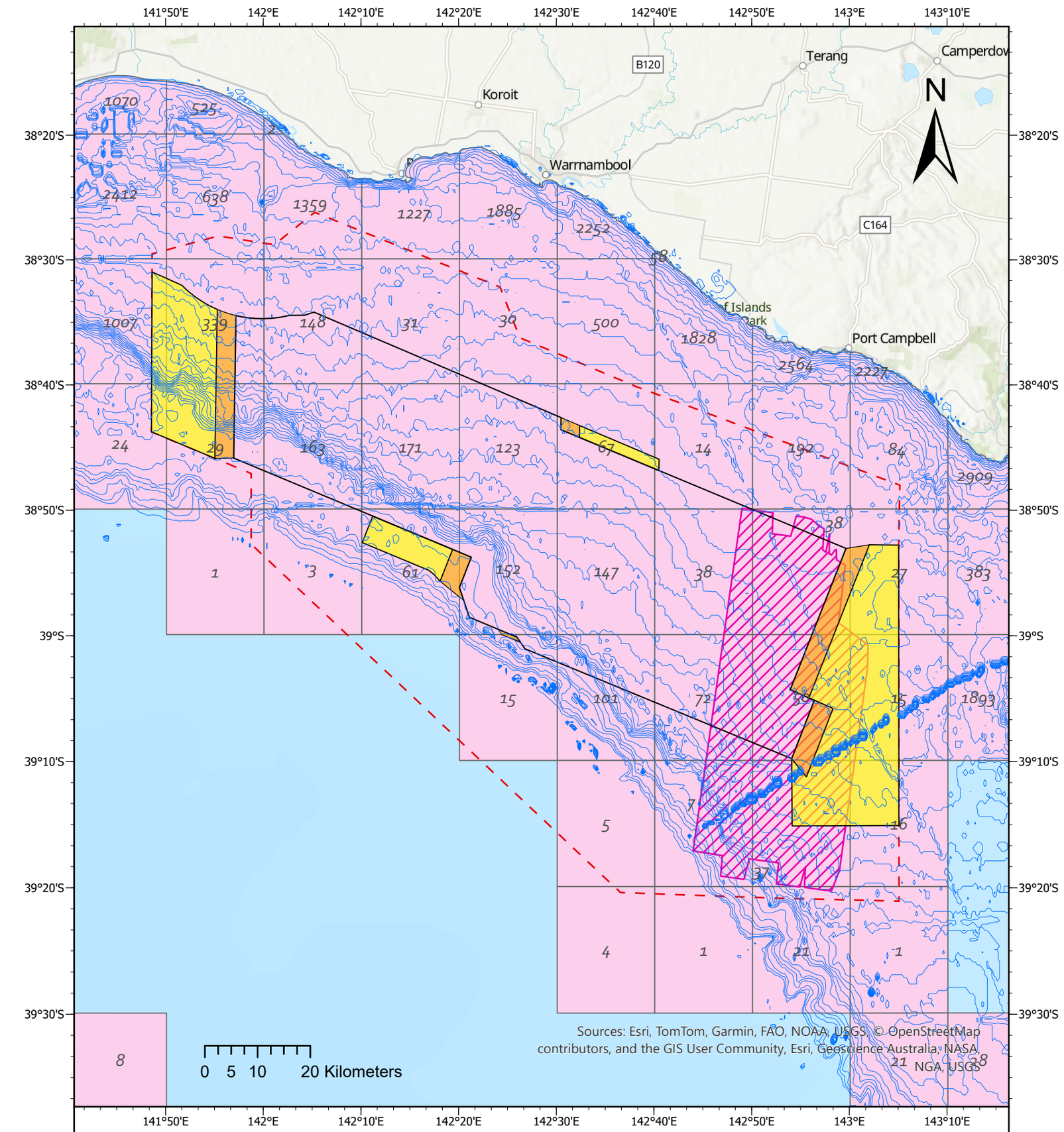
Title - Southern Right Whale Reproductive BIA
Document Number - MAP-REG-EPM-069_D

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 50m Contour
- Environmental Planning Area
- Southern Right Whale Reproduction BIA

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



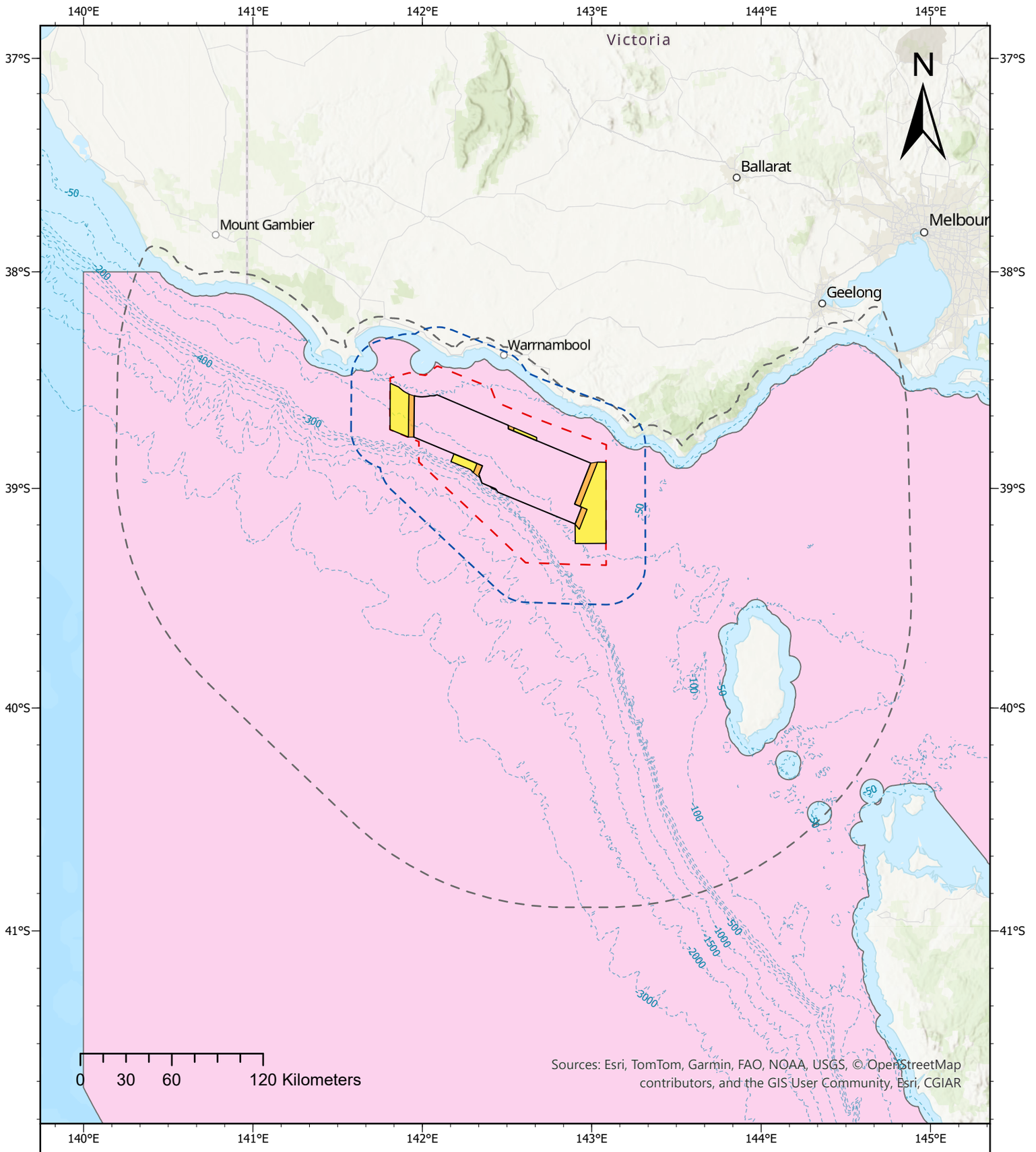
Title - 5m Bathymetry & Rock Lobster Fishing Days - Investigator
Document Number - MAP-REG-EPM-070_B

REGIA Marine Seismic Survey

Legend

- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 5m Bathymetry
- Investigator MSS
- Rock Lobster 2011-2022_RFI

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



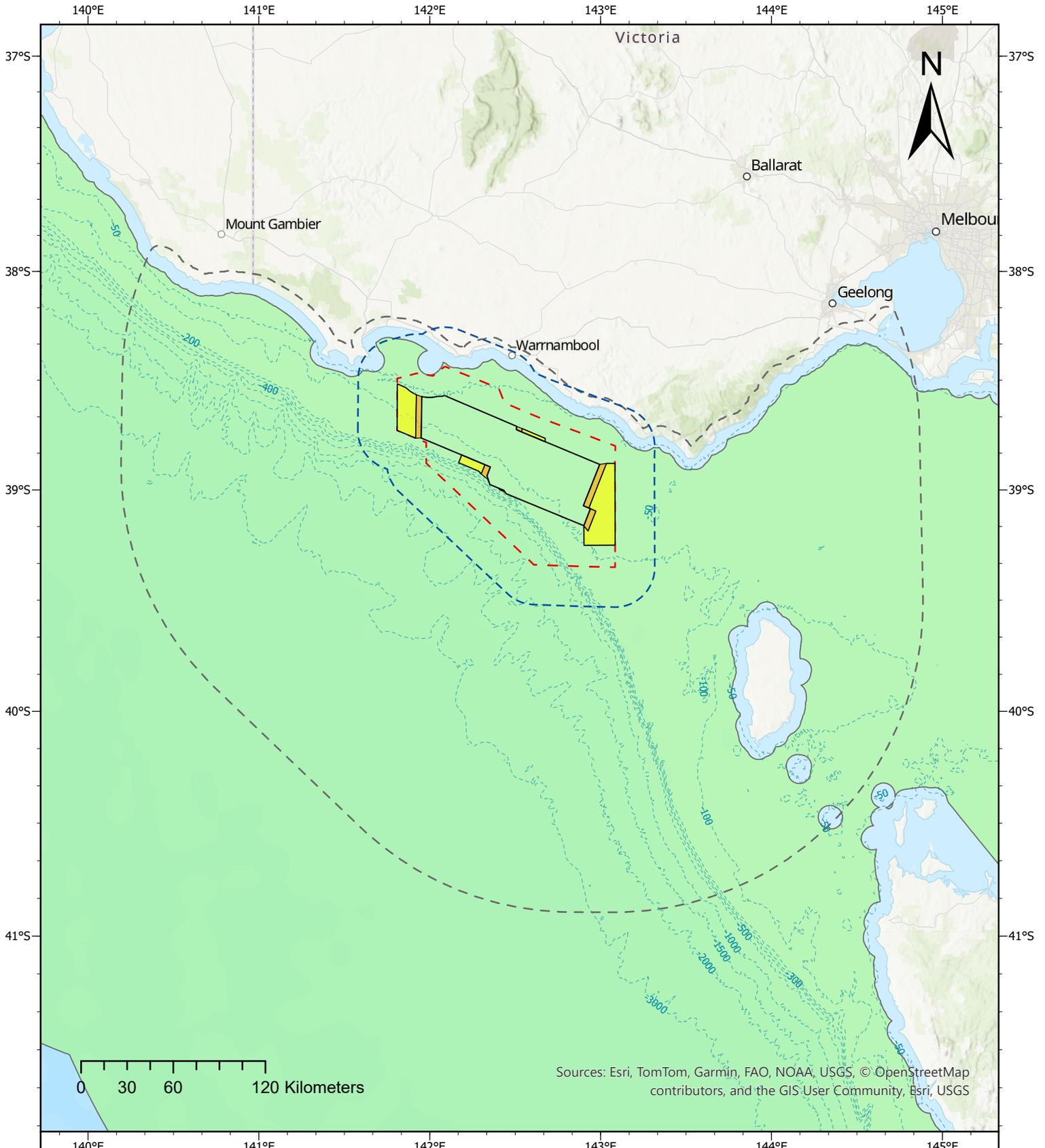
Title - Buller's Albatross Biologically Important Areas
Document Number - MAP-REG-EPM-071_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 20km Light EMBA
- Environmental Planning Area
- Bullers Albatross Foraging

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



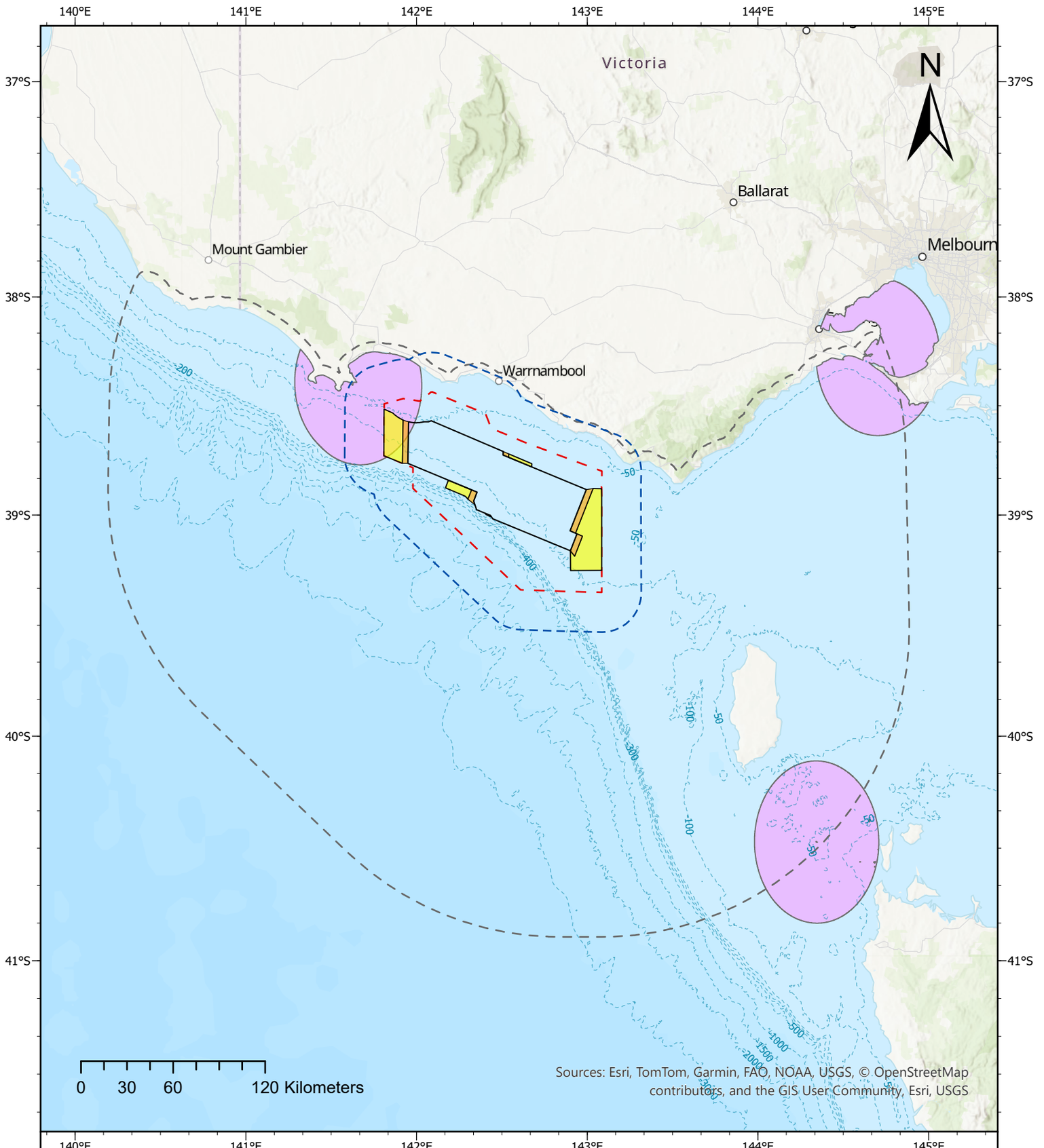
Title - Wandering Albatross Biologically Important Areas
Document Number - MAP-REG-EPM-072_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 20km Light EMBA
- Environmental Planning Area
- Wandering Albatross Foraging

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



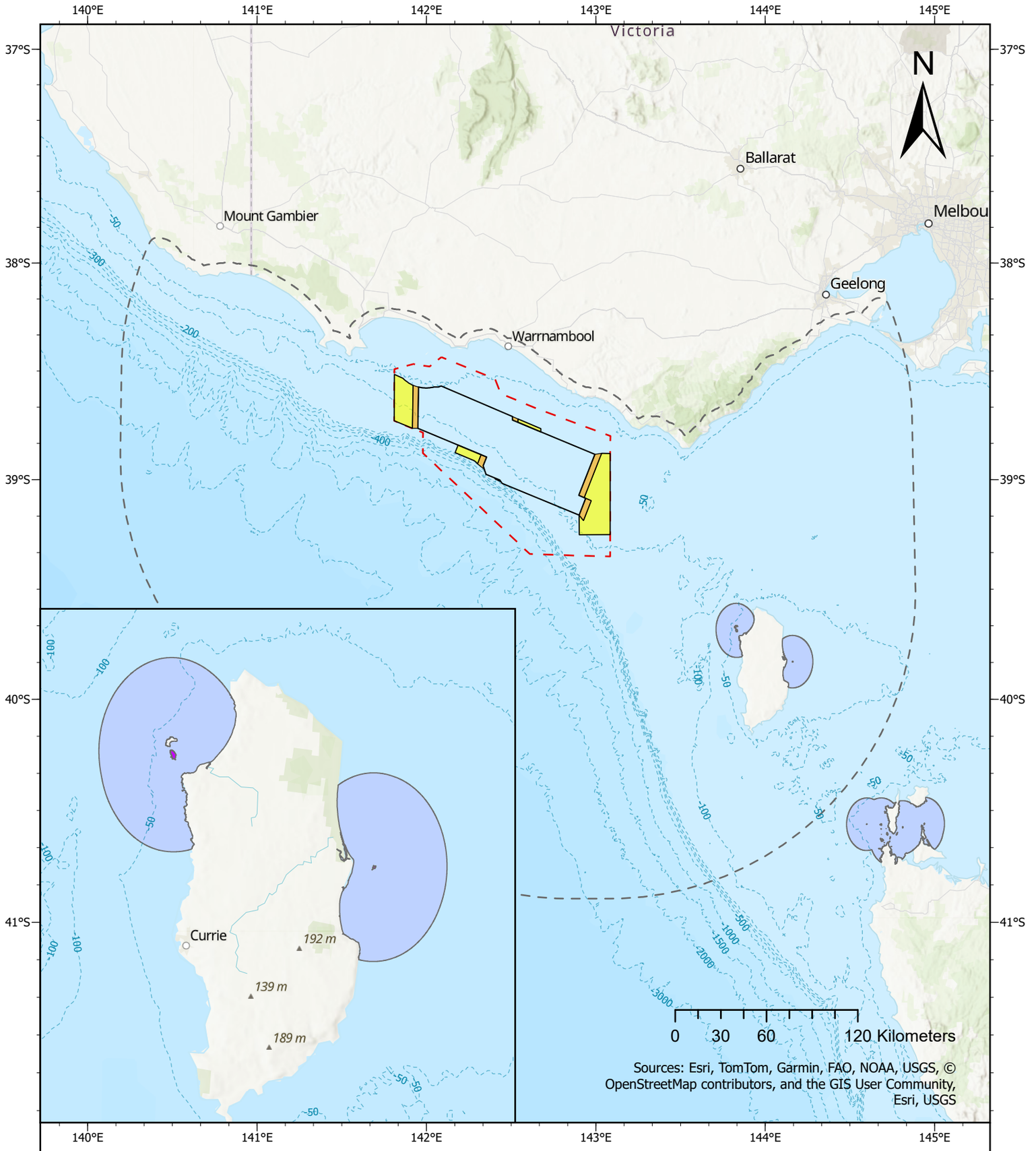
Title - Australasian Gannet Biologically Important Areas
Document Number - MAP-REG-EPM-073_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 20km Light EMBA
- Environmental Planning Area
- Australian Gannet Foraging

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



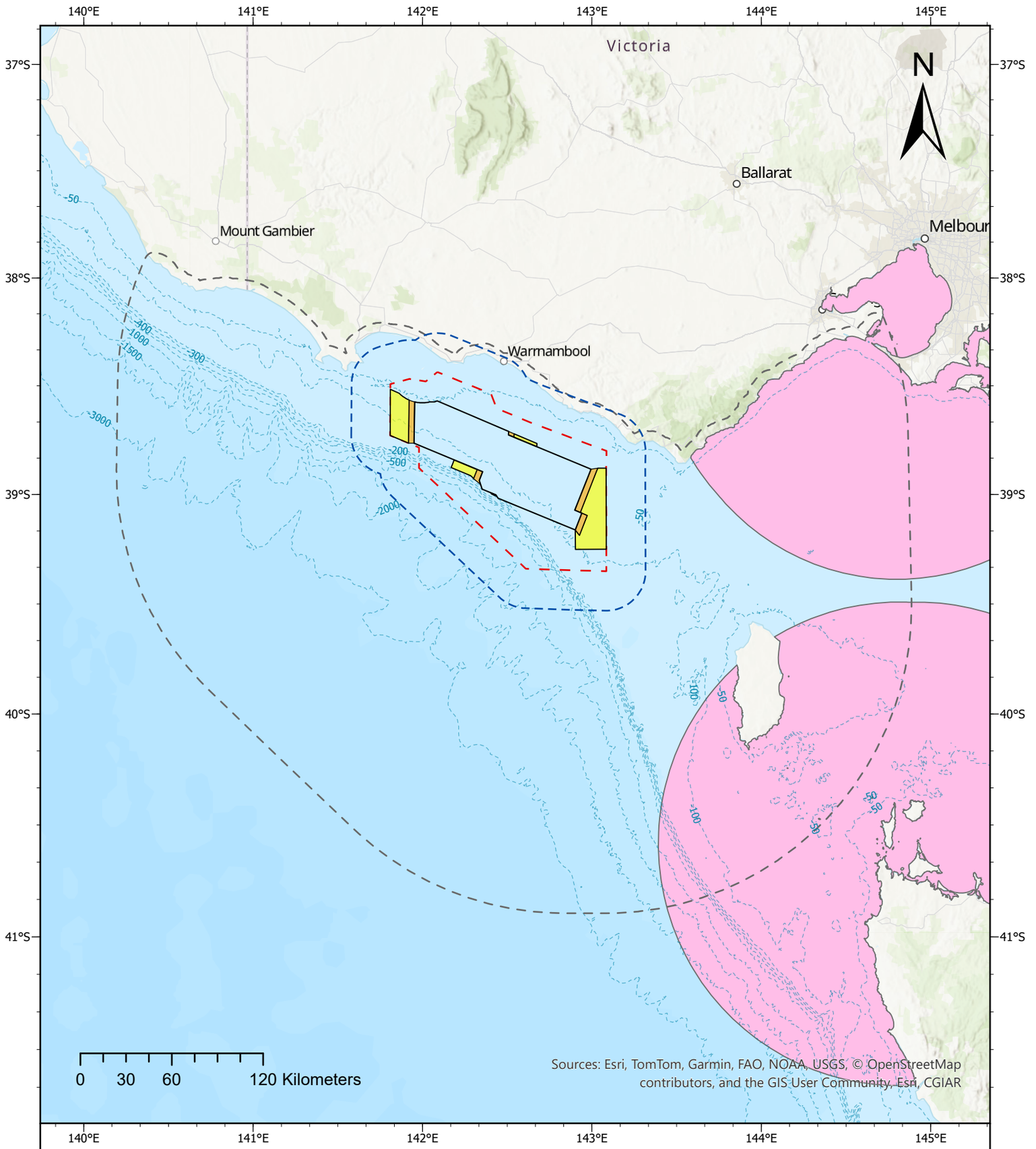
Title - Black Faced Corrmorant Biologically Important Areas
Document Number - MAP-REG-EPM-074_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- Black Faced Cormorant Breeding
- Black Faced Cormorant Foraging

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



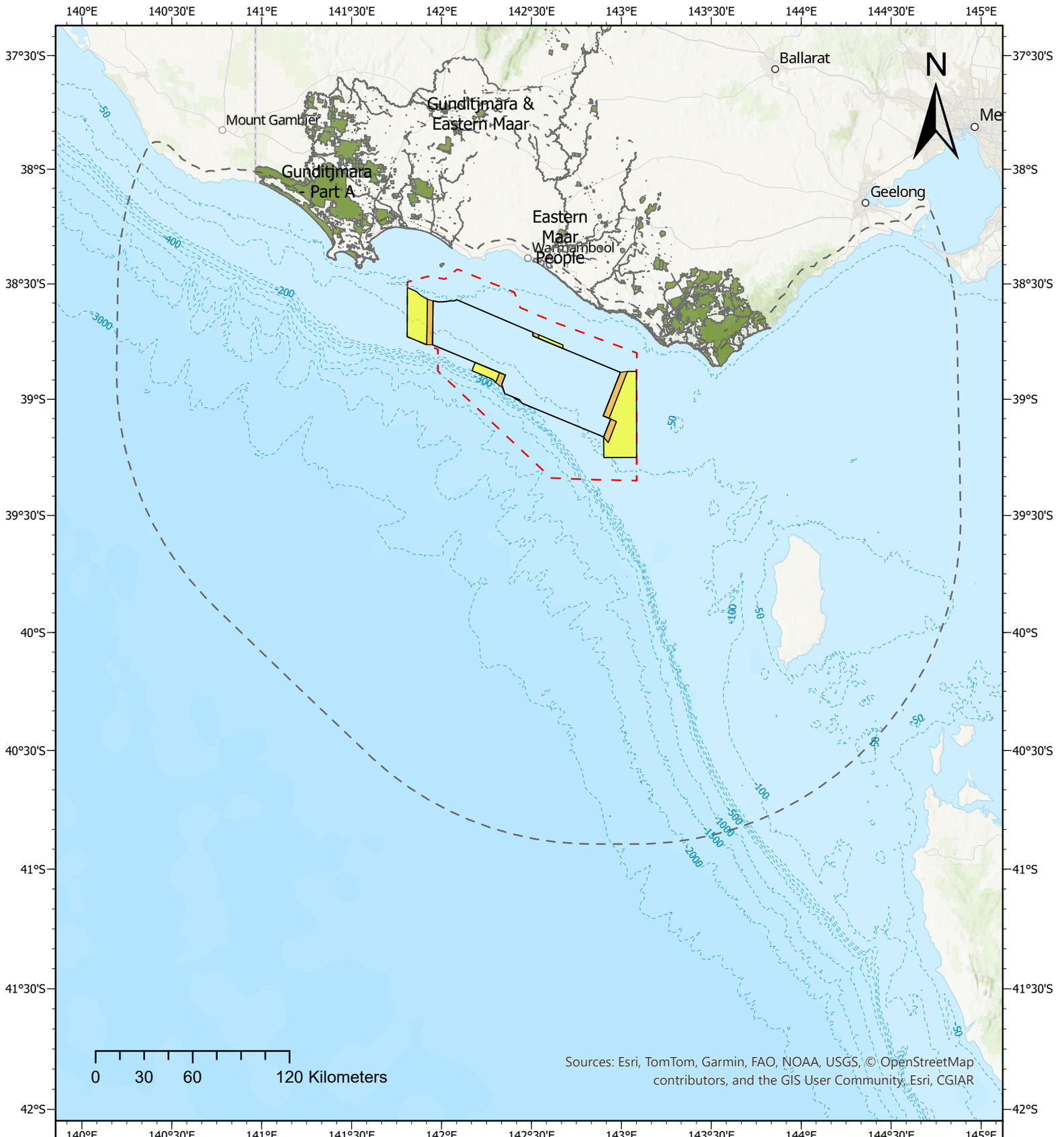
Title - White Face Storm Petrel Biologically Important Areas
Document Number - MAP-REG-EPM-075_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- White Faced Storm Petrel Foraging
- 20km Light EMBA

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



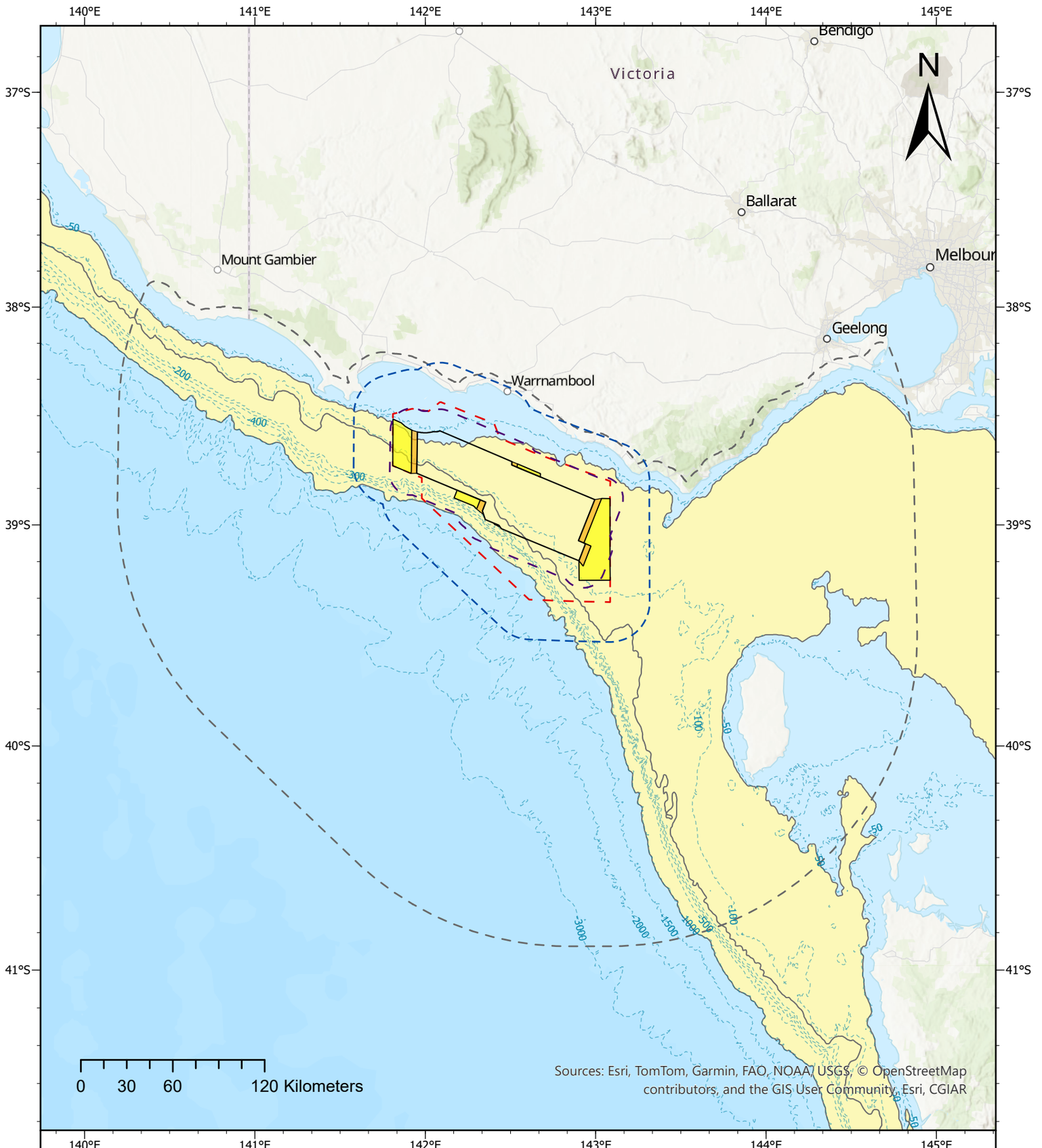
Title - Native Title and Registered Aboriginal Parties
Document Number - MAP-REG-EPM-076_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- Native Title Determinations

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



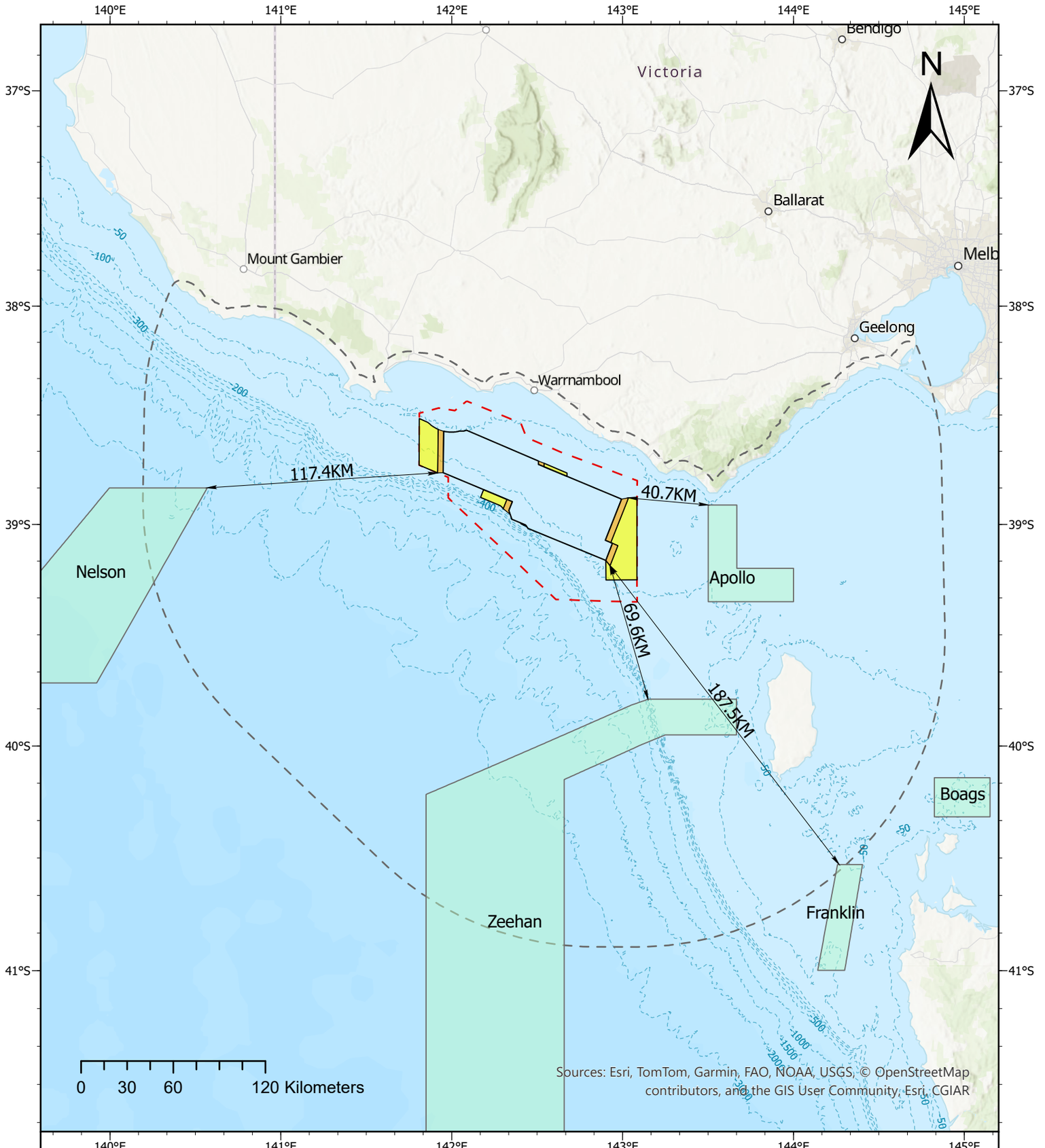
Title - White Shark Biologically Important Areas - Distribution
Document Number - MAP-REG-EPM-077_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- White Shark Distribution
- 20km Light EMBA
- 11km Fish Sound EMBA

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



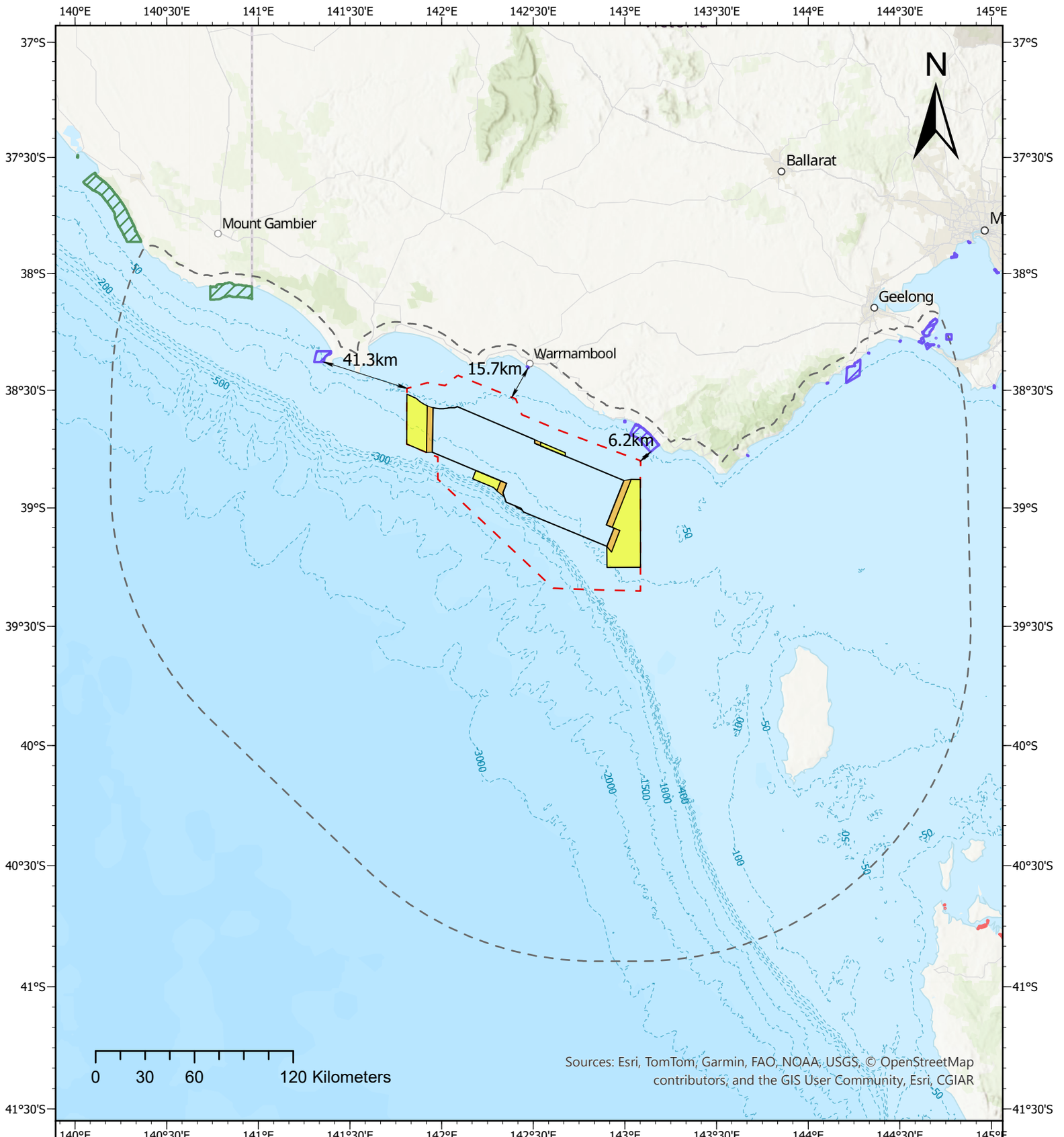
Title - Australian Marine Parks (Active Source Area Distances)
Document Number - MAP-REG-EPM-078_D

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Australian Marine Parks
- Environmental Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Title - State Marine Protected Areas
Document Number - MAP-REG-EPM-079_B

REGIA Marine Seismic Survey

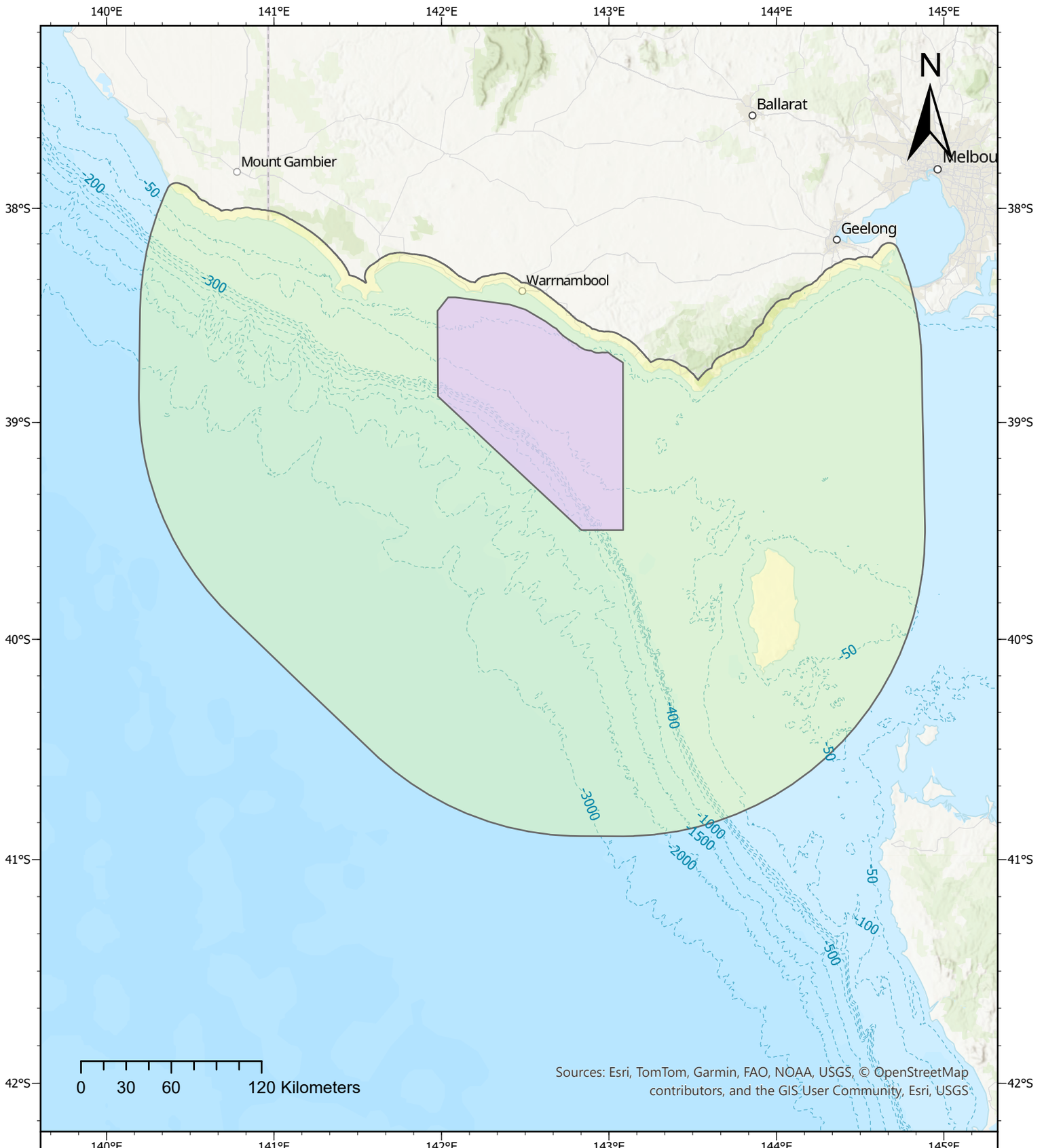
Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area

State Marine Parks

- South Australia
- Tasmania
- Victoria

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



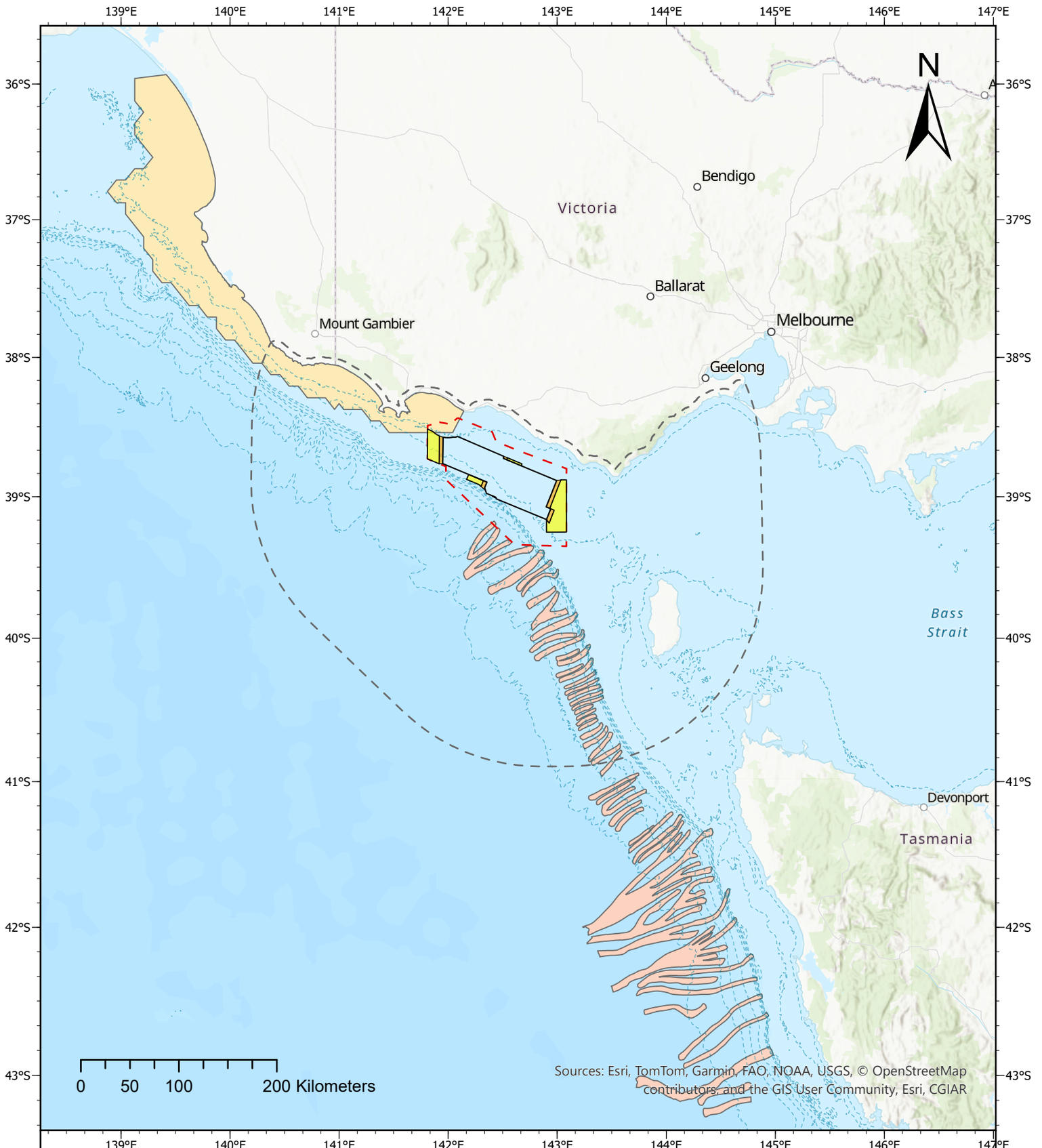
Title - Initial Planning Areas
Document Number - MAP-REG-EPM-080_A

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Activity Planning Area
- Environmental Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



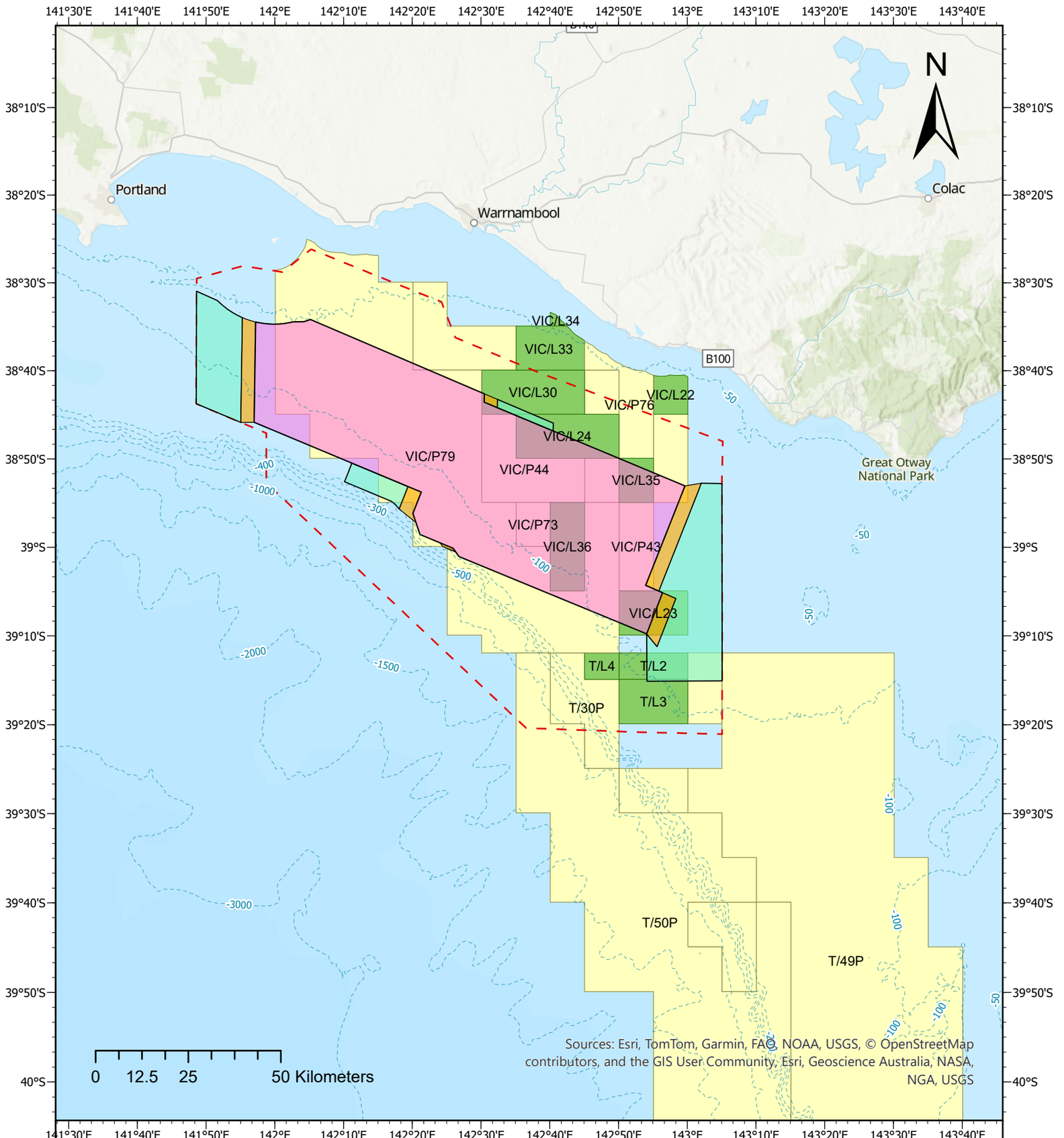
Title - Key Ecological Features
Document Number - MAP-REG-EPM-081_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Environmental Planning Area
- West Tasmanian Canyons Key Ecological Feature
- Bonney Coast Upwelling Key Ecological Feature

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Title - Active Source Area & Titles
Document Number - MAP-REG-EPM-082_B

REGIA Marine Seismic Survey

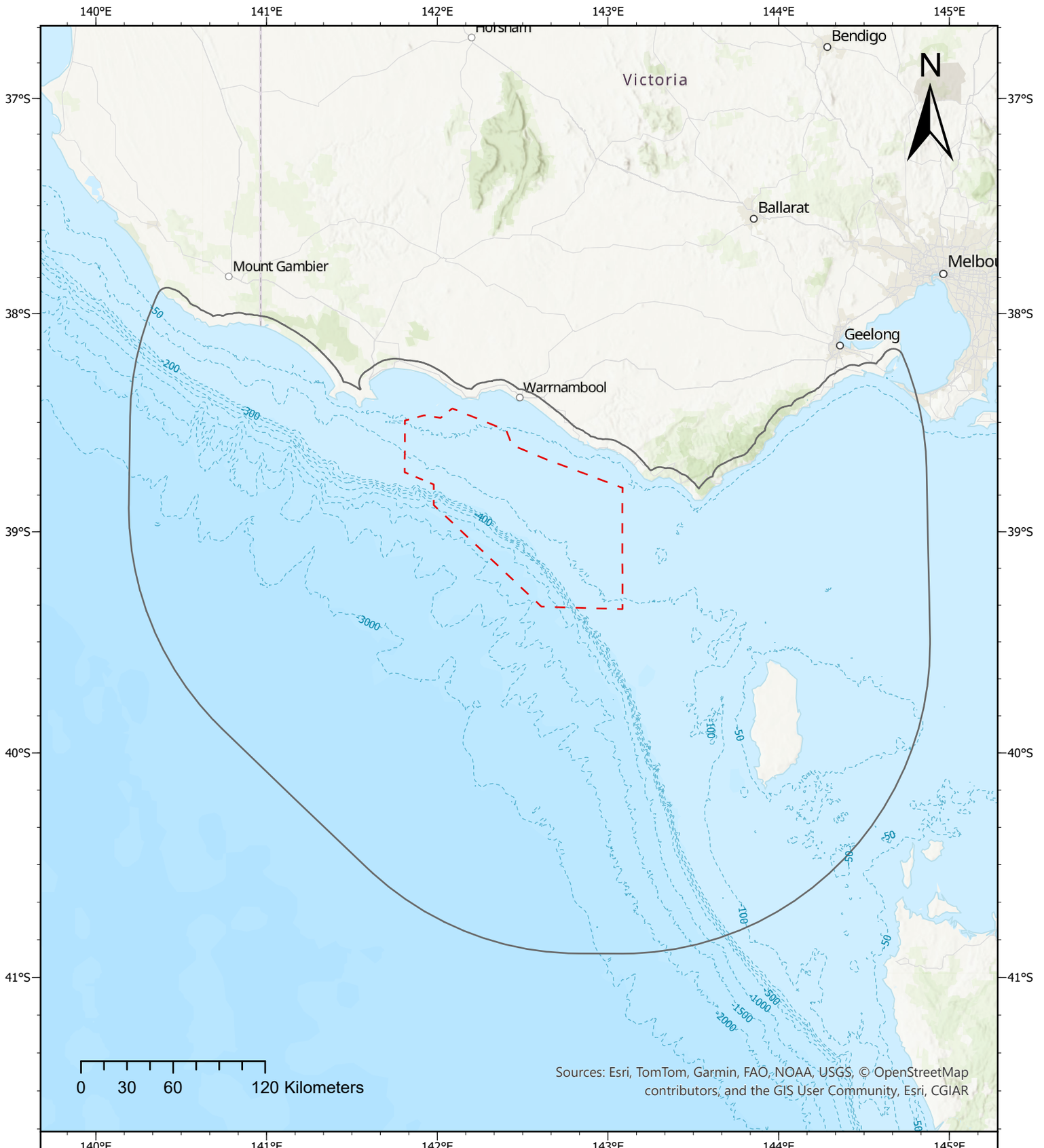
Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area

Titles and Permits Current

- Exploration Permit
- Production Licence

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



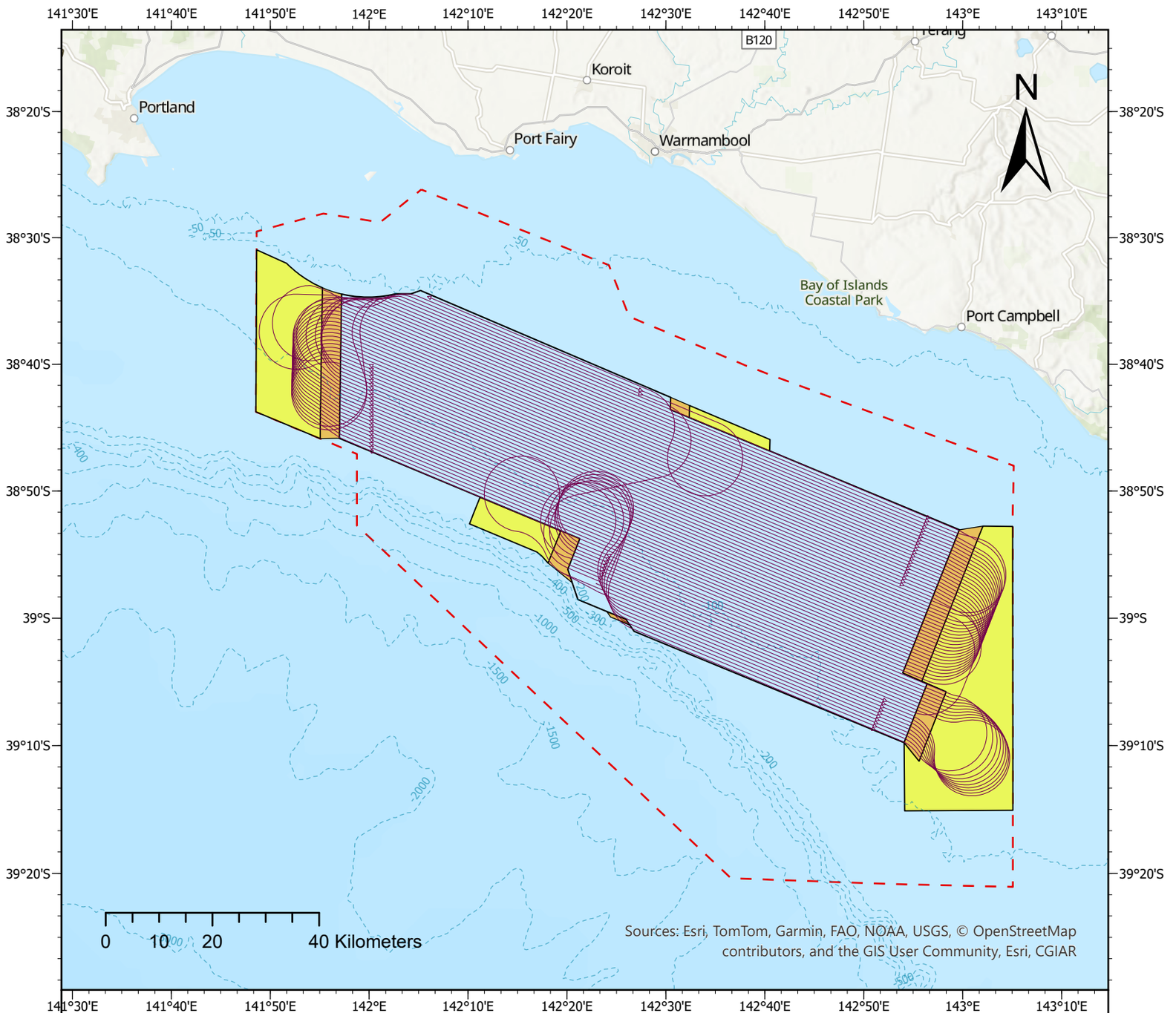
Title - Operational Area & Environmental Planning Area
Document Number - MAP-REG-EPM-083_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Environmental Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



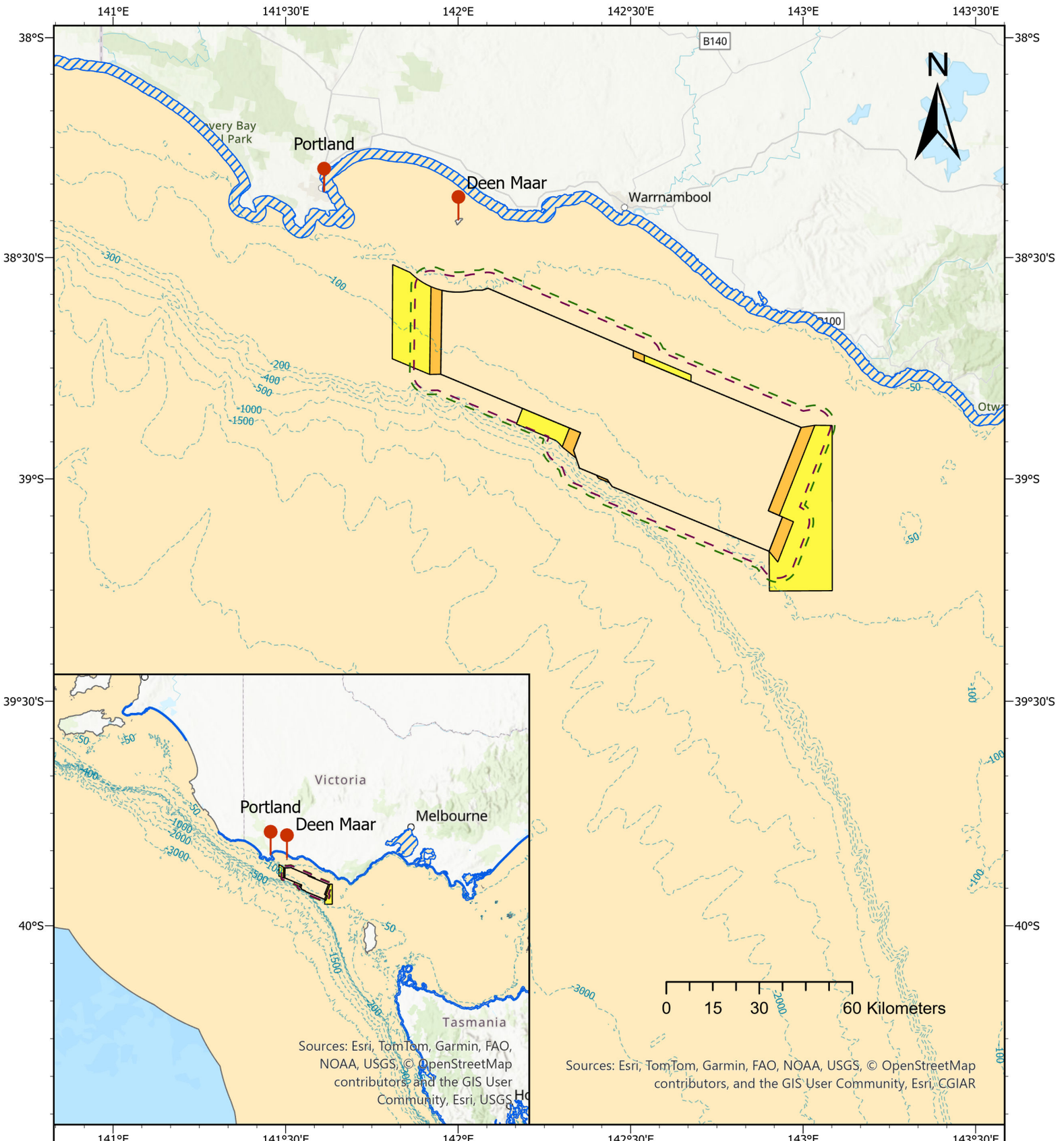
Title - Regia Marine Seismic Survey
Document Number - MAP-REG-EPM-084_B

REGIA
Marine Seismic Survey

Legend

- Indicative Sail Lines
- Bathymetry Contours
- Survey Acquisition Area
- Mitigation Source Area
- Active Source Area
- Operational Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



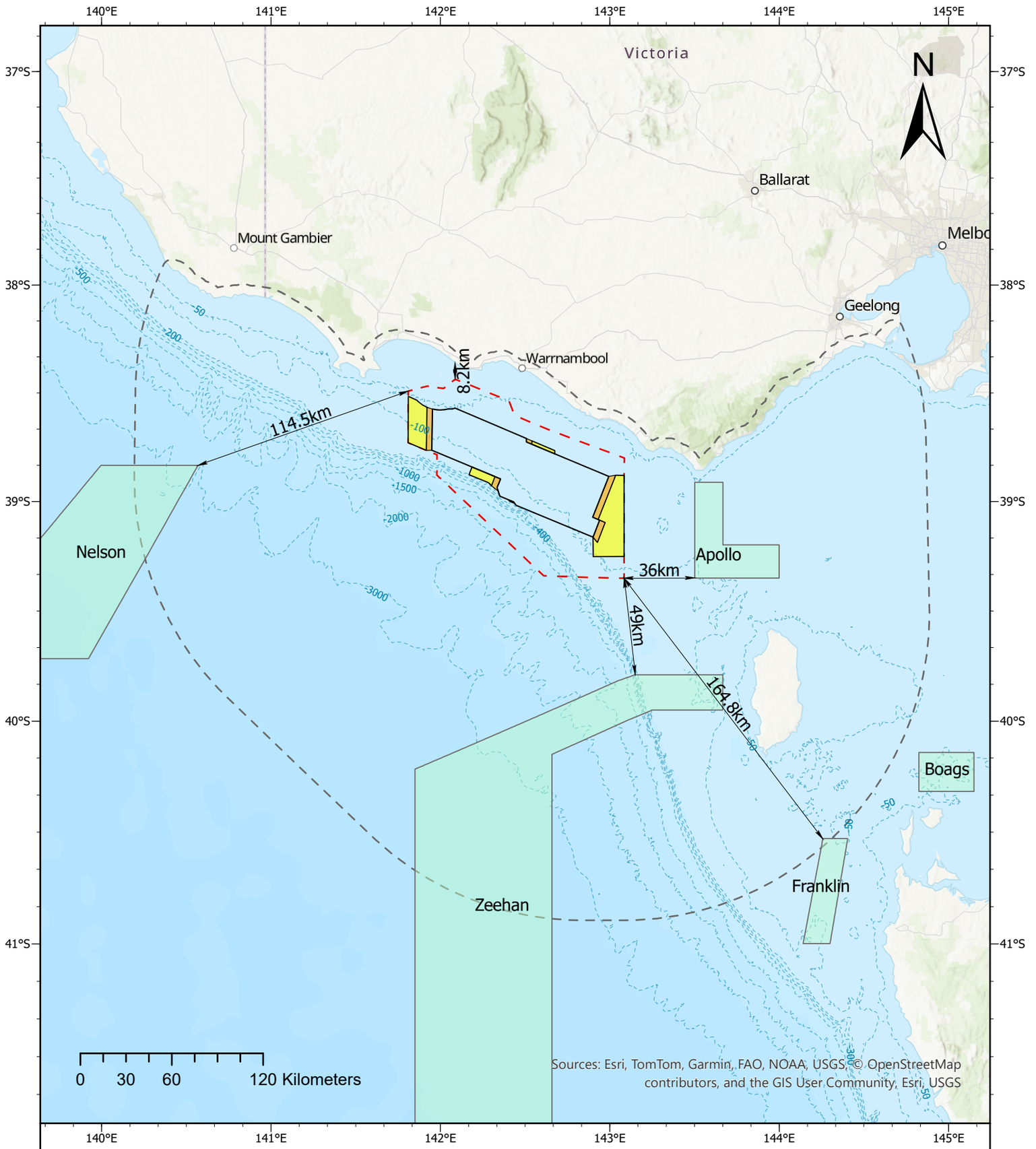
Title - Southern Right Whale Reproduction & Migration BIAs & Noise EMBAs
Document Number - MAP-REG-EPM-085_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Southern Right Whale Reproduction BIA
- Southern Right Whale Migration
- Active Source Area
- 160 dB Behavioural Sound EMBA (5km)
- 167 dB SEL TTS Sound EMBA (4km)

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



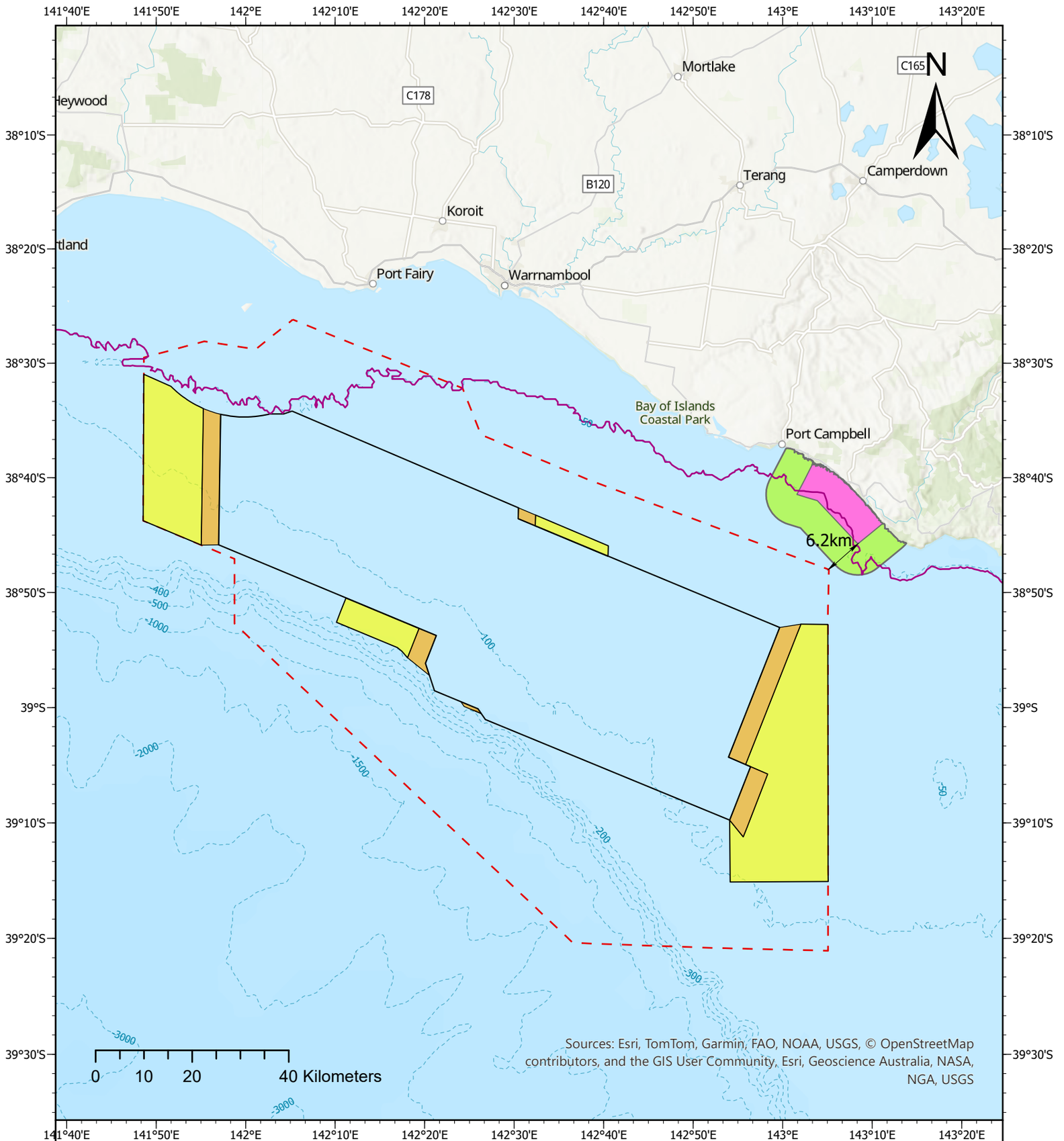
Title - Australian Marine Parks - Distances from Operational area
Document Number - MAP-REG-EPM-086_C

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Australian Marine Parks
- Environmental Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



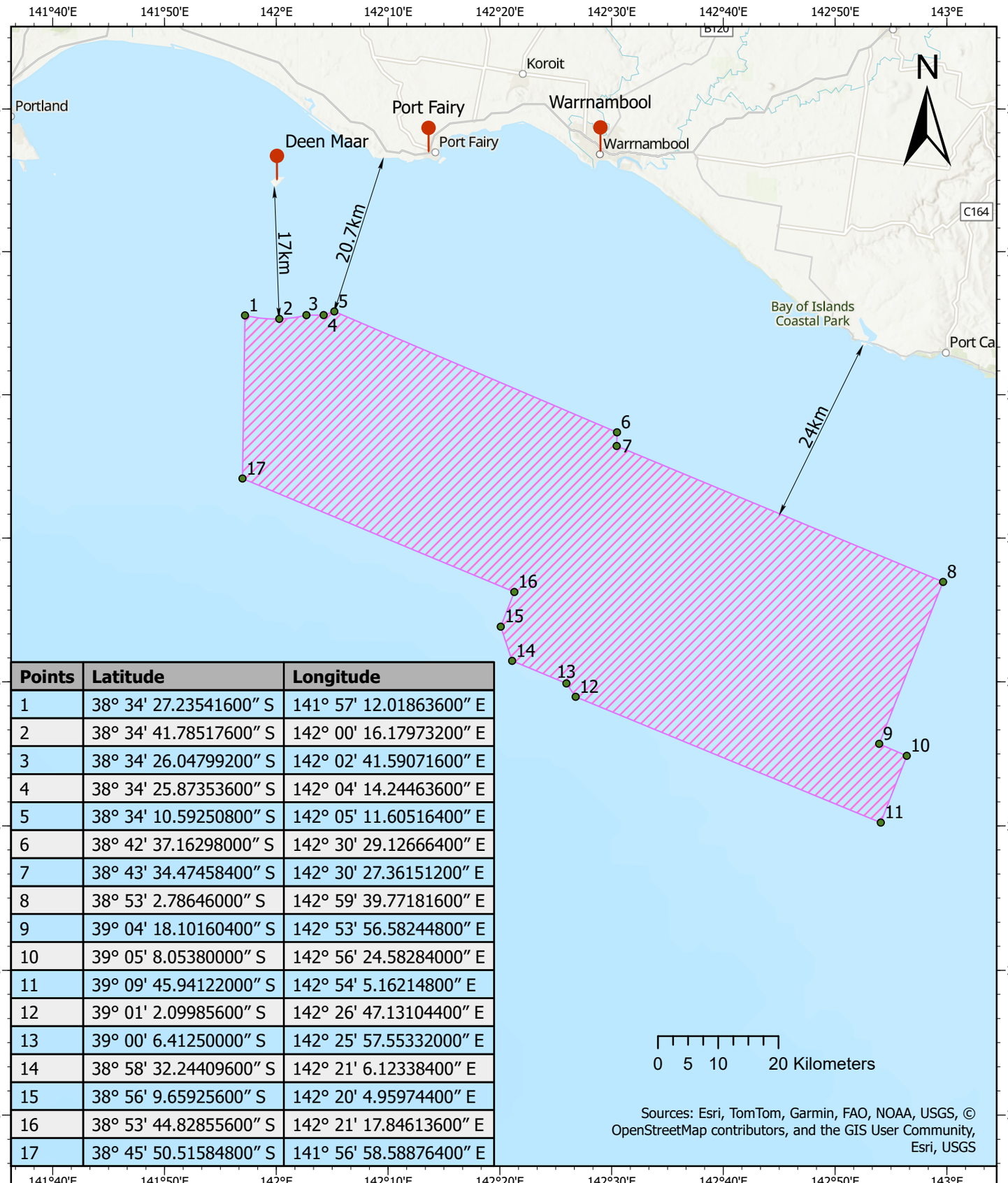
Title - 12 Apostles Marine Park 5km Buffer - distance from Operational Area
Document Number - MAP-REG-EPM-087_B

REGIA Marine Seismic Survey

Legend

- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- 50m Contour
- 12 Apostles Marine Park
- 12 Apostles 5km Buffer

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Points	Latitude	Longitude
1	38° 34' 27.23541600" S	141° 57' 12.01863600" E
2	38° 34' 41.78517600" S	142° 00' 16.17973200" E
3	38° 34' 26.04799200" S	142° 02' 41.59071600" E
4	38° 34' 25.87353600" S	142° 04' 14.24463600" E
5	38° 34' 10.59250800" S	142° 05' 11.60516400" E
6	38° 42' 37.16298000" S	142° 30' 29.12666400" E
7	38° 43' 34.47458400" S	142° 30' 27.36151200" E
8	38° 53' 2.78646000" S	142° 59' 39.77181600" E
9	39° 04' 18.10160400" S	142° 53' 56.58244800" E
10	39° 05' 8.05380000" S	142° 56' 24.58284000" E
11	39° 09' 45.94122000" S	142° 54' 5.16214800" E
12	39° 01' 2.09985600" S	142° 26' 47.13104400" E
13	39° 00' 6.41250000" S	142° 25' 57.55332000" E
14	38° 58' 32.24409600" S	142° 21' 6.12338400" E
15	38° 56' 9.65925600" S	142° 20' 4.95974400" E
16	38° 53' 44.82855600" S	142° 21' 17.84613600" E
17	38° 45' 50.51584800" S	141° 56' 58.58876400" E

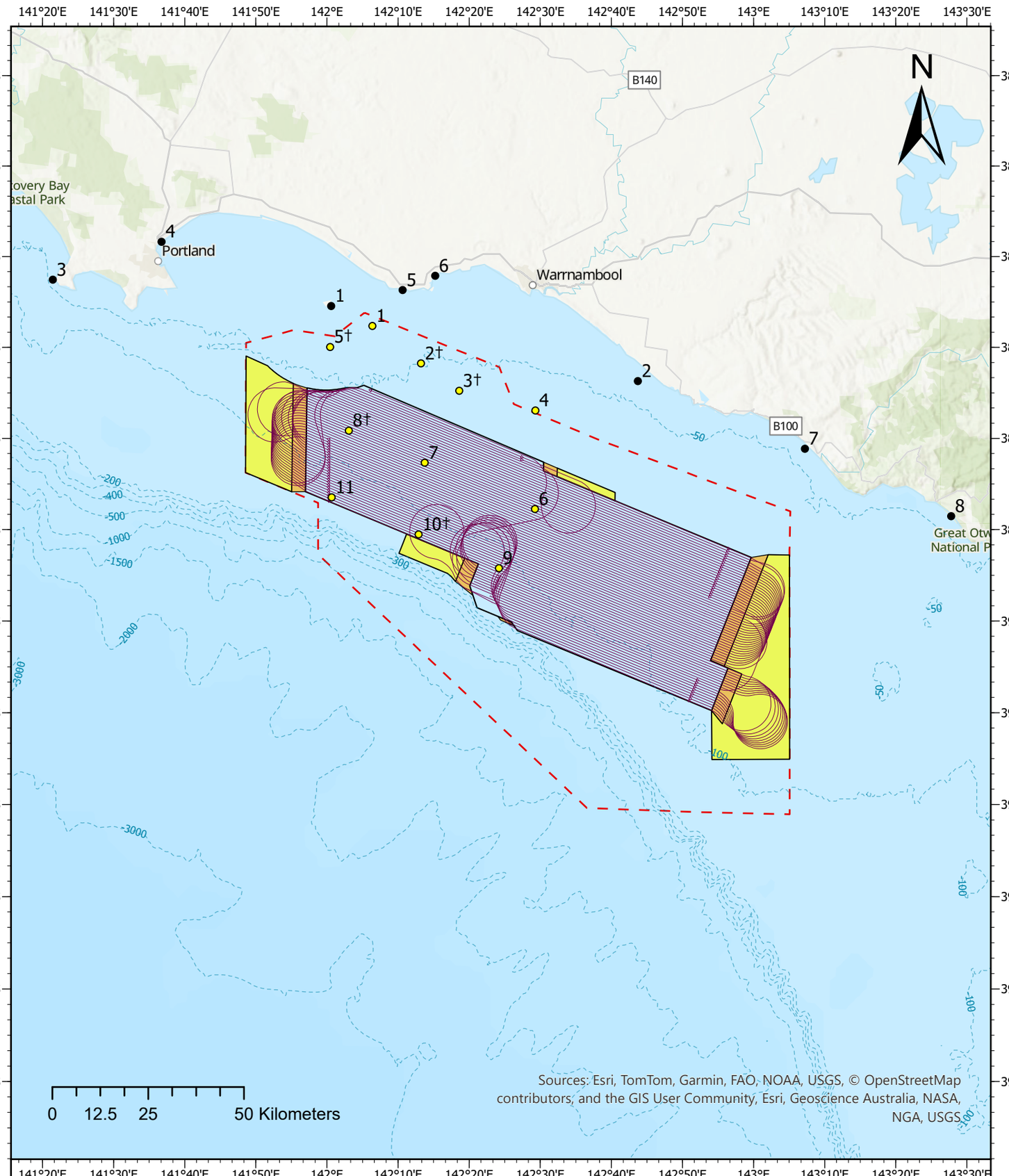
Title - Survey Acquisition Area Coordinates
Document Number - MAP-REG-EPM-088_B

REGIA Marine Seismic Survey

Legend

Survey Acquisition Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



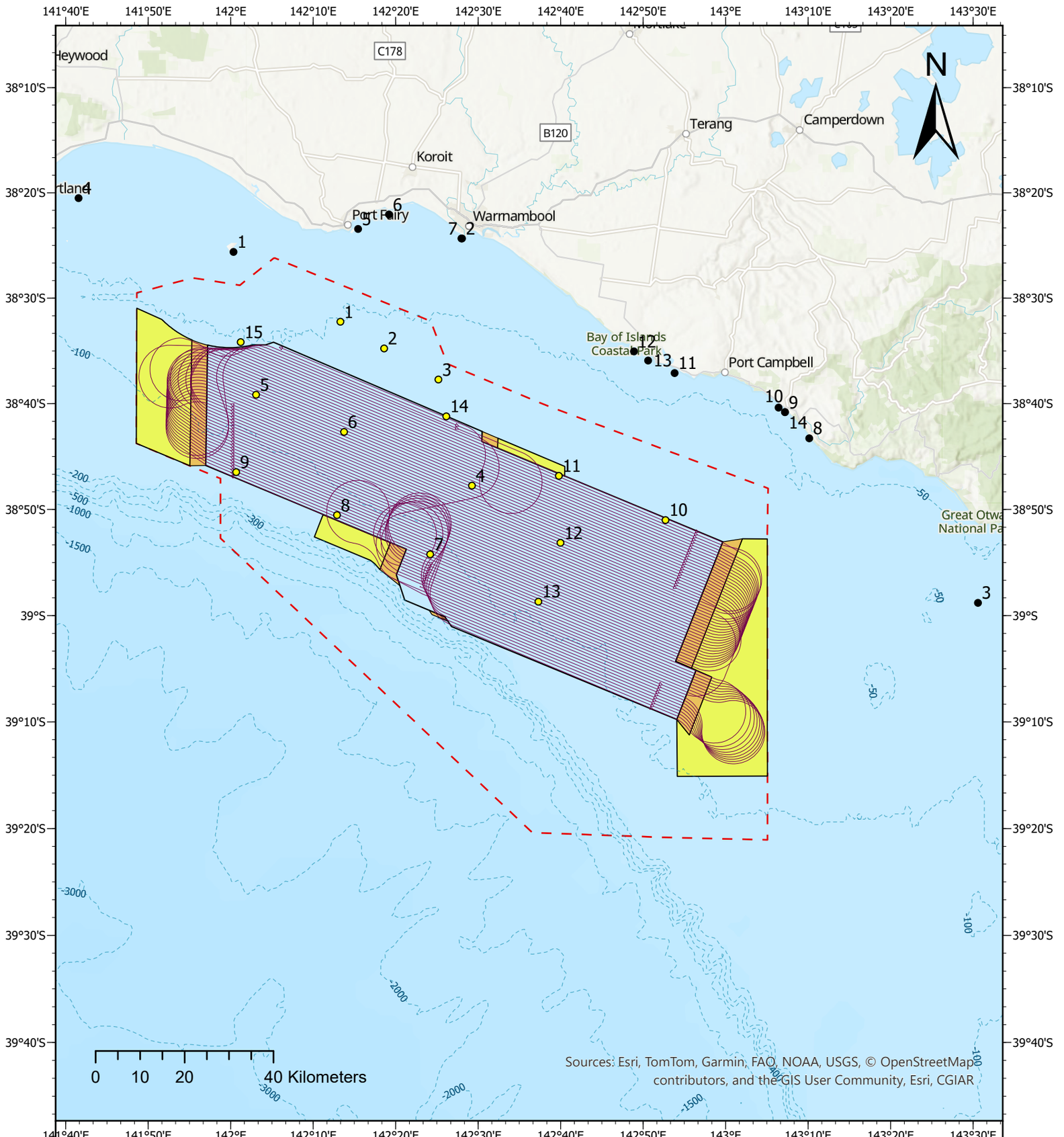
Title - Initial Sound Modelling Receiver and Impulse sites
Document Number - MAP-REG-EPM-089_B

REGIA Marine Seismic Survey

Legend

- Indicative Sail Lines
- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Modelled Sound Impulse Locations
- Receiver Locations

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



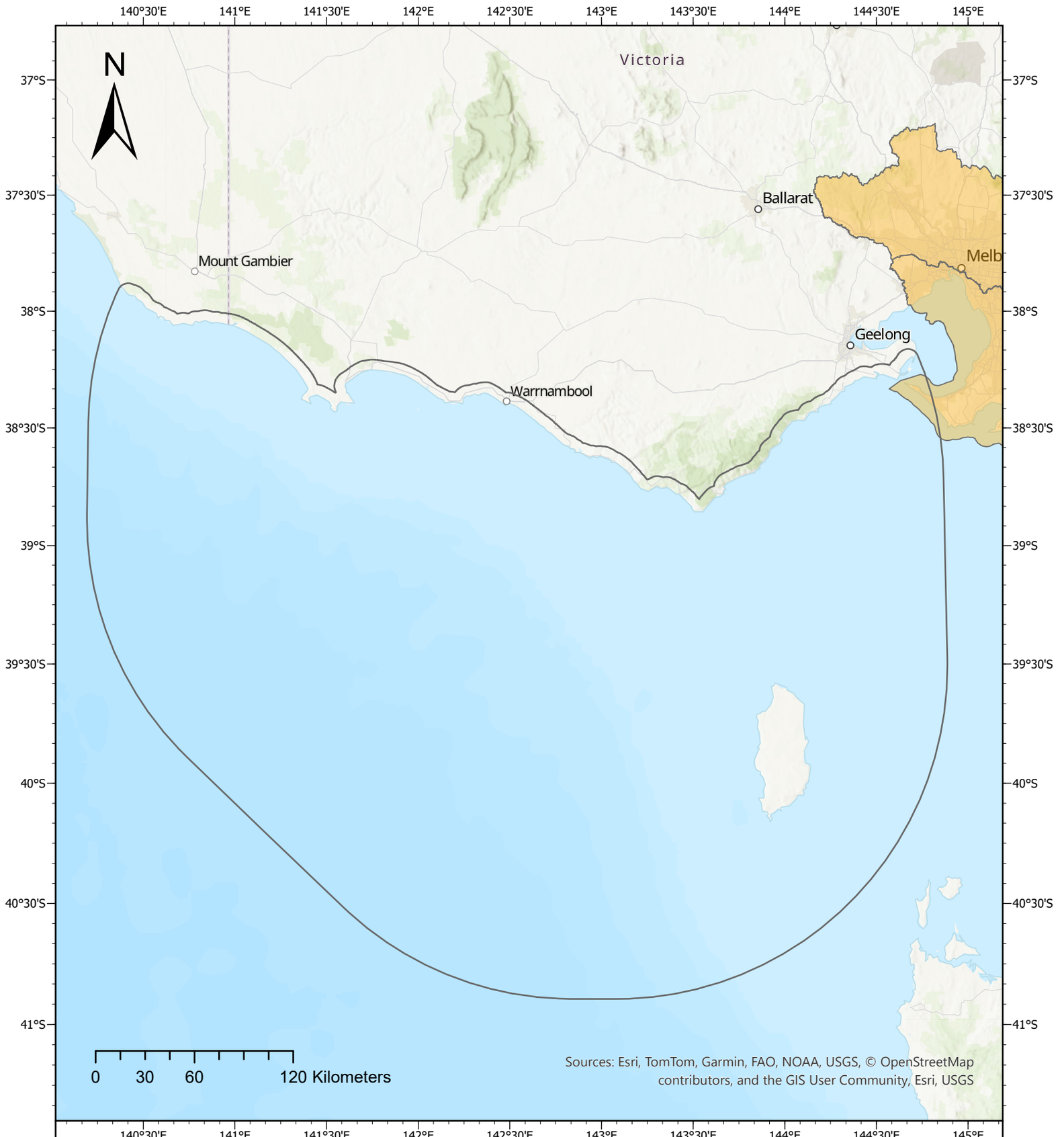
Title - Secondary Sound Modelling Receiver and Impulse Sites
Document Number - MAP-REG-EPM-090_B

REGIA Marine Seismic Survey

Legend

- Indicative Sail Lines
- Bathymetry Contours
- Operational Area
- Survey Acquisition Area
- Active Source Area
- Mitigation Source Area
- Receiver Locations
- Modelled Sound Impulse Locations

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



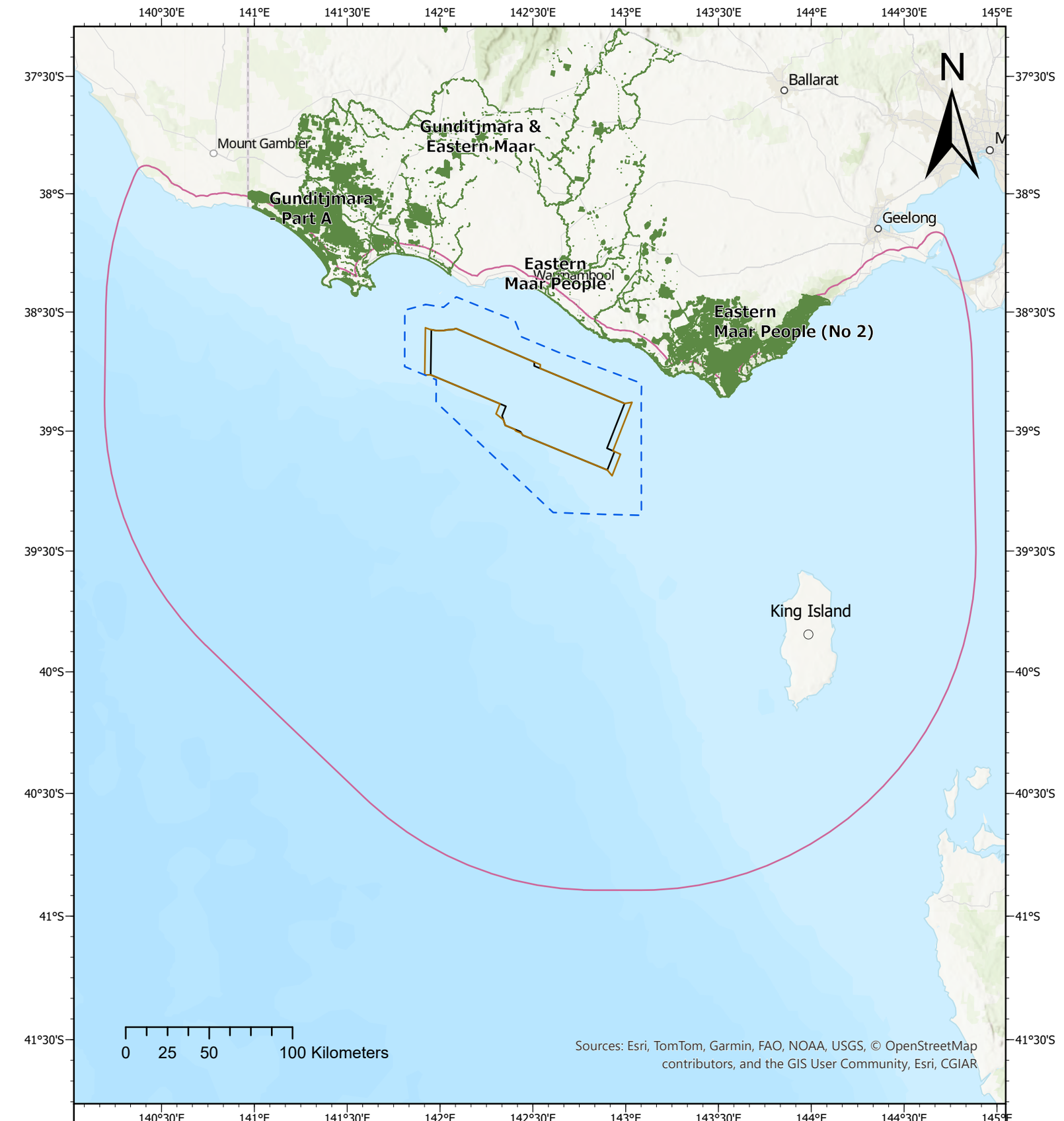
Title - EPA overlap with Point Nepean and Mornington Peninsula
Document Number - MAP-REG-EPM-091_A

REGIA Marine Seismic Survey

Legend

- Bunurong Country RAP
- Environmental Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



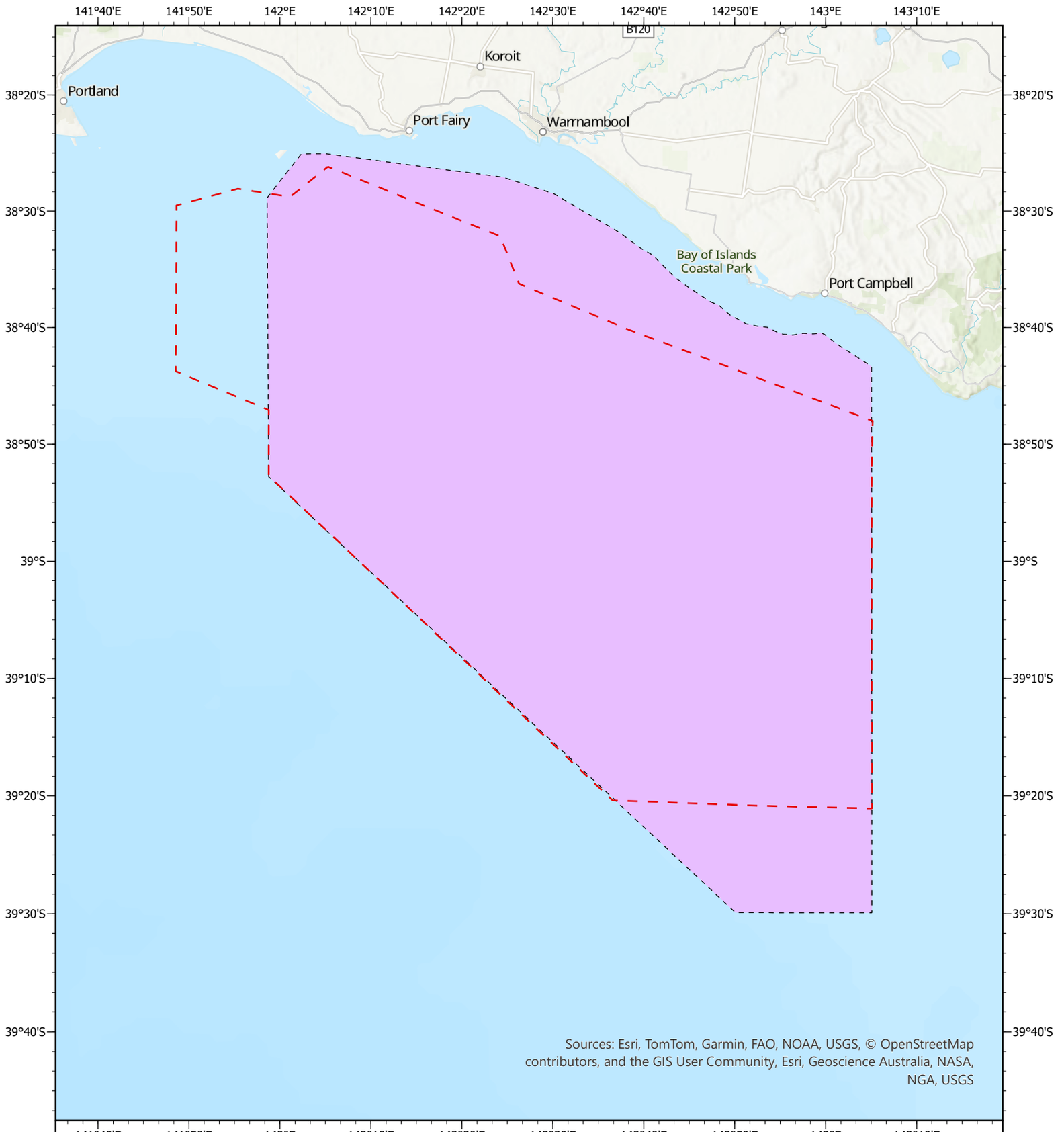
Native Title Determinations with Environmental Planning Area
Document Number - MAP-REG-EPM-92_B

REGIA Marine Seismic Survey

Legend

- Operational Area
- Active Source Area
- Acquisition Area
- Environmental Planning Area
- Native Title Determinations

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



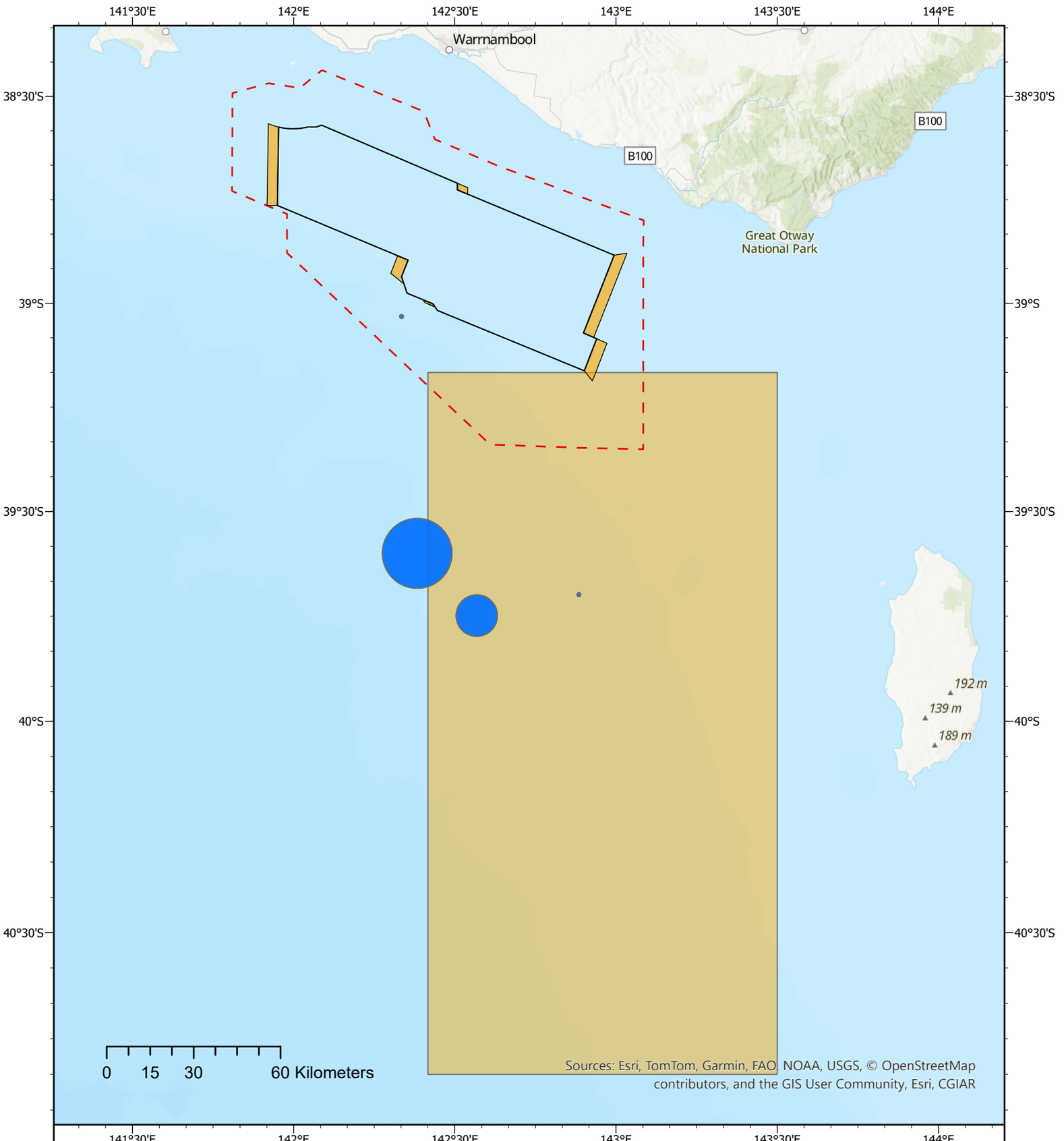
Title - Activity Planning Area & Operational Area
Document Number - MAP-REG-EPM-093_A

REGIA Marine Seismic Survey

Legend

- Operational Area
- Activity Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



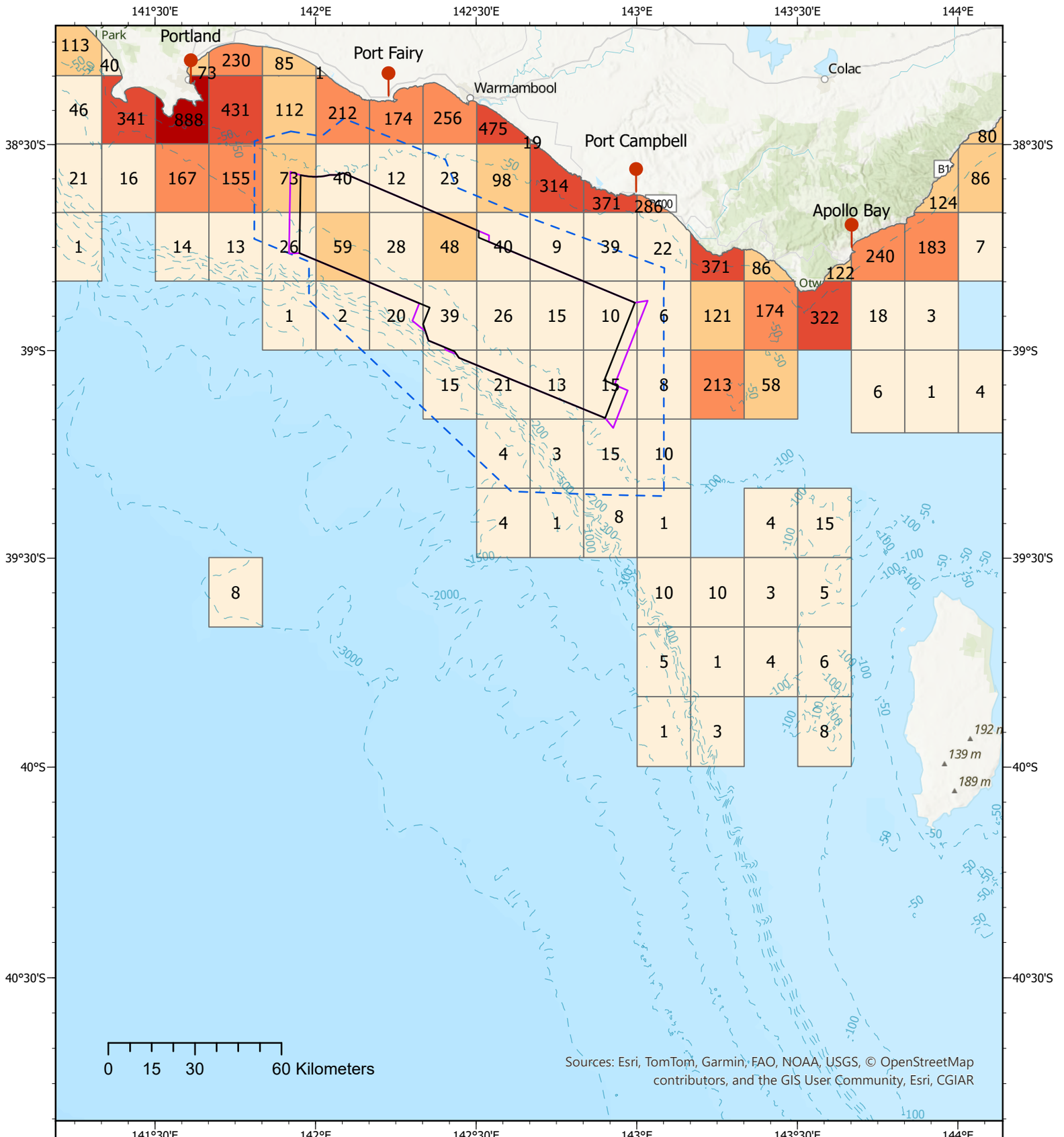
Title - UXOs
Document Number - MAP-REG-EPM-094_A

REGIA
Marine Seismic Survey

Legend

- Operational Area
- Survey Acquisition Area
- Active Source Area
- UXO - King Island - Firing Range
- UXO - Sea Dumping

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Rock Lobster Fishery - Maximum Annual Days Fished In Any Given Year - 2011-2022

Document Number - MAP-REG-EPM-95_A

REGIA Marine Seismic Survey

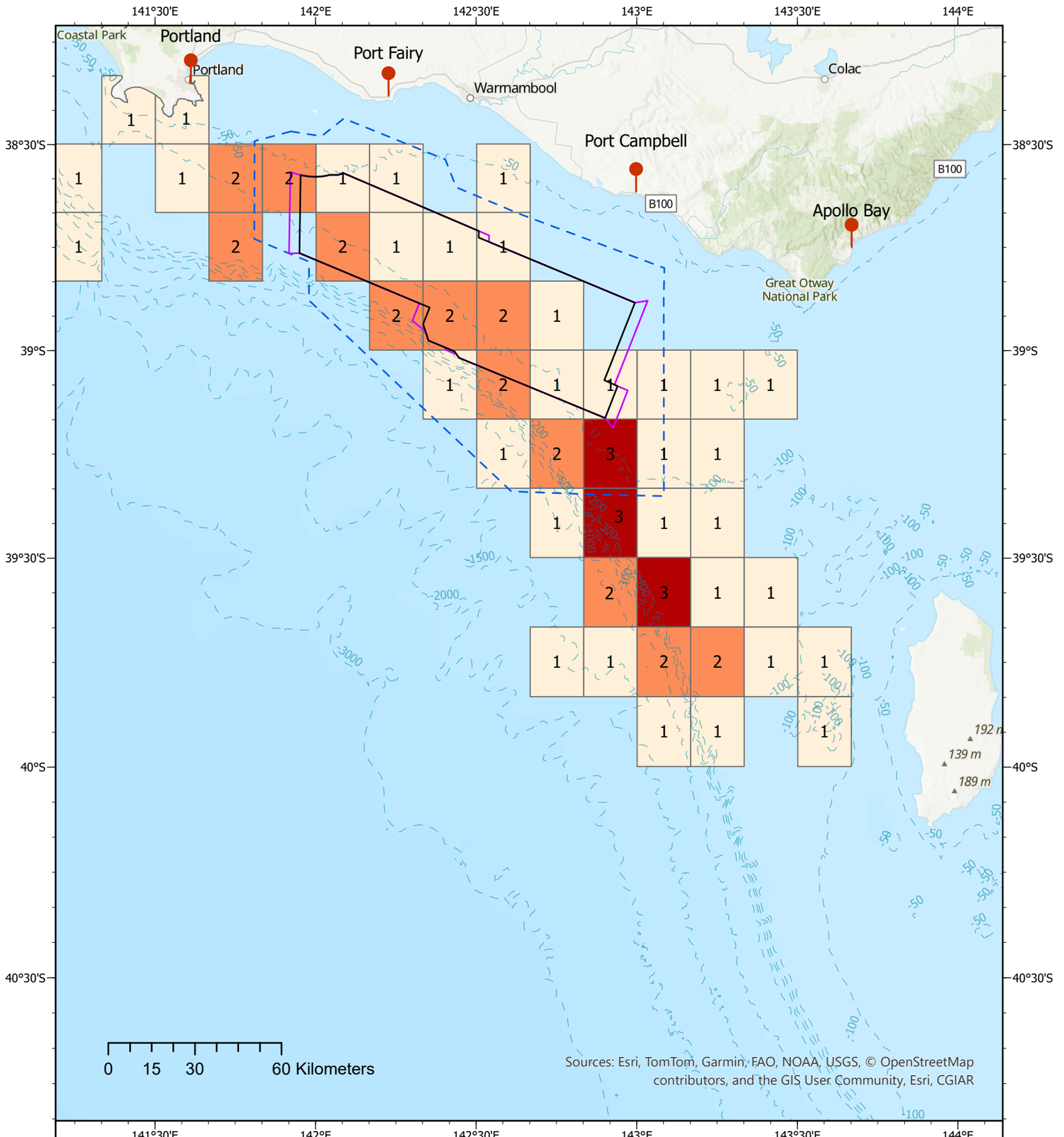
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

MaxDayFish

- 1 - 46
- 47 - 134
- 135 - 286
- 287 - 592
- 593 - 1113

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Giant Crab Fishery - Maximum Annual Days Fished In Any Given Year - 2011-2022

Document Number - MAP-REG-EPM-96_A

REGIA Marine Seismic Survey

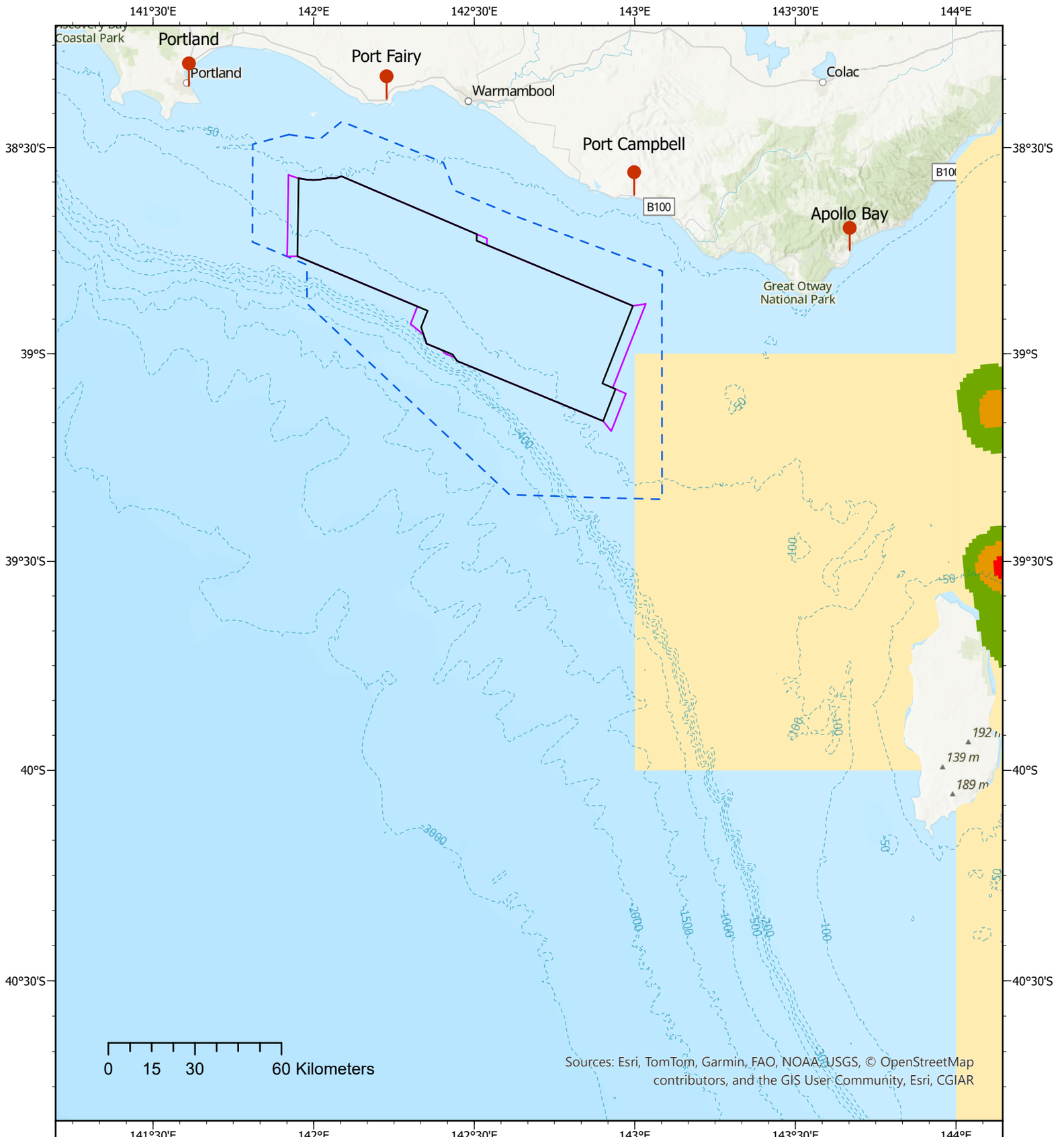
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Maximum Annual Days Fished

- 1
- 2
- 3

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



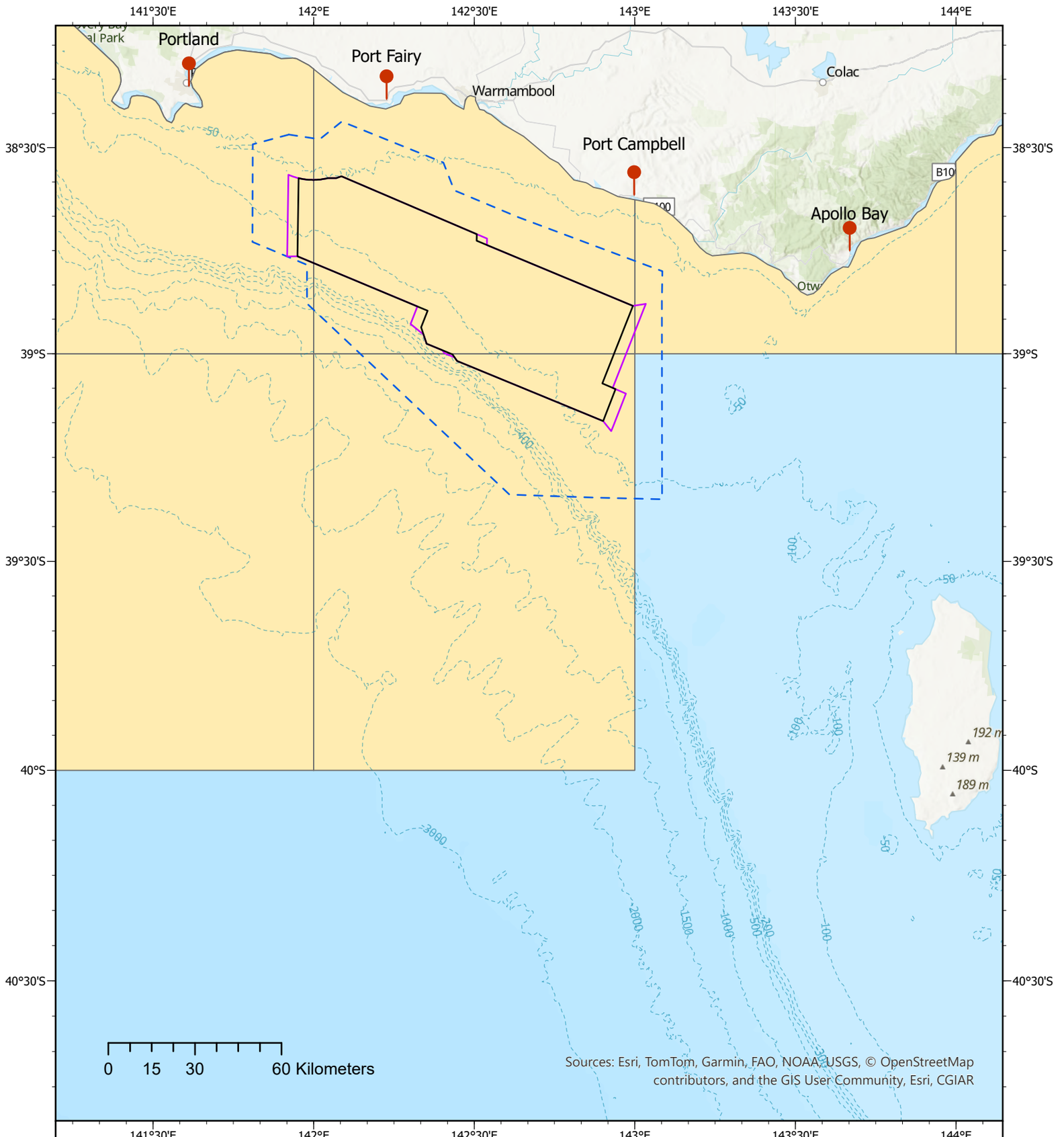
Bass Strait Central Zone Scallop Fishery - 2010-2023
Document Number - MAP-REG-EPM-097_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- Bass Strait Central Zone Scallop Fishery - Maximum Area Fished
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



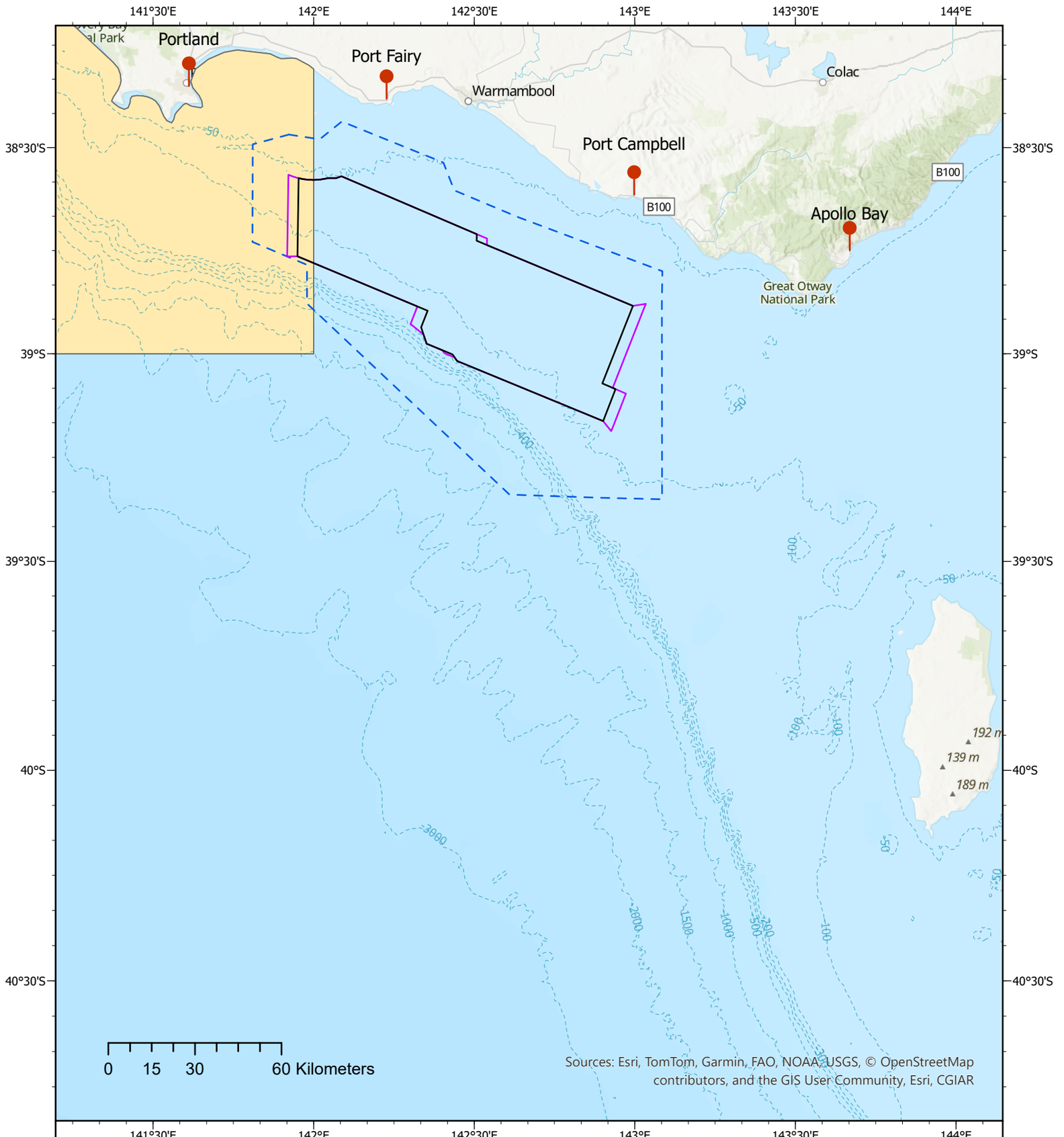
Eastern Tuna And Billfish Fishery - 2010-2023
Document Number - MAP-REG-EPM-098_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- ETBF Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



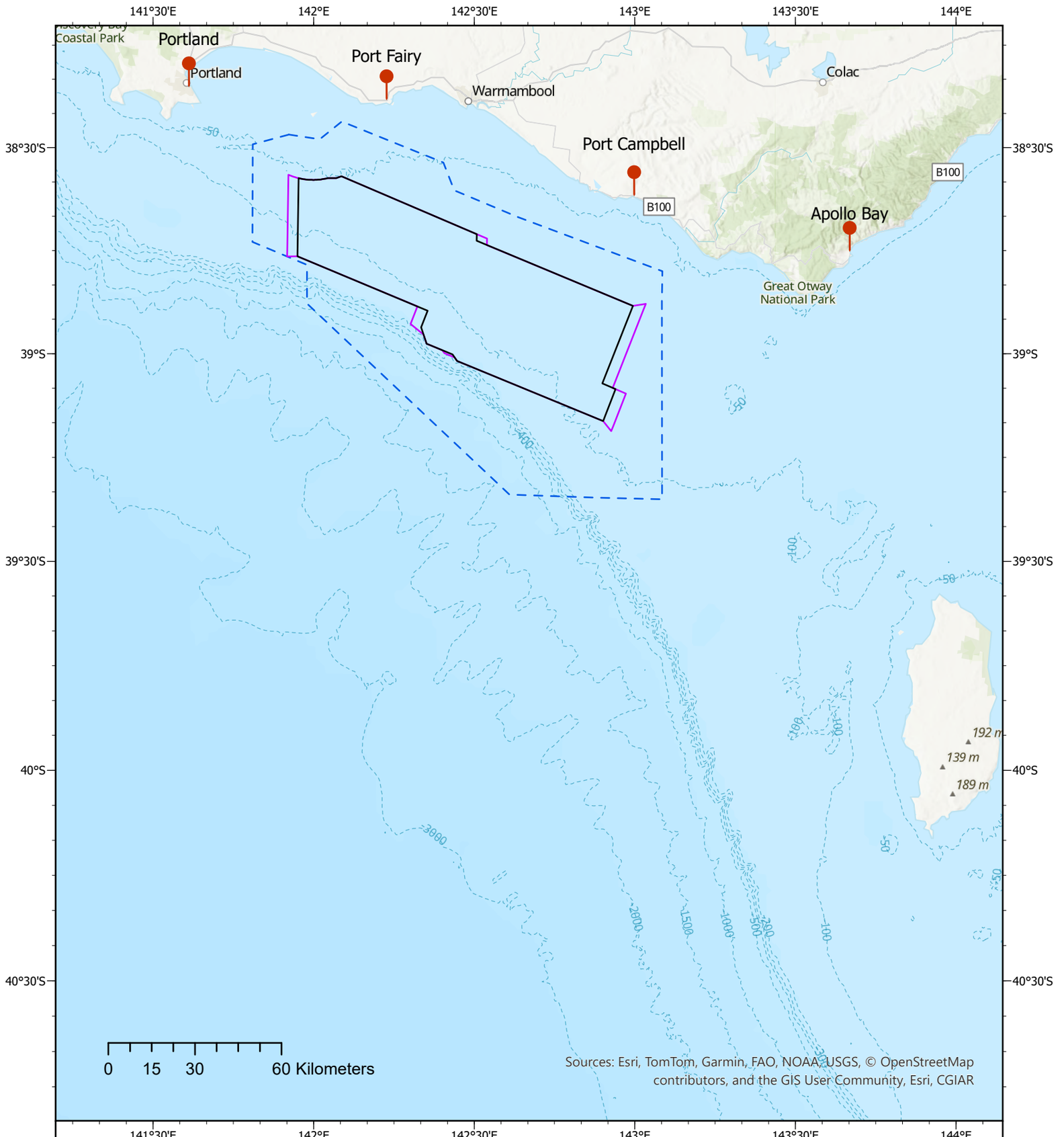
Small Pelagic Fishery - 2010-2023
Document Number - MAP-REG-EPM-099_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Small Pelagic Fishery Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



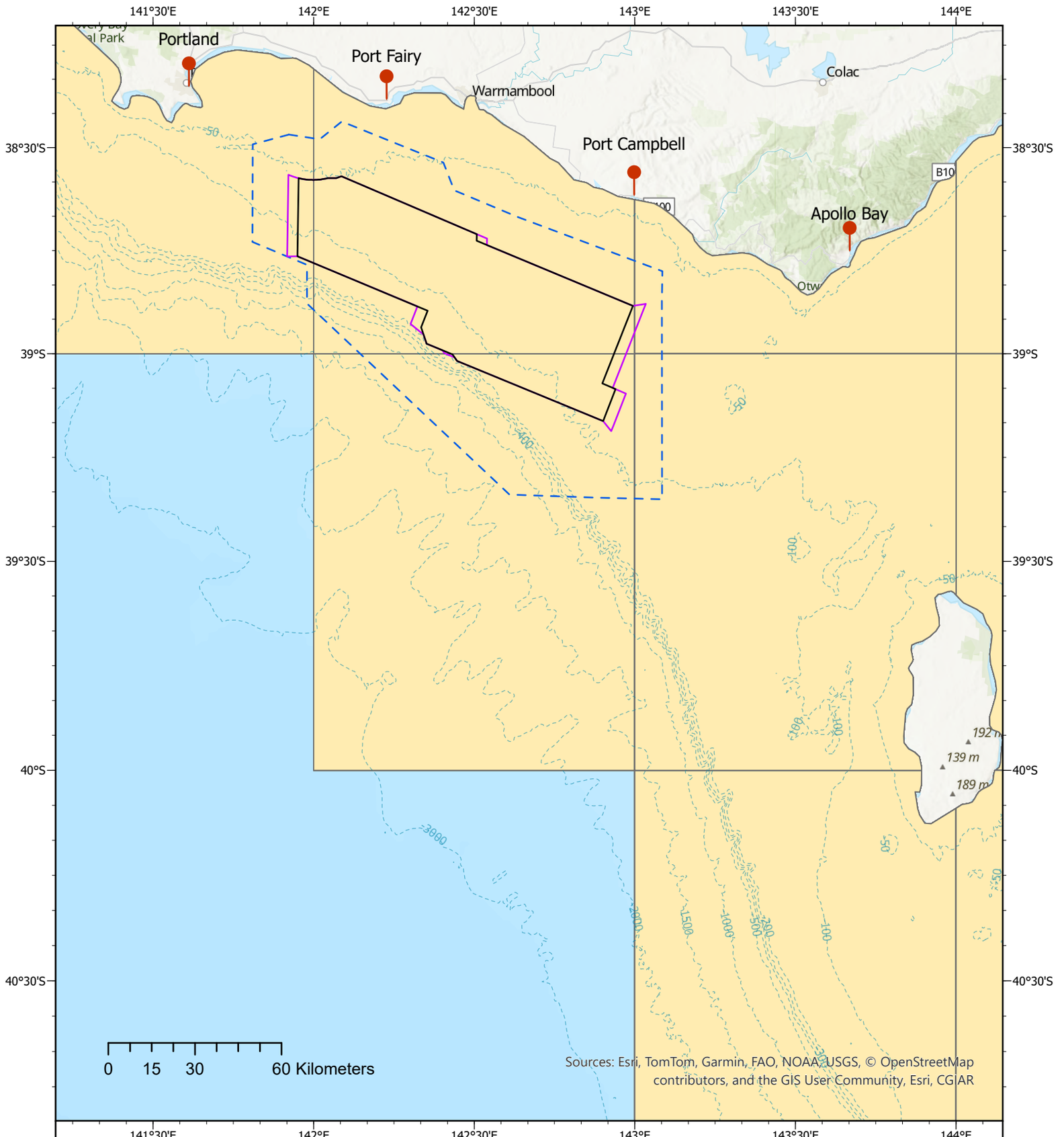
Southern Bluefin Tuna Fishery Purse Seine Sector - 2010-2023
Document Number - MAP-REG-EPM-100_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SBTFPS Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



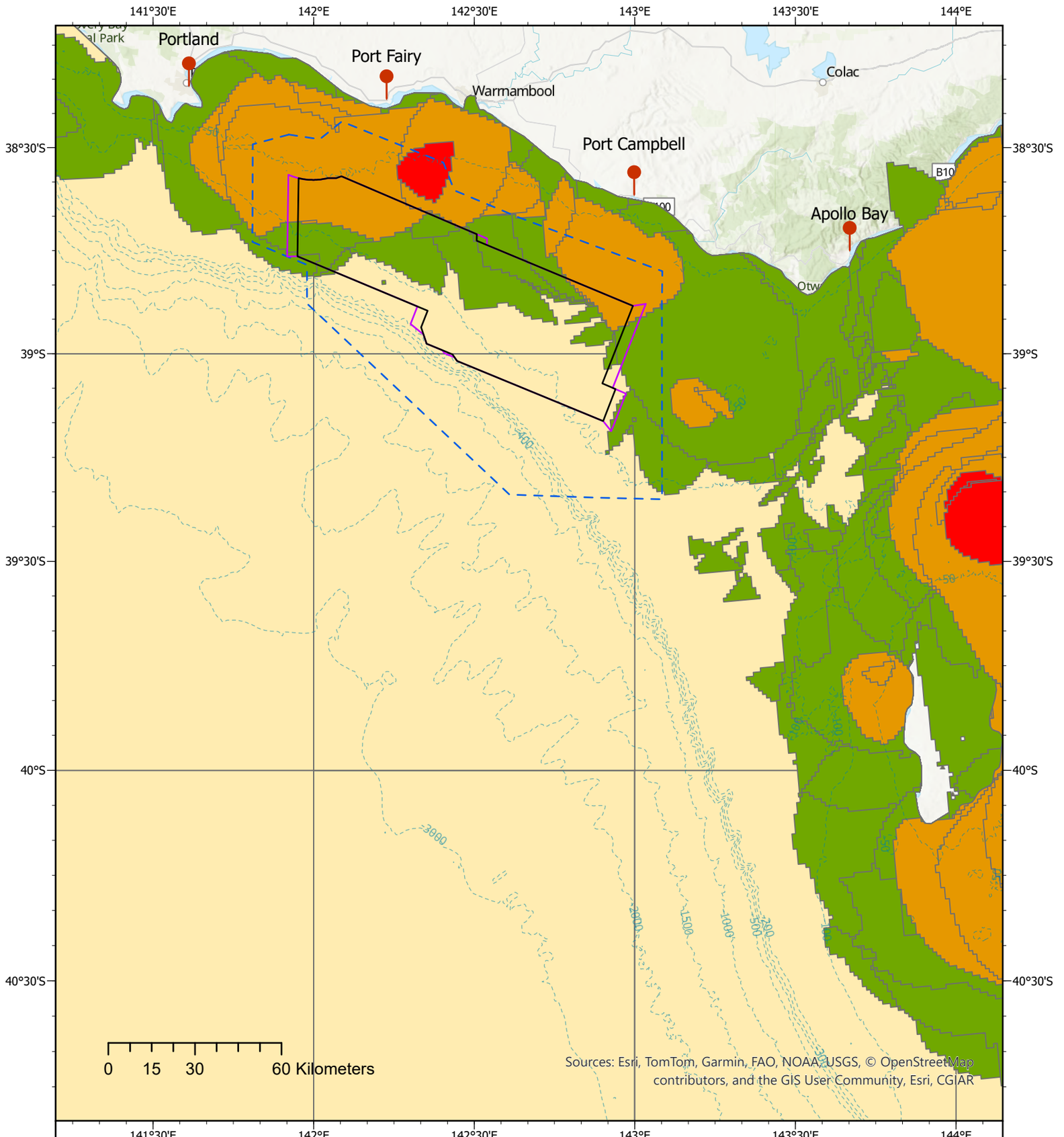
Southern and Eastern Scalefish and Shark Fishery SSKK - 2010-2023
Document Number - MAP-REG-EPM-101_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SSKK Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



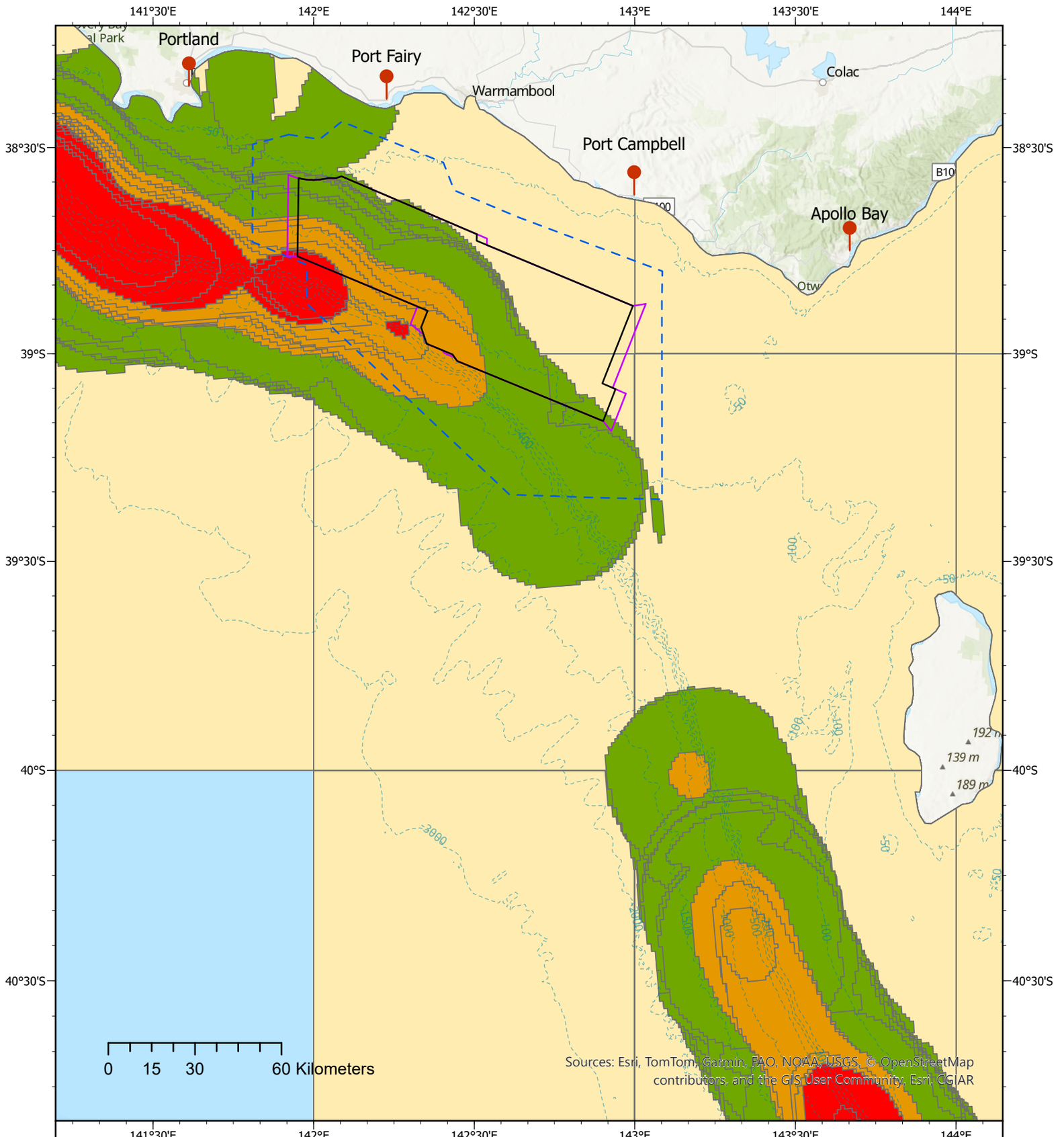
Southern and Eastern Scalefish and Shark Fishery SSKN - 2010-2023
Document Number - MAP-REG-EPM-102_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SSKN Maximum Area Fished
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



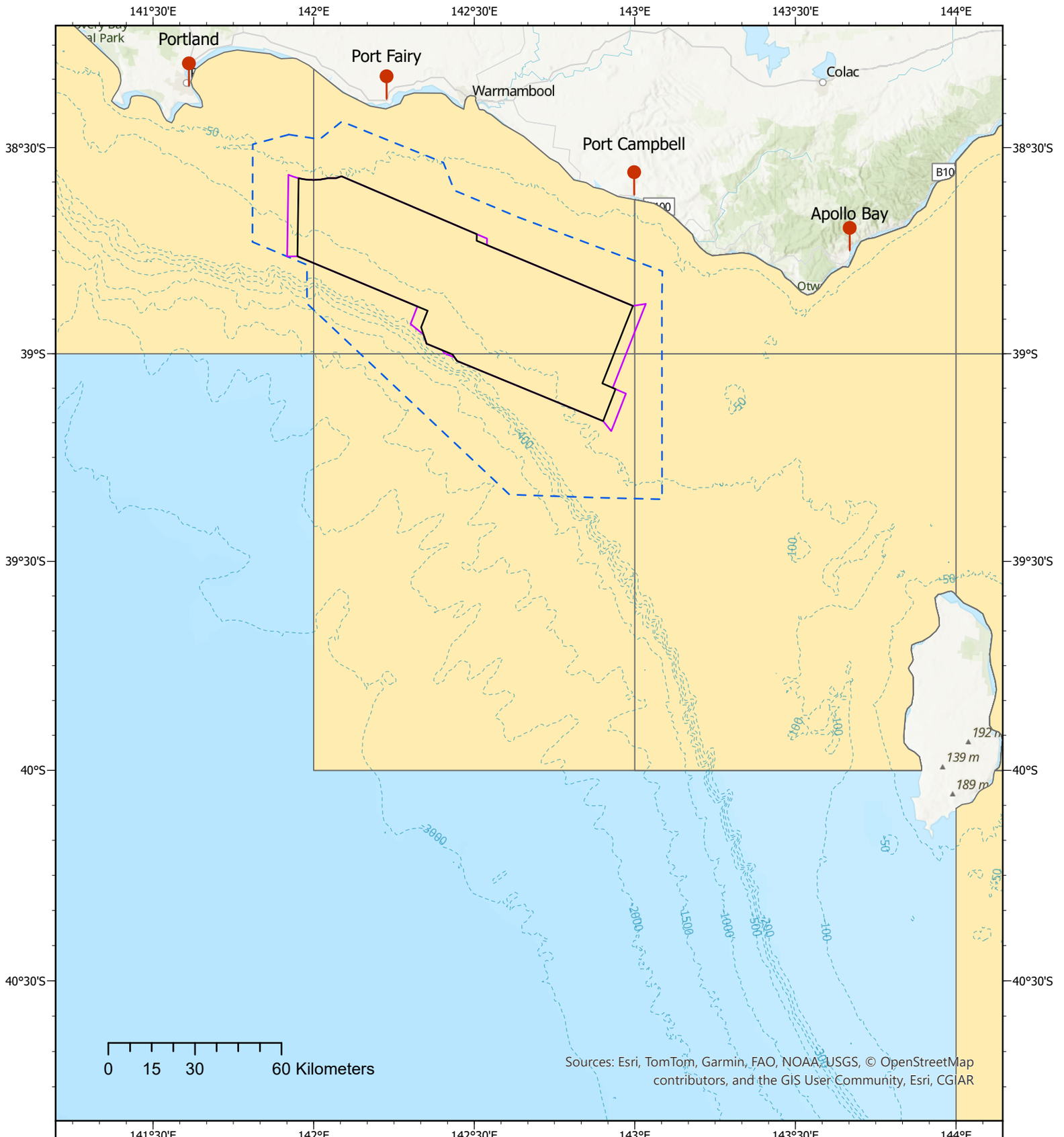
Southern and Eastern Scalefish and Shark Fishery SCTR - 2010-2023
Document Number - MAP-REG-EPM-103_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SCTR Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



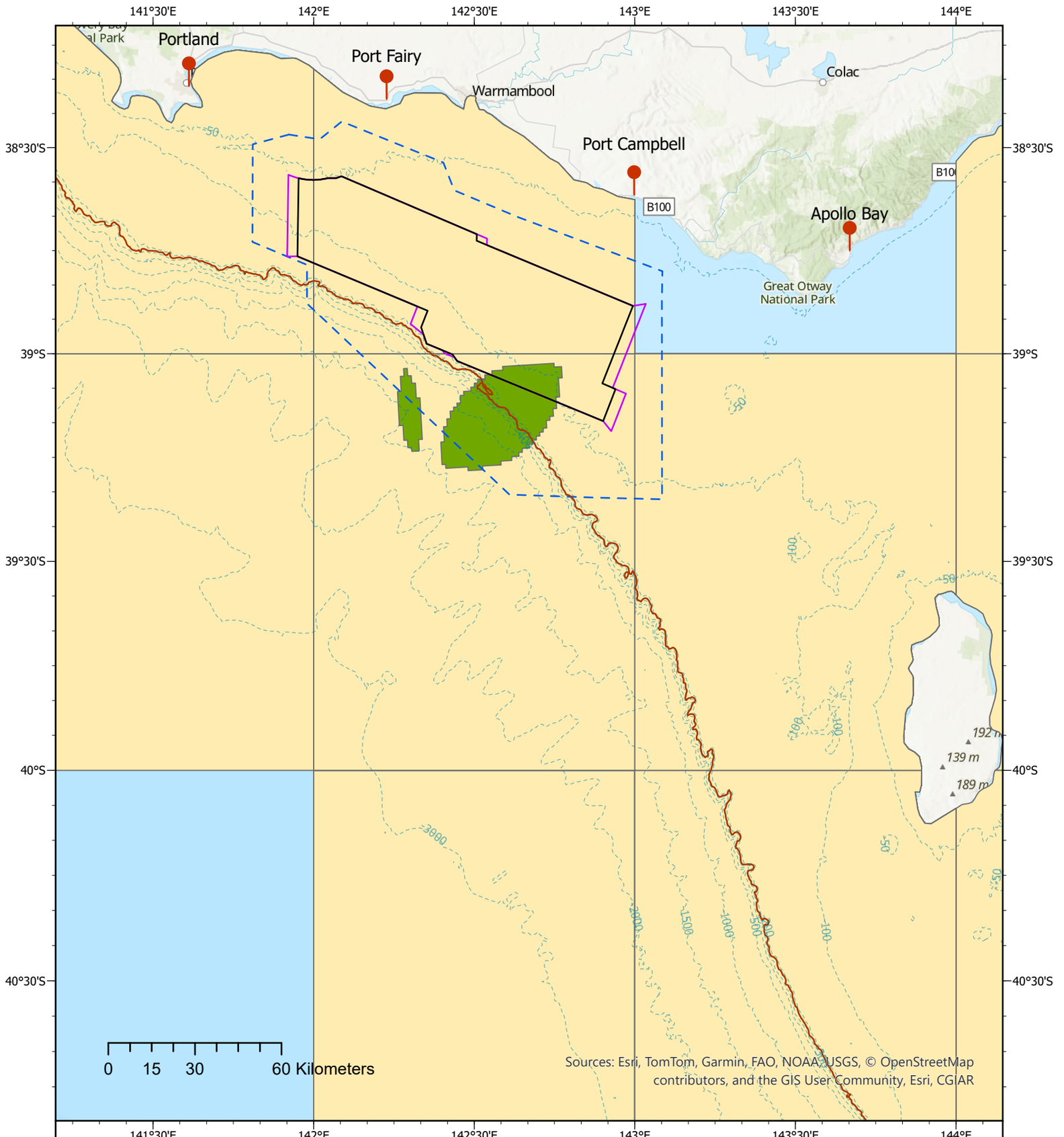
Southern and Eastern Scalefish and Shark Fishery SCDS - 2010-2023
Document Number - MAP-REG-EPM-104_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SCDS Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



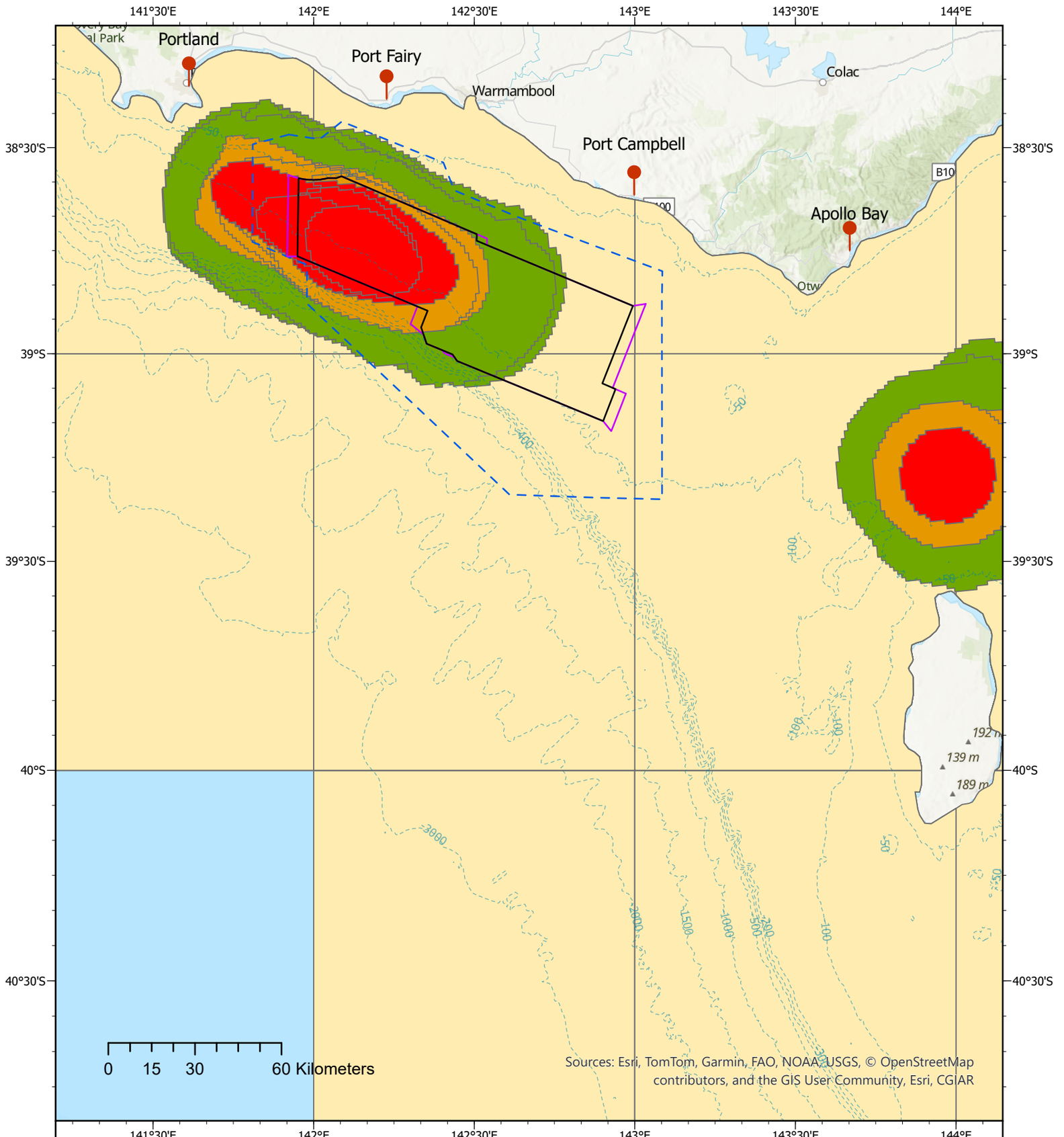
Southern and Eastern Scalefish and Shark Fishery SSCK - 2010-2023
Document Number - MAP-REG-EPM-105_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SSCK Maximum Area Fished 2010-2022
- Bathymetry Contours
- -250m countour

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



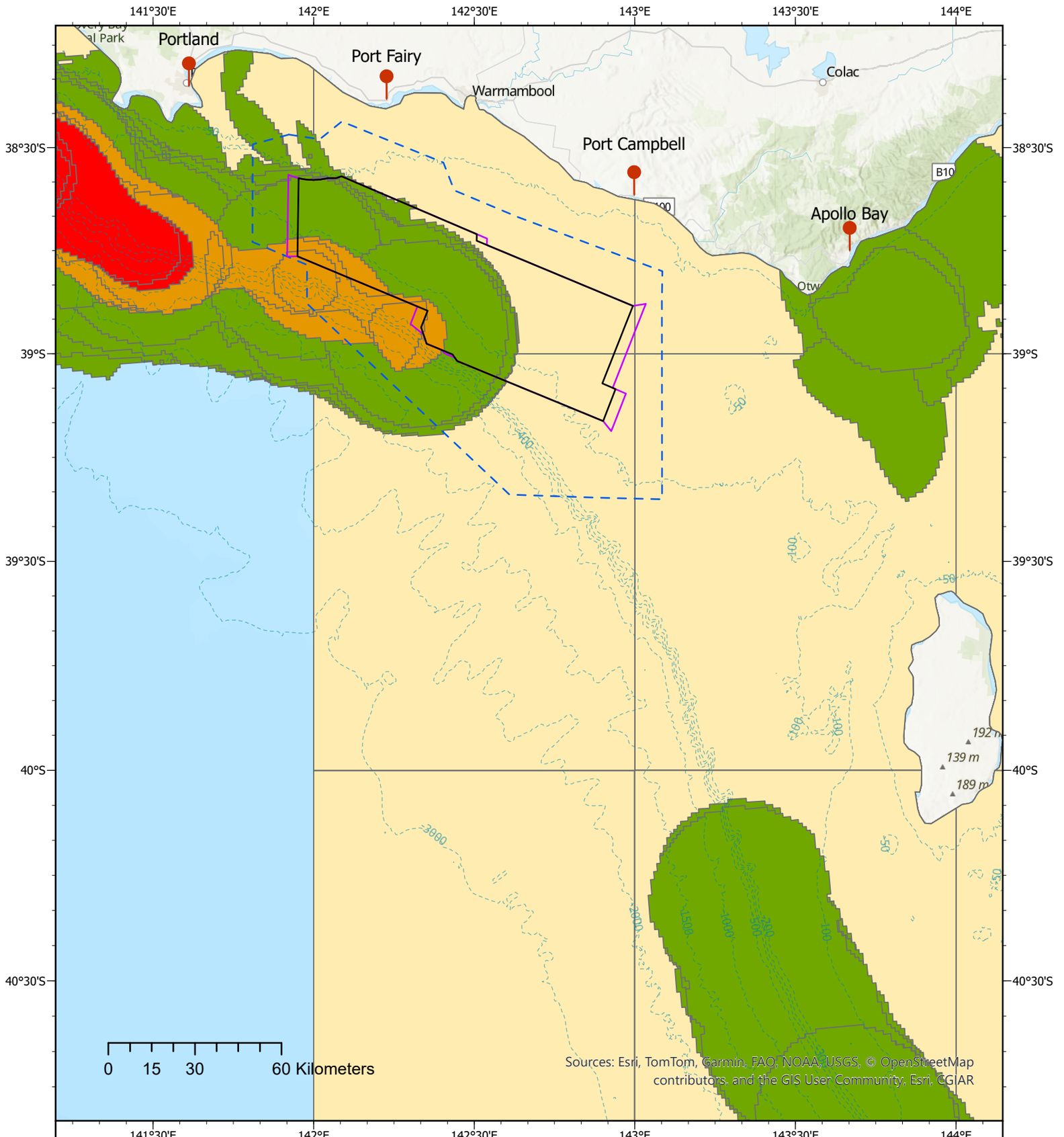
Southern Squid Jig Fishery SSJF - 2010-2023
Document Number - MAP-REG-EPM-106_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SSJF Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



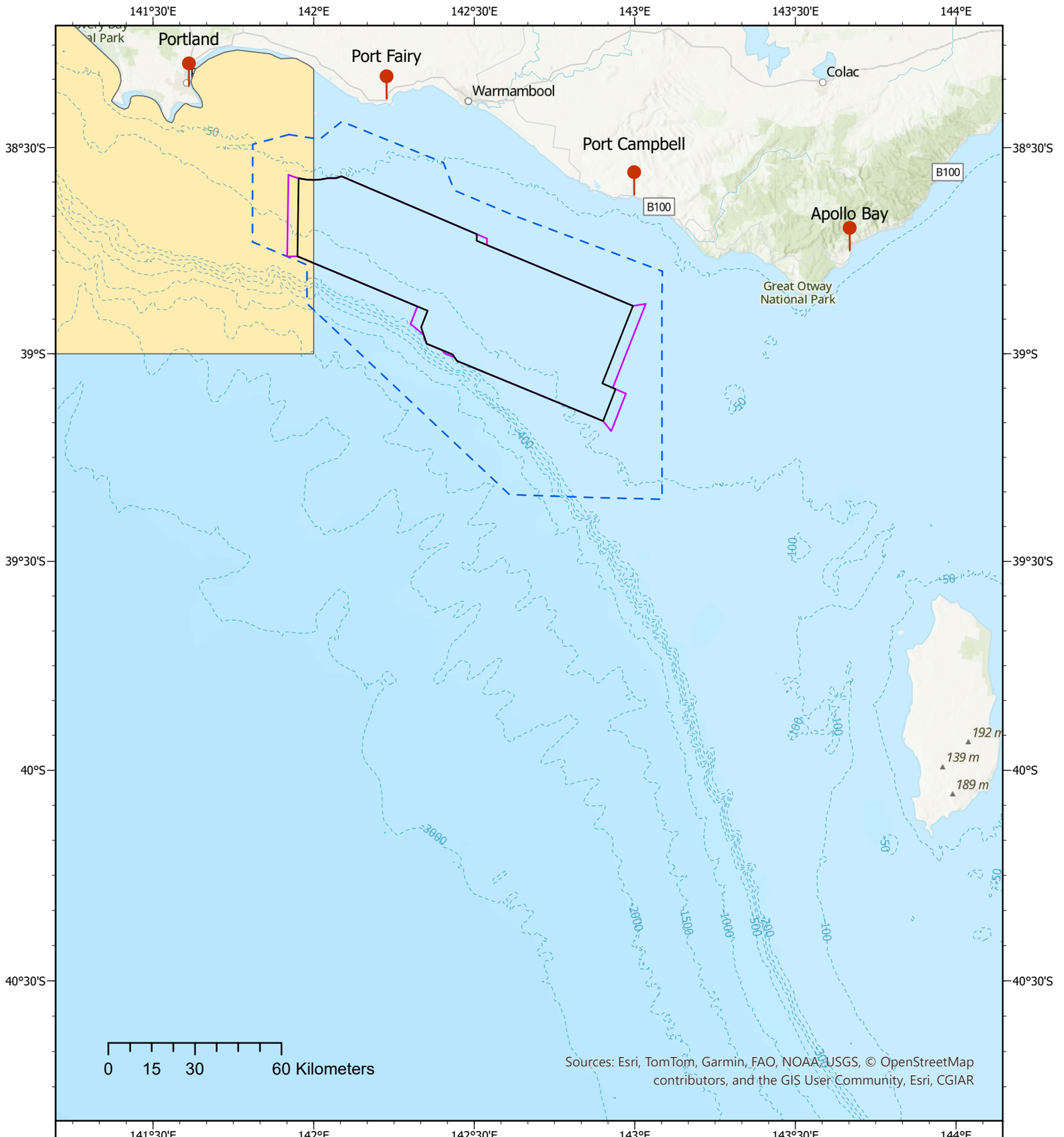
Southern and Eastern Scalefish and Shark Fishery SCSQ - 2010-2023
Document Number - MAP-REG-EPM-107_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SCSQ Maximum Area Fished
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



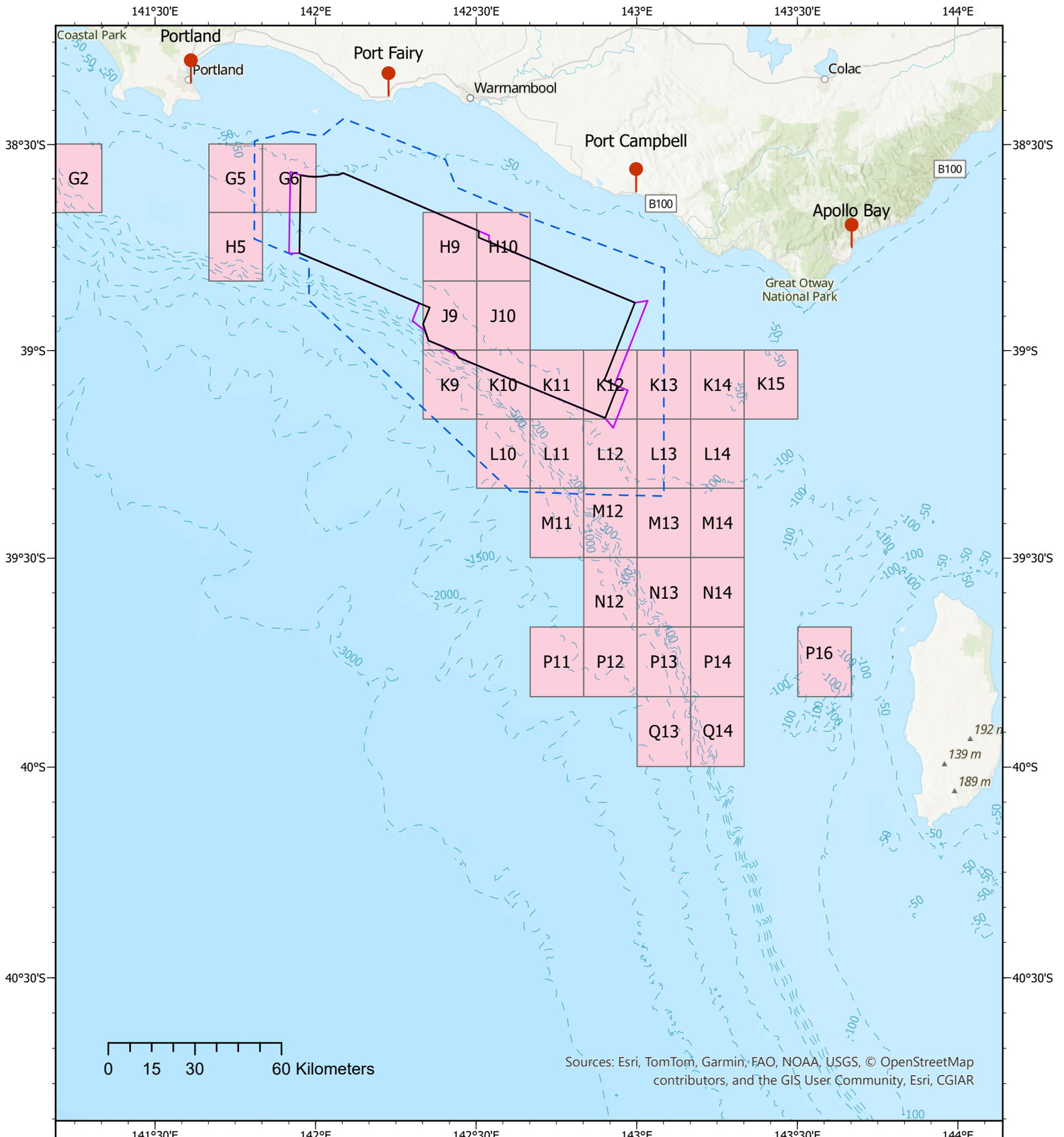
Western Tuna and Billfish Fishery - 2010-2023
Document Number - MAP-REG-EPM-108_B

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- WTBF Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



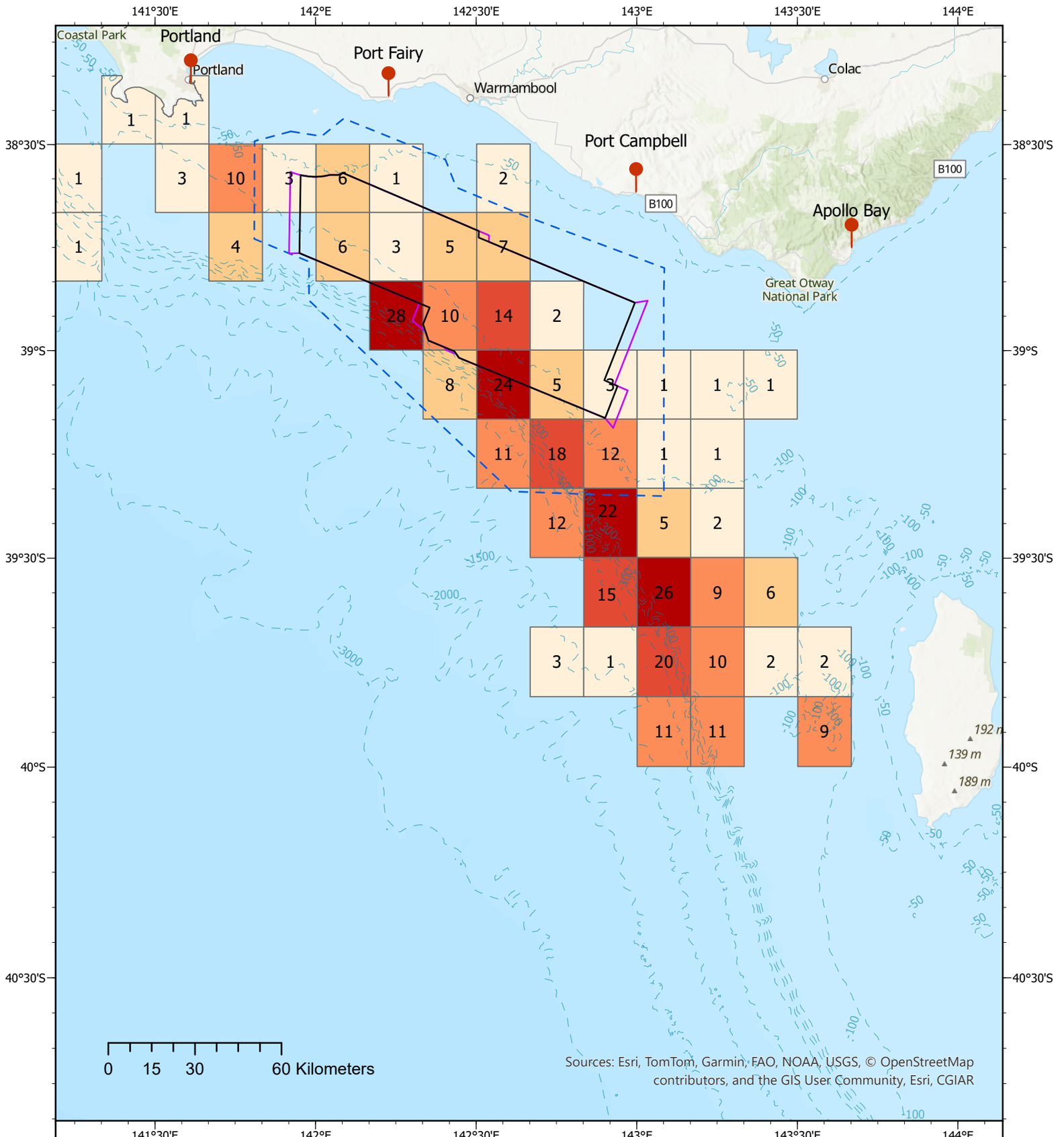
Giant Crab Fishery - Fished Blocks - 2018-2022
Document Number - MAP-REG-EPM-109_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours
- Giant Crab Fishery - Fished Blocks - 2018-2022

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Giant Crab Fishery - Maximum Annual Vessels In Any Given Year - 2011-2022
Document Number - MAP-REG-EPM-110_A

REGIA Marine Seismic Survey

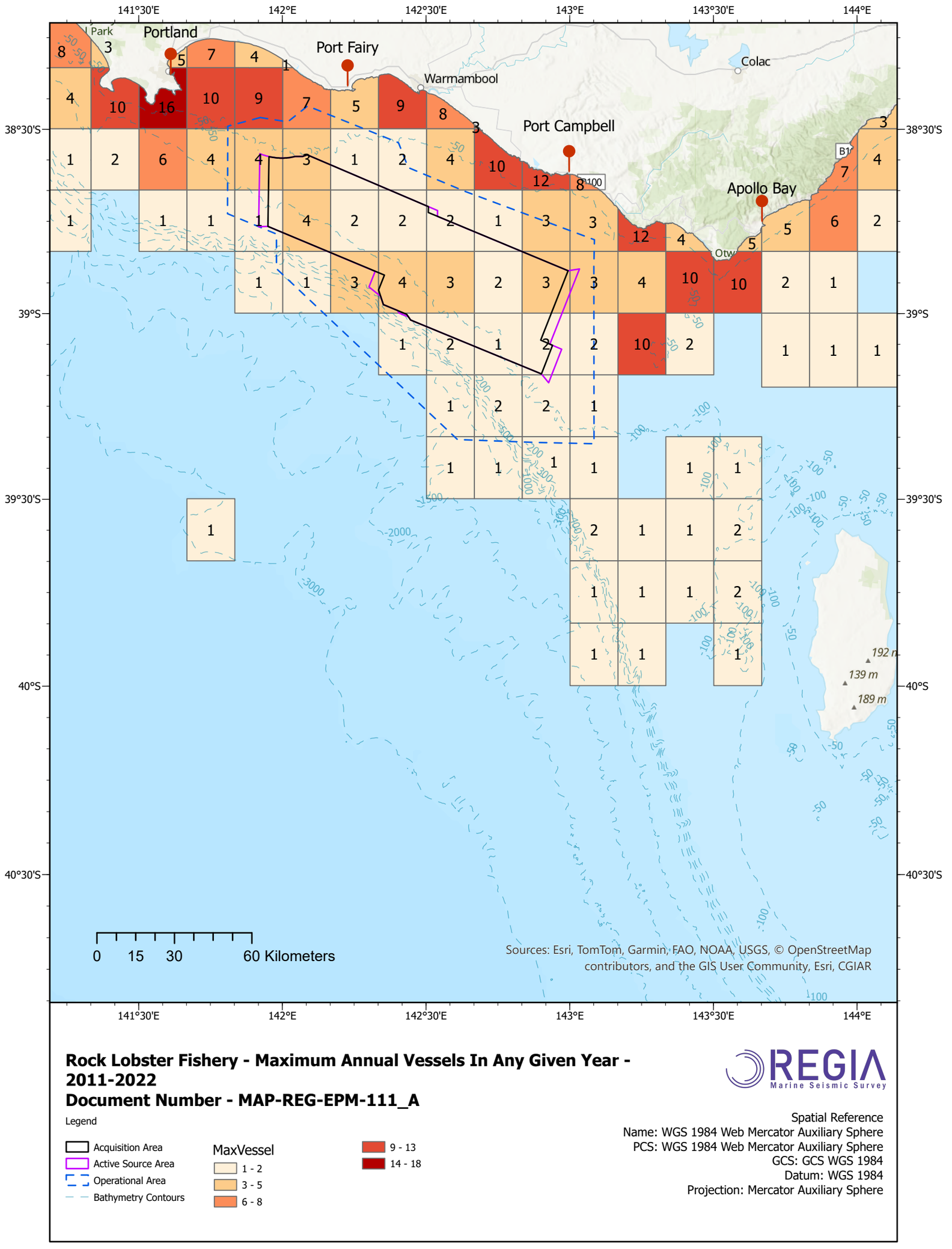
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Maximum Annual Vessels

- 1 - 3
- 4 - 8
- 9 - 12
- 13 - 20
- 21 - 28

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Rock Lobster Fishery - Maximum Annual Vessels In Any Given Year - 2011-2022

Document Number - MAP-REG-EPM-111_A

REGIA Marine Seismic Survey

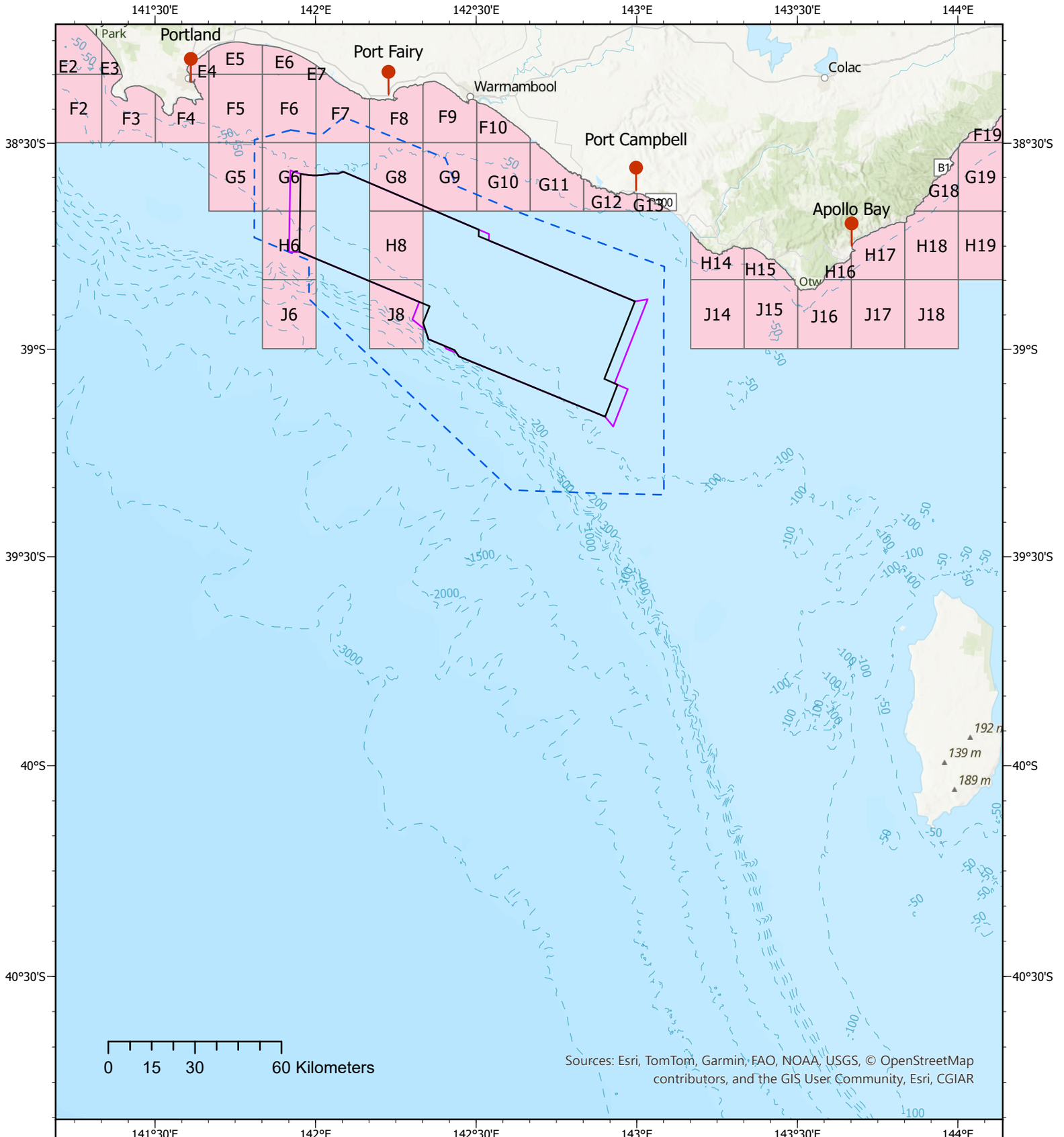
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

MaxVessel

- 1 - 2
- 3 - 5
- 6 - 8
- 9 - 13
- 14 - 18

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



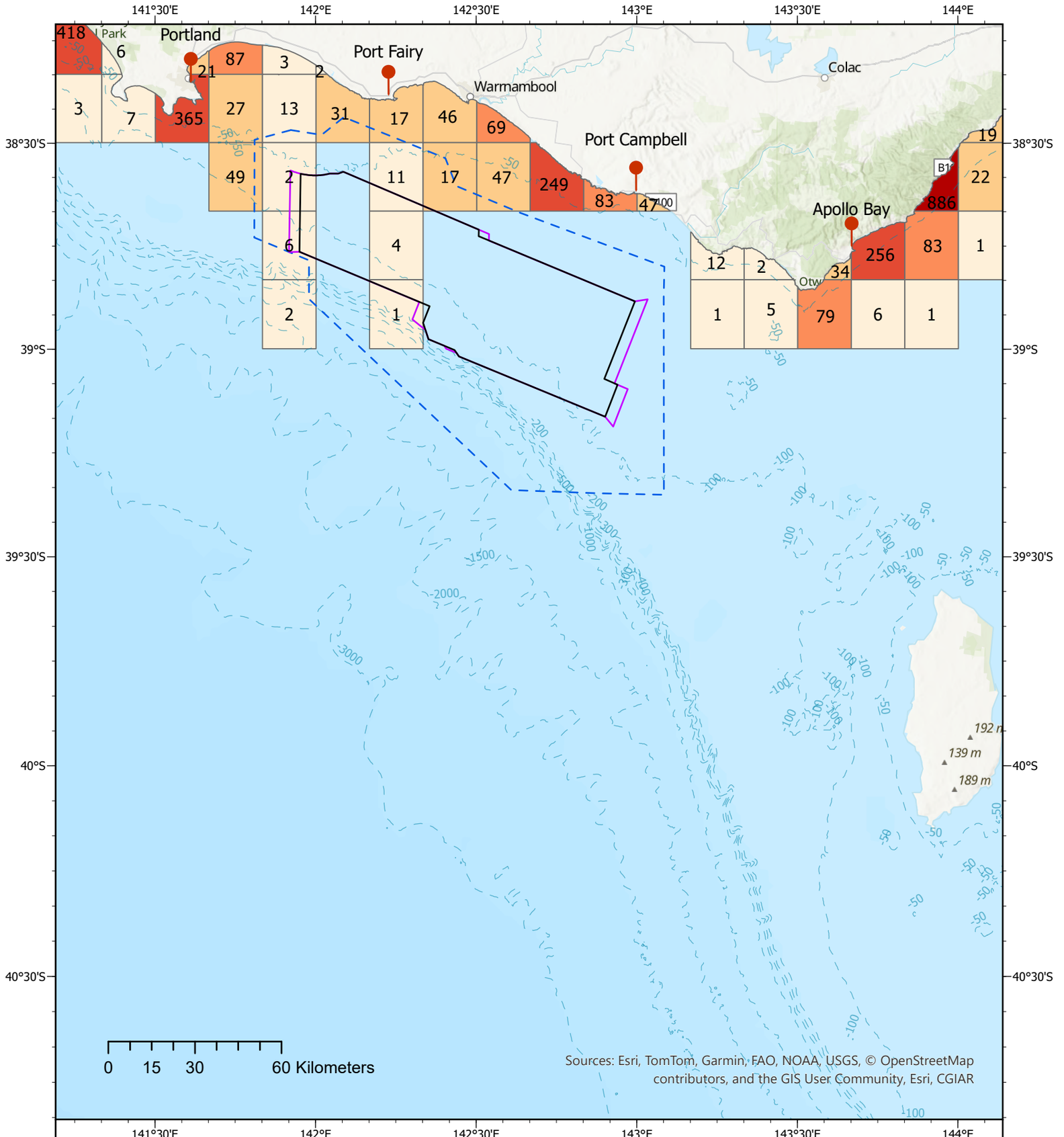
Ocean General Fishery - Fished Blocks - 2011-2022
Document Number - MAP-REG-EPM-112_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours
- Ocean General Fishery - Fished Blocks - 2011-2022

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Ocean General Fishery - Days Fished (Cumulative Total) - 2011-2022
Document Number - MAP-REG-EPM-113_A

REGIA Marine Seismic Survey

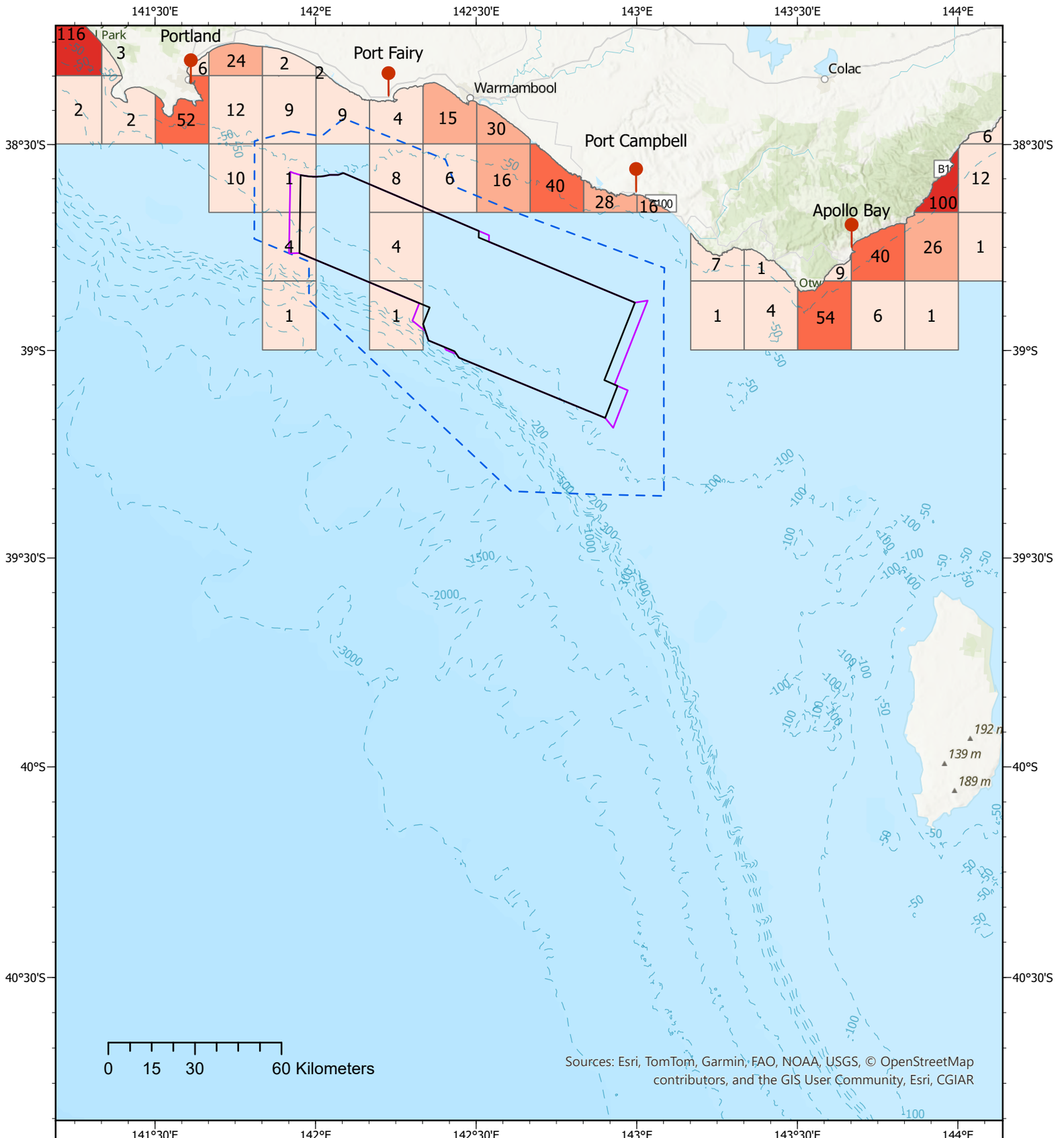
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Days Fished

- 1 - 13
- 14 - 49
- 50 - 149
- 150 - 450
- 451 - 1204

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Ocean General Fishery - Maximum Annual Days Fished In Any Given Year - 2011-2022

Document Number - MAP-REG-EPM-114_A

REGIA Marine Seismic Survey

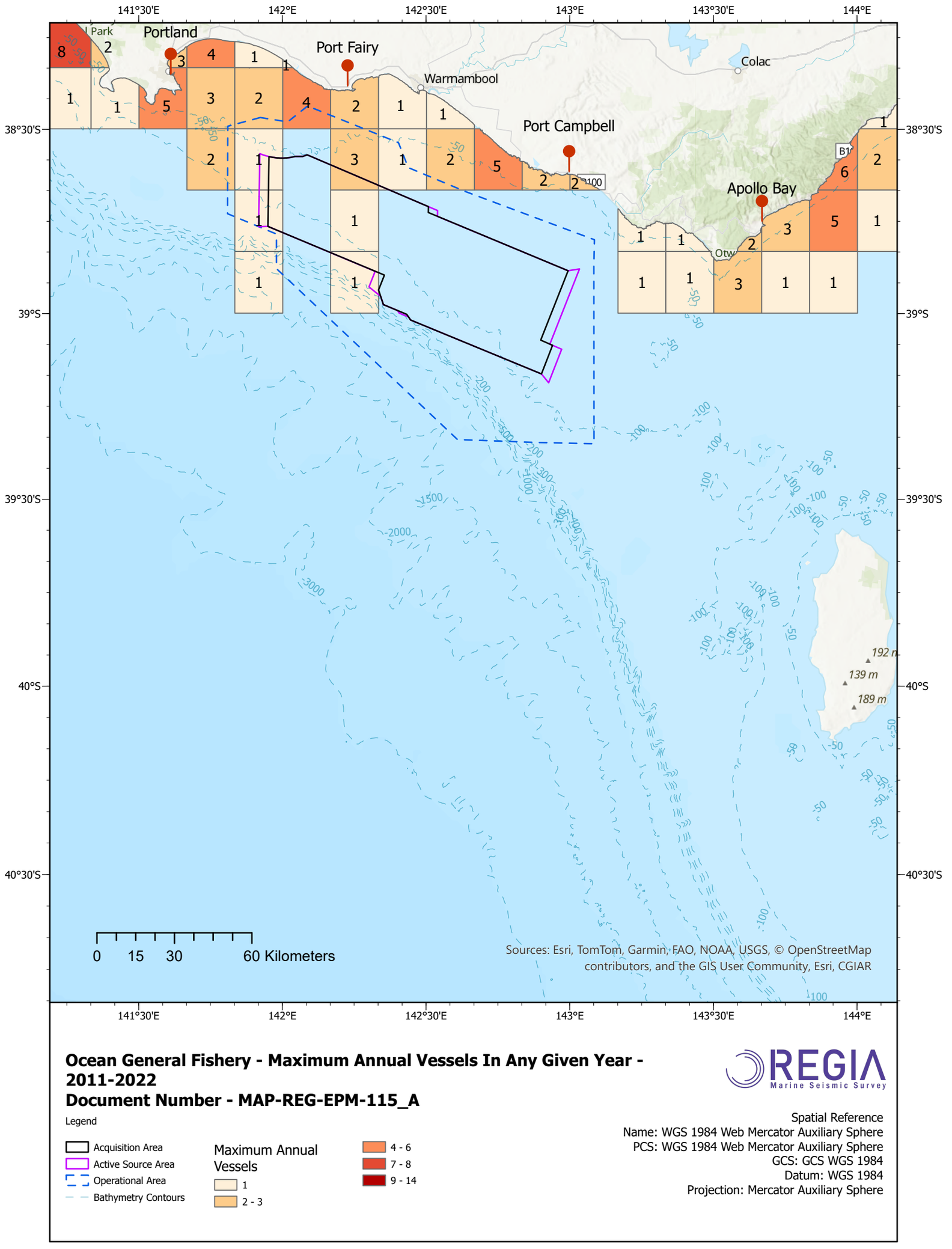
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Maximum Annual Days Fished

- 1 - 12
- 13 - 31
- 32 - 55
- 56 - 116
- 117 - 332

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Ocean General Fishery - Maximum Annual Vessels In Any Given Year - 2011-2022

Document Number - MAP-REG-EPM-115_A

REGIA Marine Seismic Survey

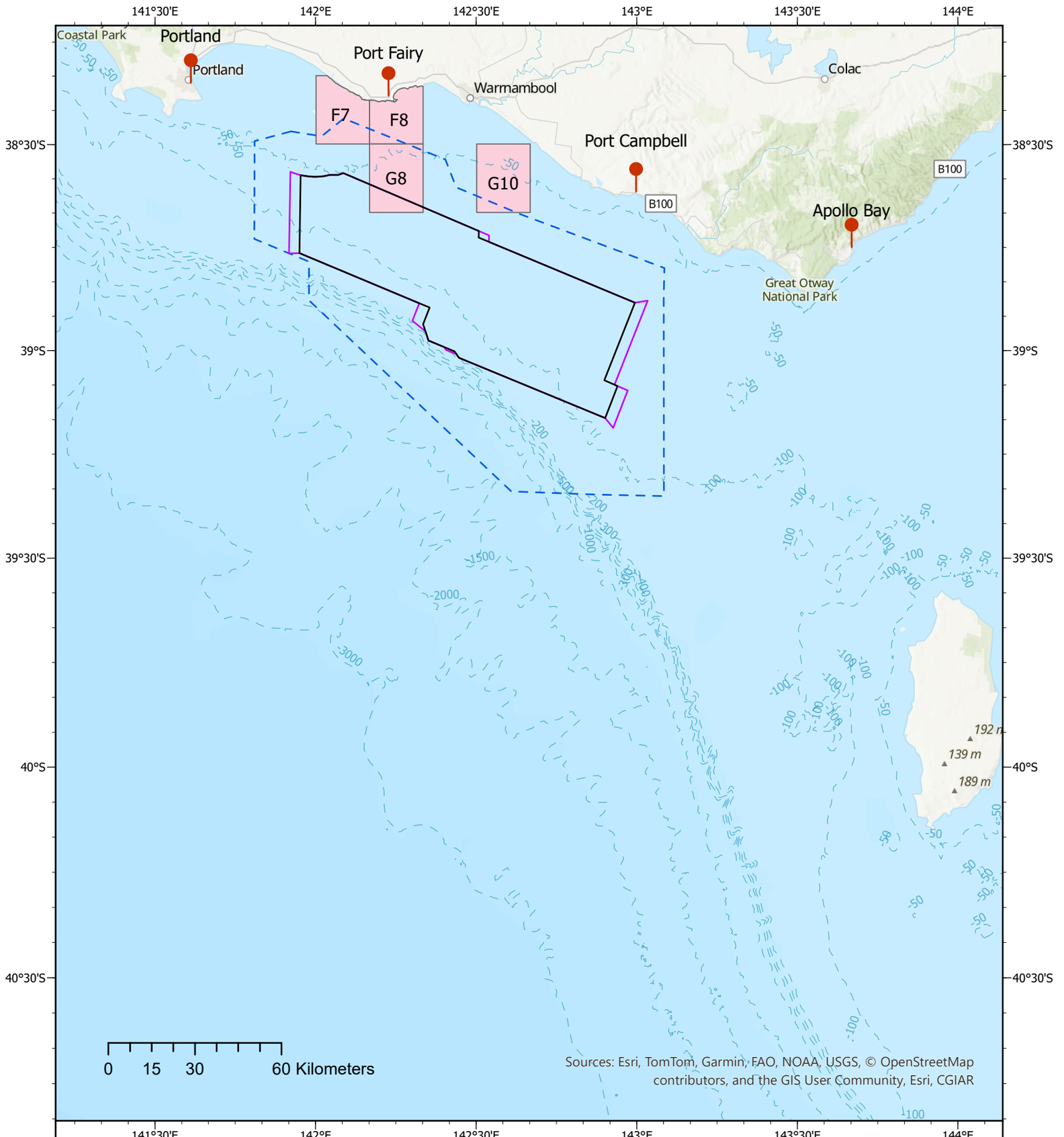
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Maximum Annual Vessels

- 1
- 2 - 3
- 4 - 6
- 7 - 8
- 9 - 14

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



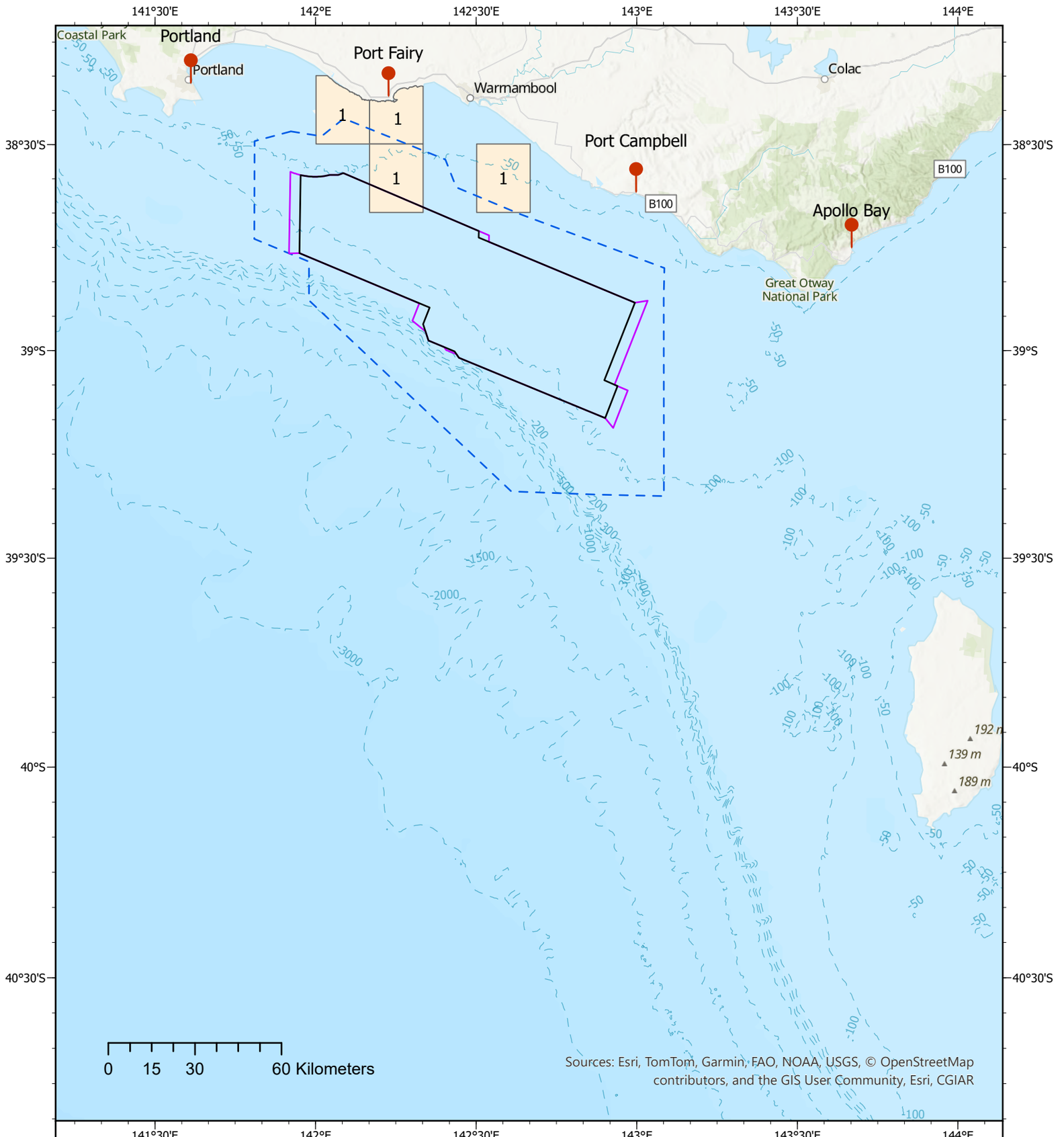
Octopus Fishery - Fished Blocks - 2020-2022
Document Number - MAP-REG-EPM-116_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours
- Octopus Fishery - Fished Blocks - 2020-2022

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Octopus Fishery - Days Fished (Cumulative Total) - 2020-2022
Document Number - MAP-REG-EPM-117_A

REGIA Marine Seismic Survey

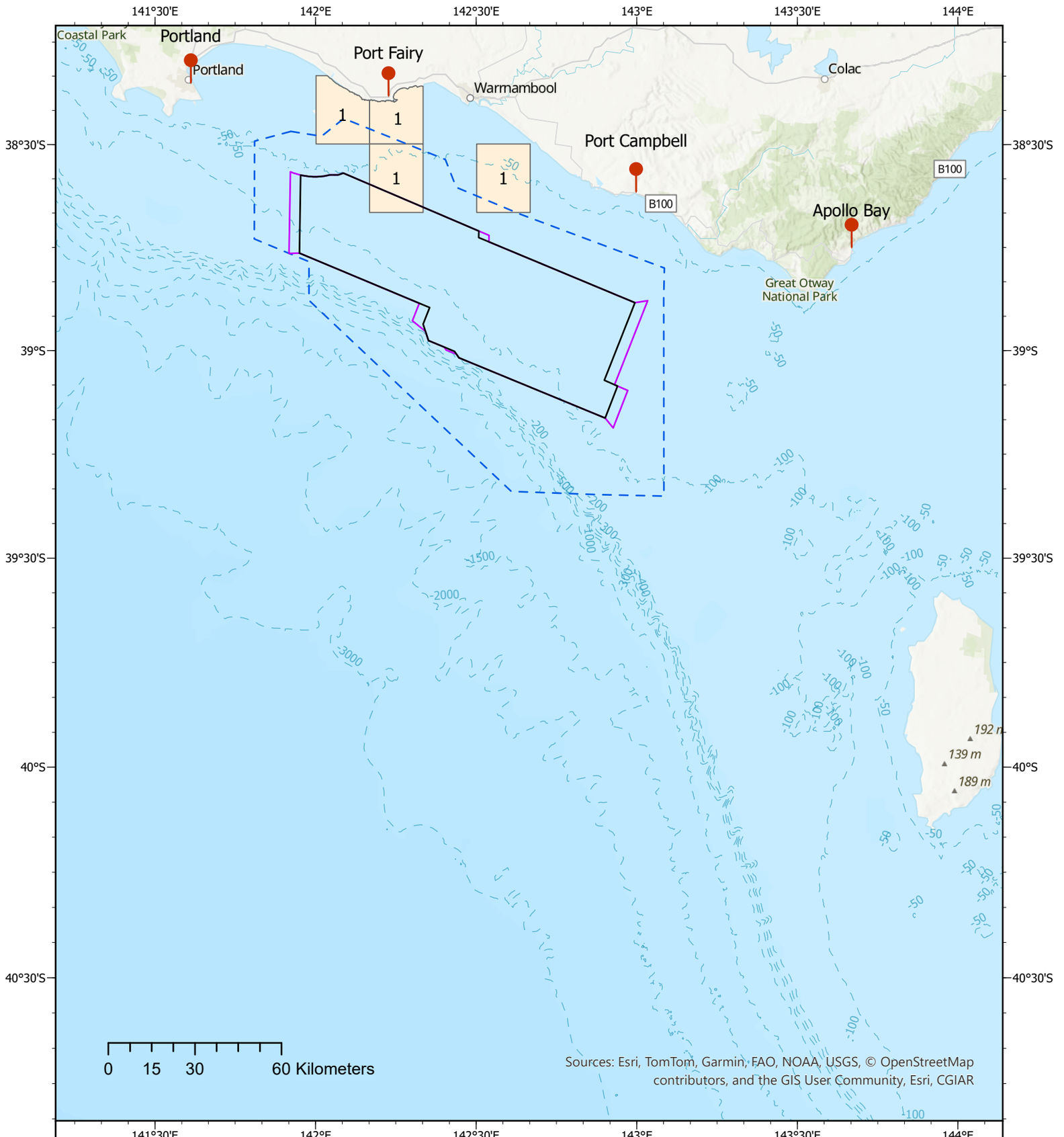
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Days Fished

- 1
- 2 - 3
- 4 - 8
- 9 - 24
- 25 - 38

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Octopus Fishery - Maximum Annual Days Fished In Any Given Year - 2020-2022

Document Number - MAP-REG-EPM-118_A

REGIA Marine Seismic Survey

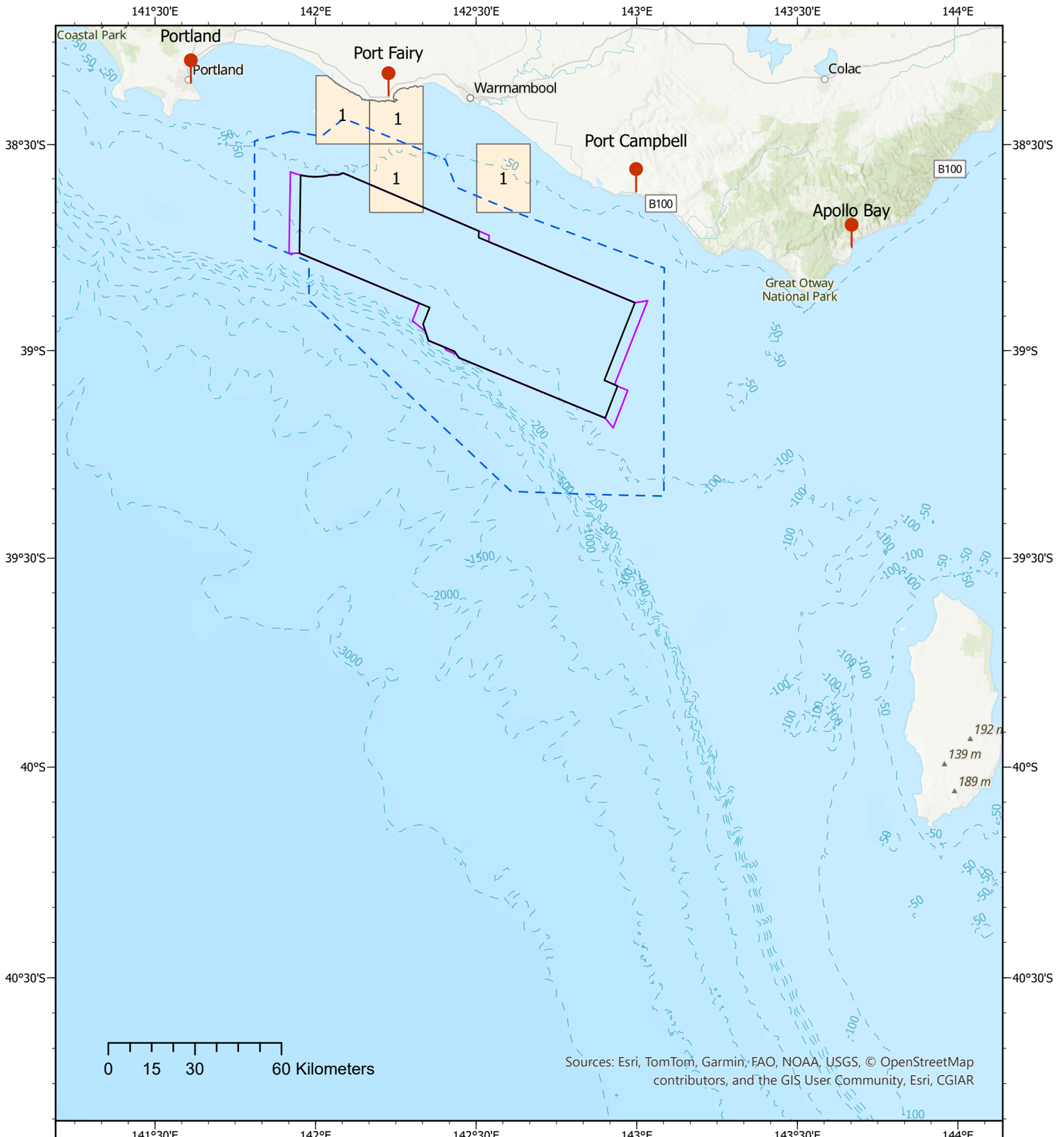
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Maximum Annual Days Fished

- 1 - 2
- 3 - 4
- 5 - 7
- 8 - 13
- 14 - 25

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Octopus Fishery - Maximum Annual Vessels In Any Given Year - 2020-2022
Document Number - MAP-REG-EPM-119_A

REGIA Marine Seismic Survey

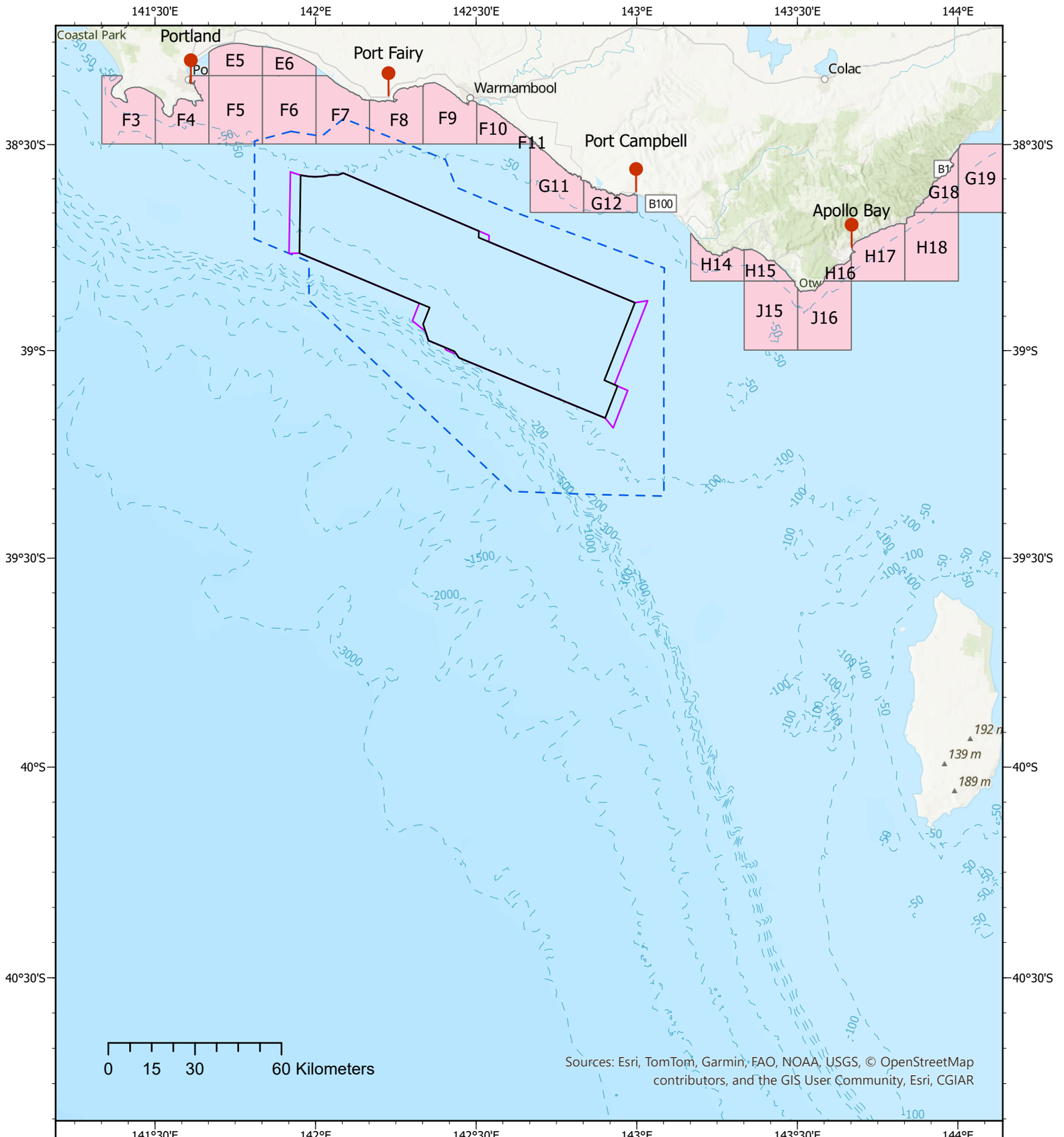
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Maximum Annual Vessels

- 1
- 2
- 3 - 4
- 5

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



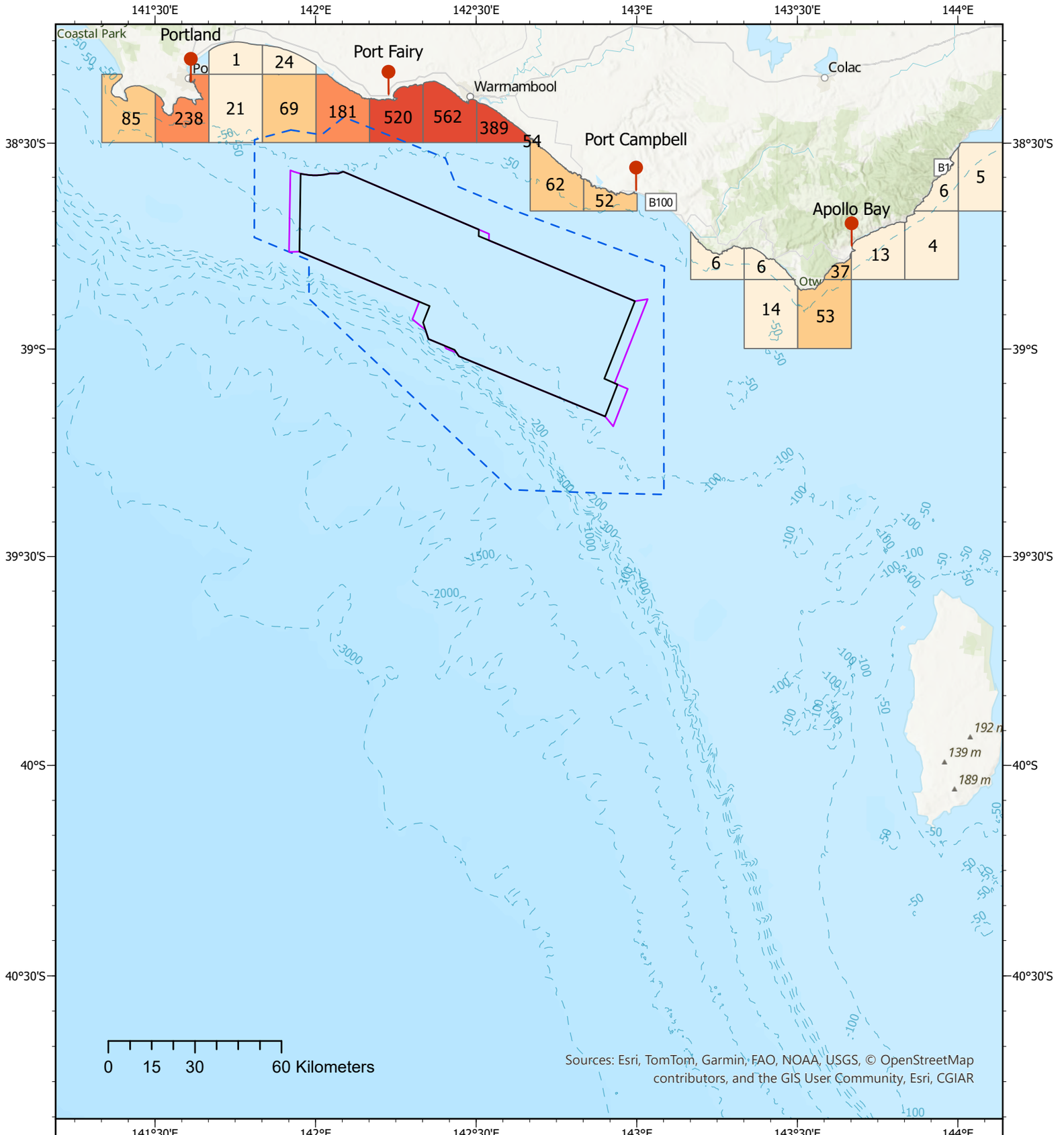
Ocean Wrasse Fishery - Fished Blocks - 2011-2022
Document Number - MAP-REG-EPM-120_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours
- Ocean Wrasse Fishery - Fished Blocks - 2011-2022

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Ocean Wrasse Fishery - Days Fished (Cumulative Total) - 2011-2022
Document Number - MAP-REG-EPM-121_A

REGIA Marine Seismic Survey

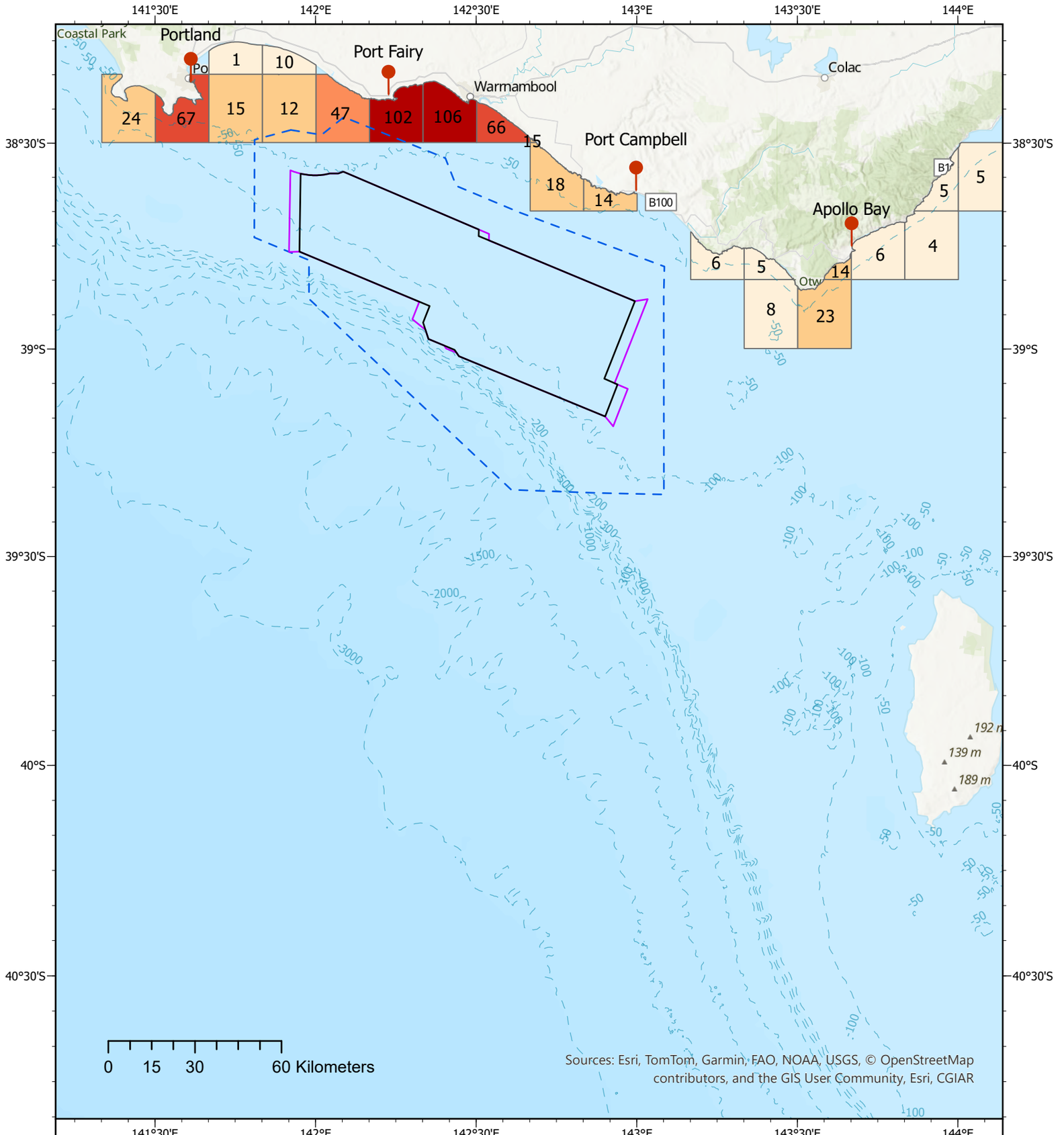
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Days Fished

- 1 - 24
- 25 - 106
- 107 - 309
- 310 - 562
- 563 - 862

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Ocean Wrasse Fishery - Maximum Annual Days Fished In Any Given Year - 2011-2022

Document Number - MAP-REG-EPM-122_A

REGIA Marine Seismic Survey

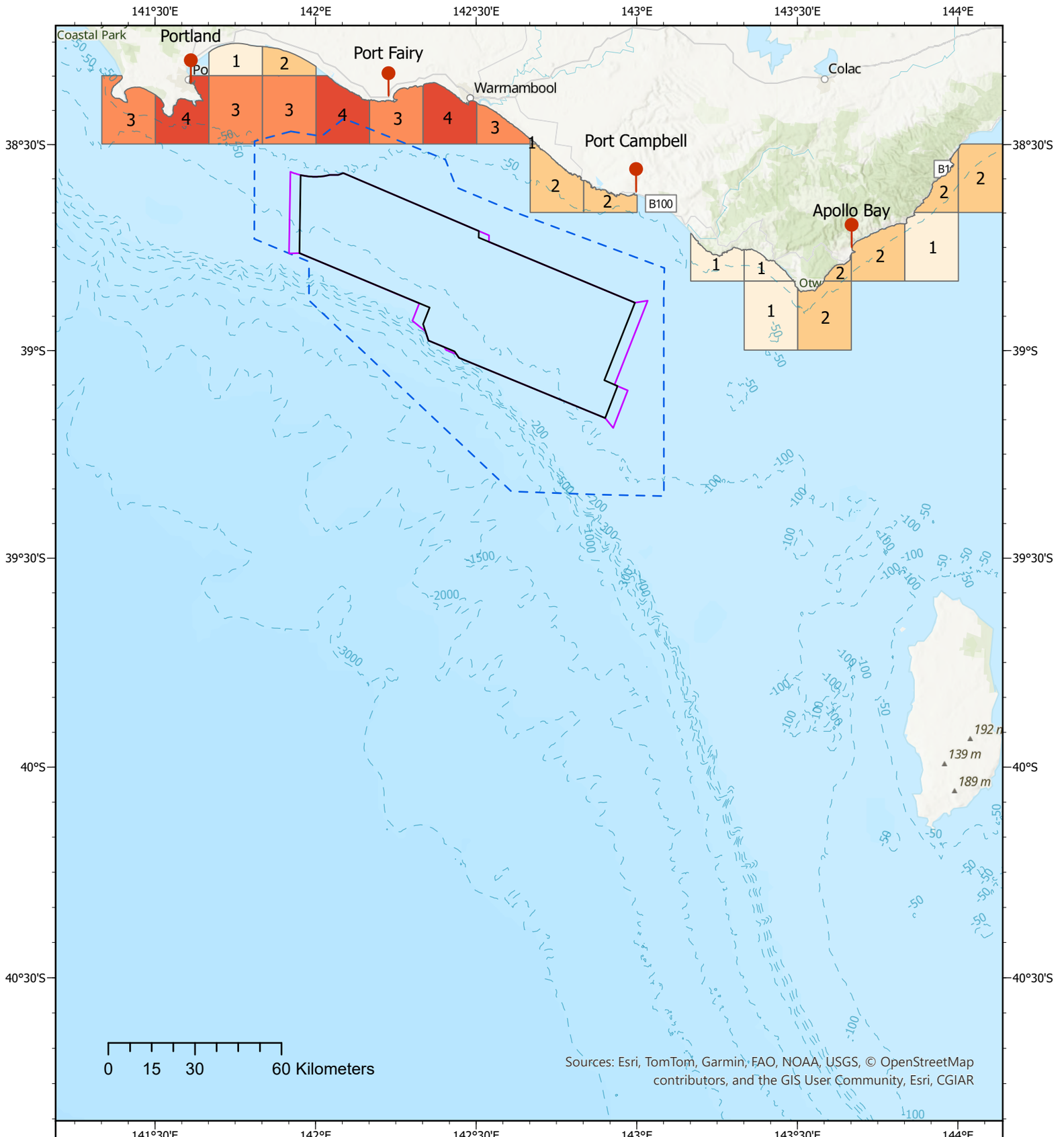
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Maximum Annual Days Fished

- 1 - 10
- 11 - 26
- 27 - 52
- 53 - 69
- 70 - 125

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



Ocean Wrasse Fishery - Maximum Annual Vessels In Any Given Year - 2011-2022

Document Number - MAP-REG-EPM-123_A

REGIA Marine Seismic Survey

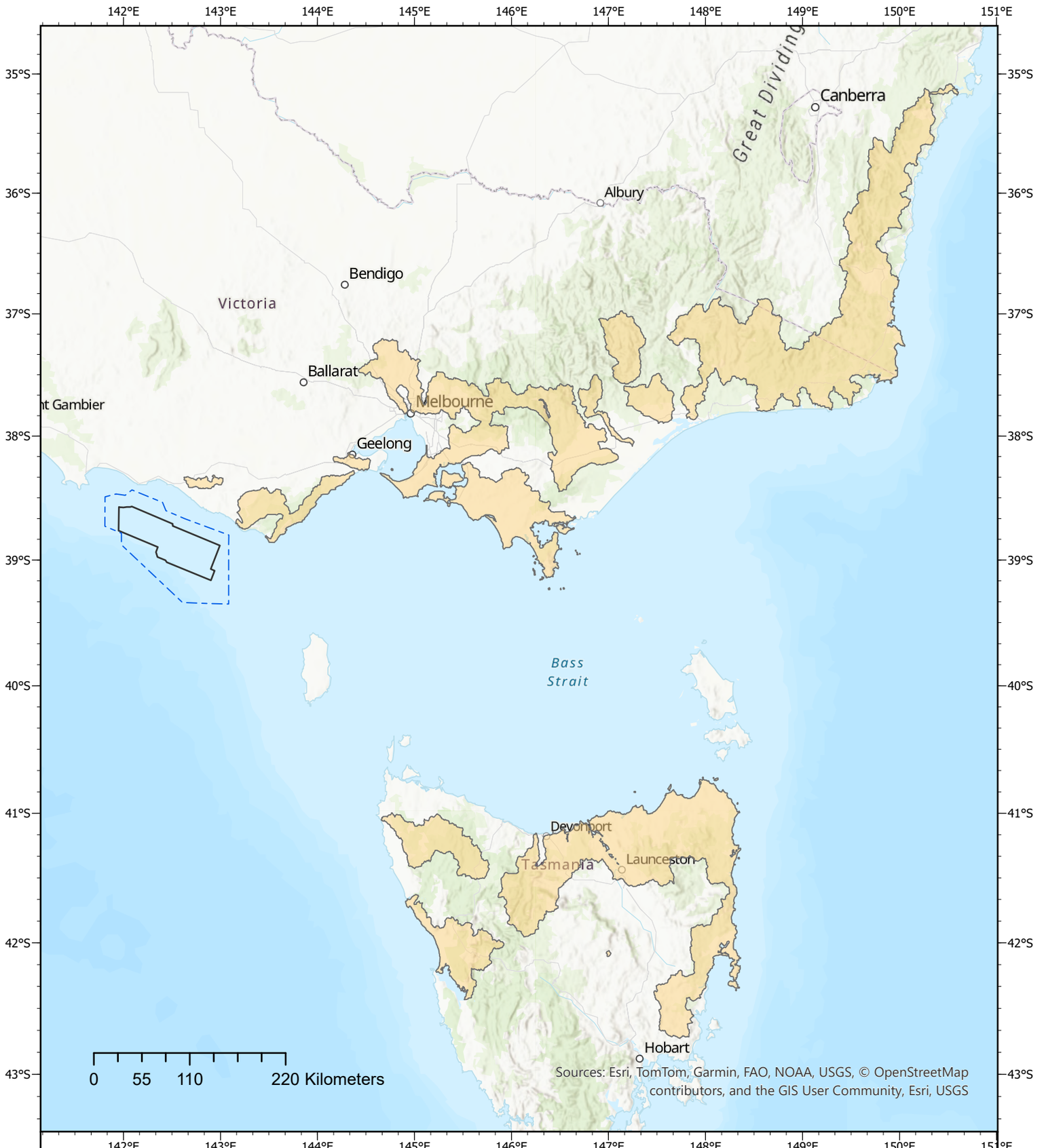
Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours

Maximum Annual Vessels

- 1
- 2
- 3
- 4 - 5
- 6 - 7

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



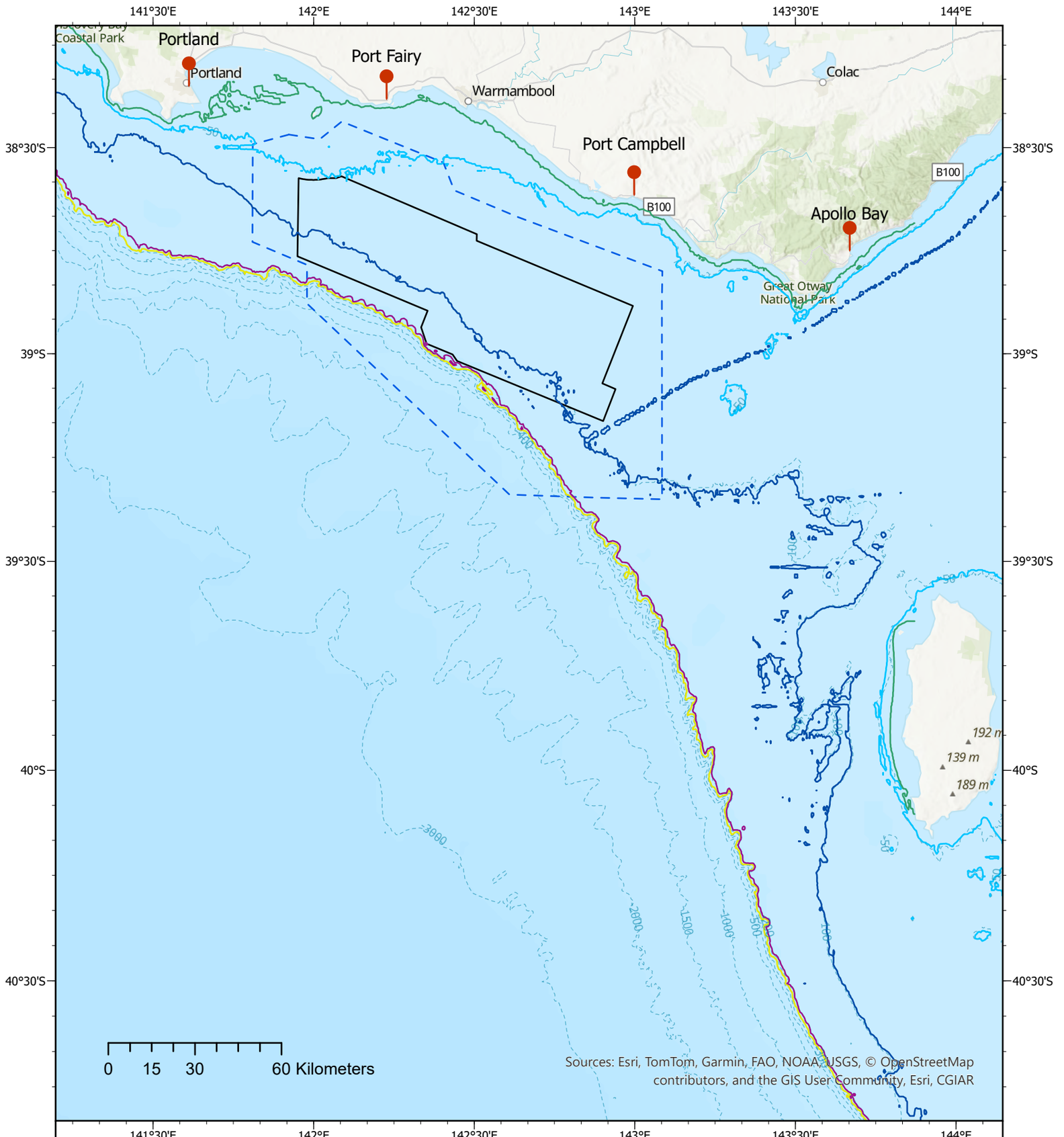
Australian Grayling Geographic Range
Document Number - MAP-REG-EPM-124_A

REGIA Marine Seismic Survey

Legend

- Survey Acquisition Area
- Operational Area
- Australian Grayling Geographic Range

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



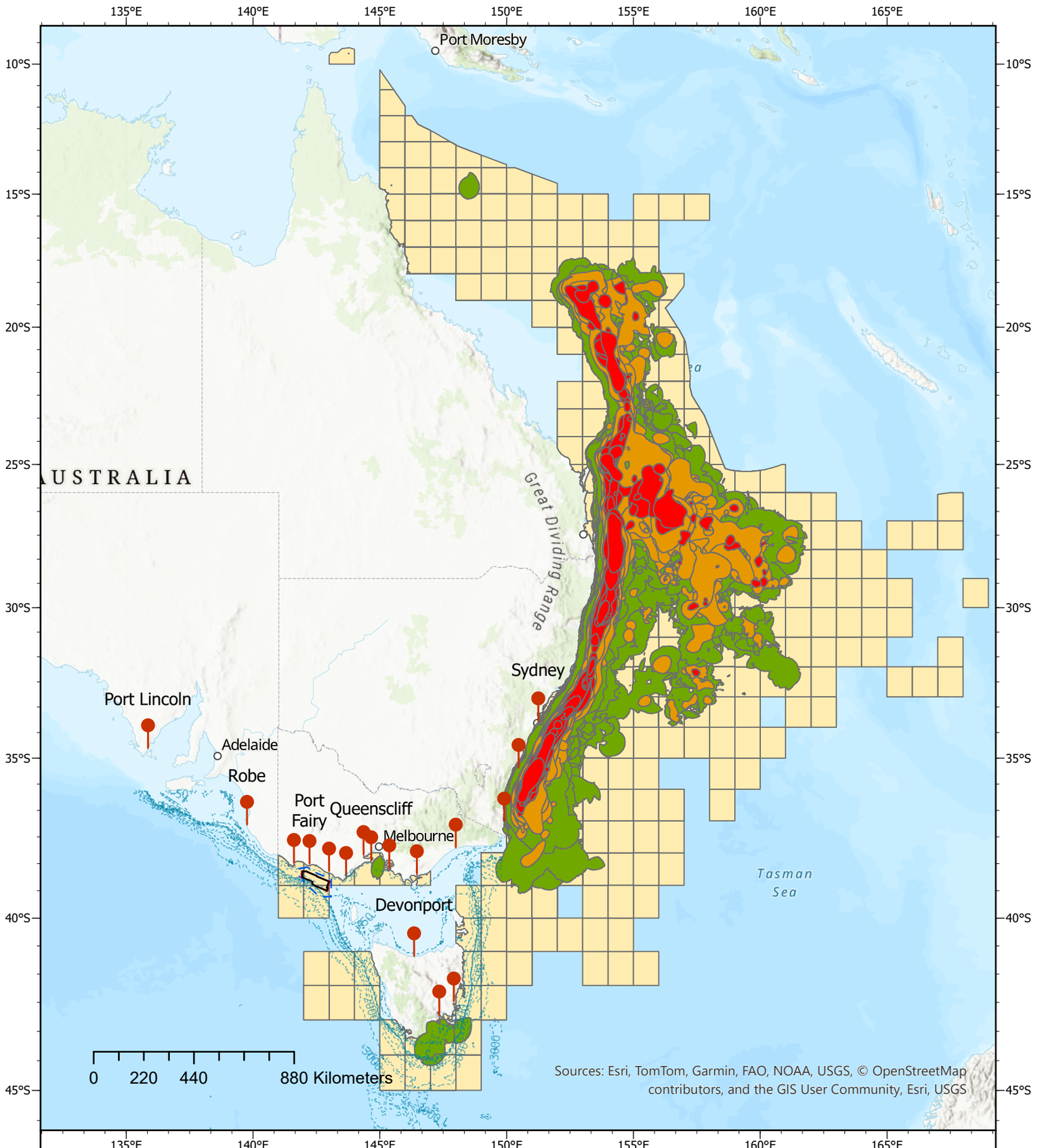
Bathymetry Contours -30m, -50m, -100m, -200m, -250m
Document Number - MAP-REG-EPM-125_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Operational Area
- Bathymetry Contours
- -30m contour
- -50m contour
- -100m contour
- -200m contour
- -250m contour

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



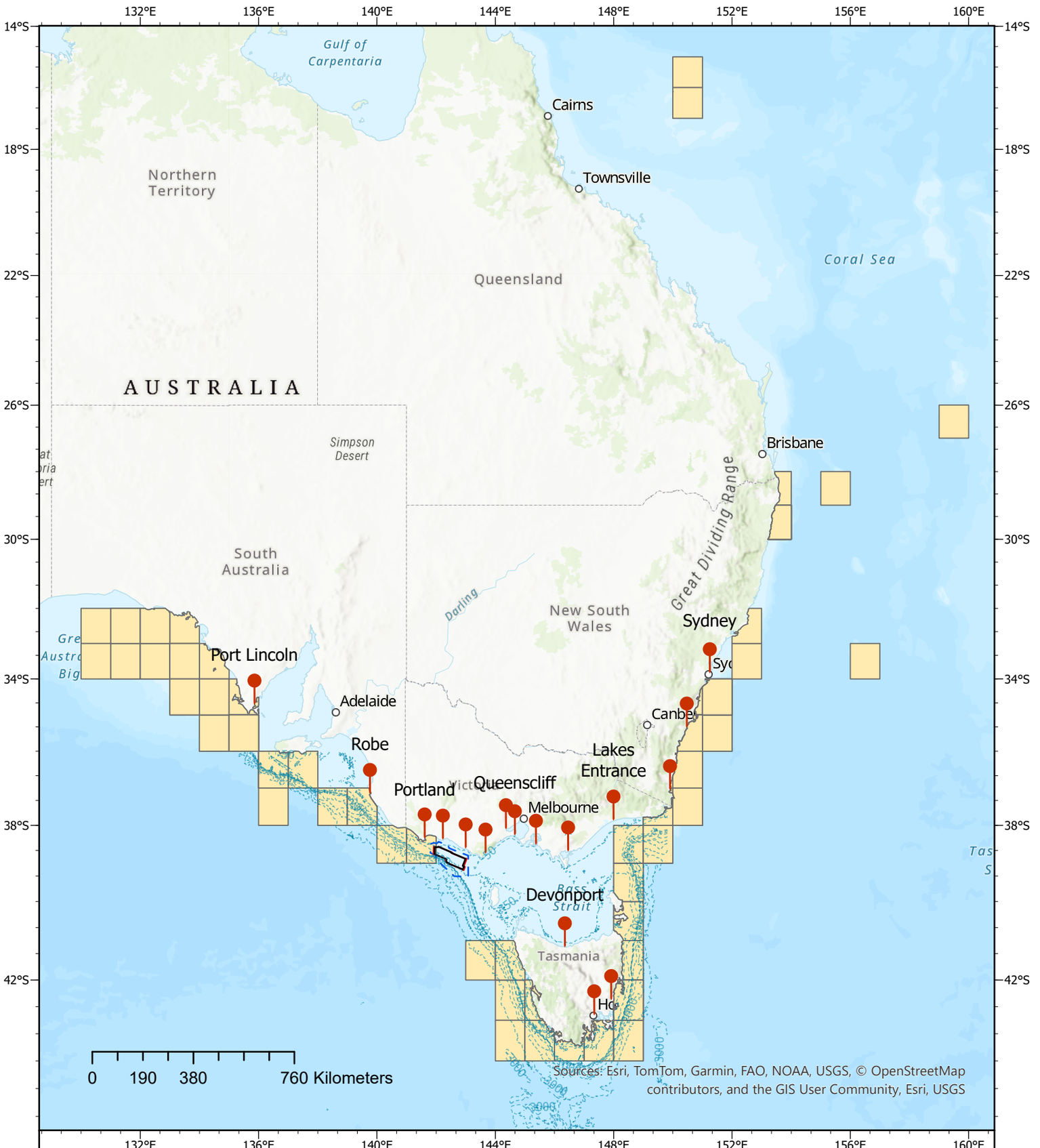
Eastern Tuna And Billfish Fishery - 2010-2023
Document Number - MAP-REG-EPM-126_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- ETBF Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



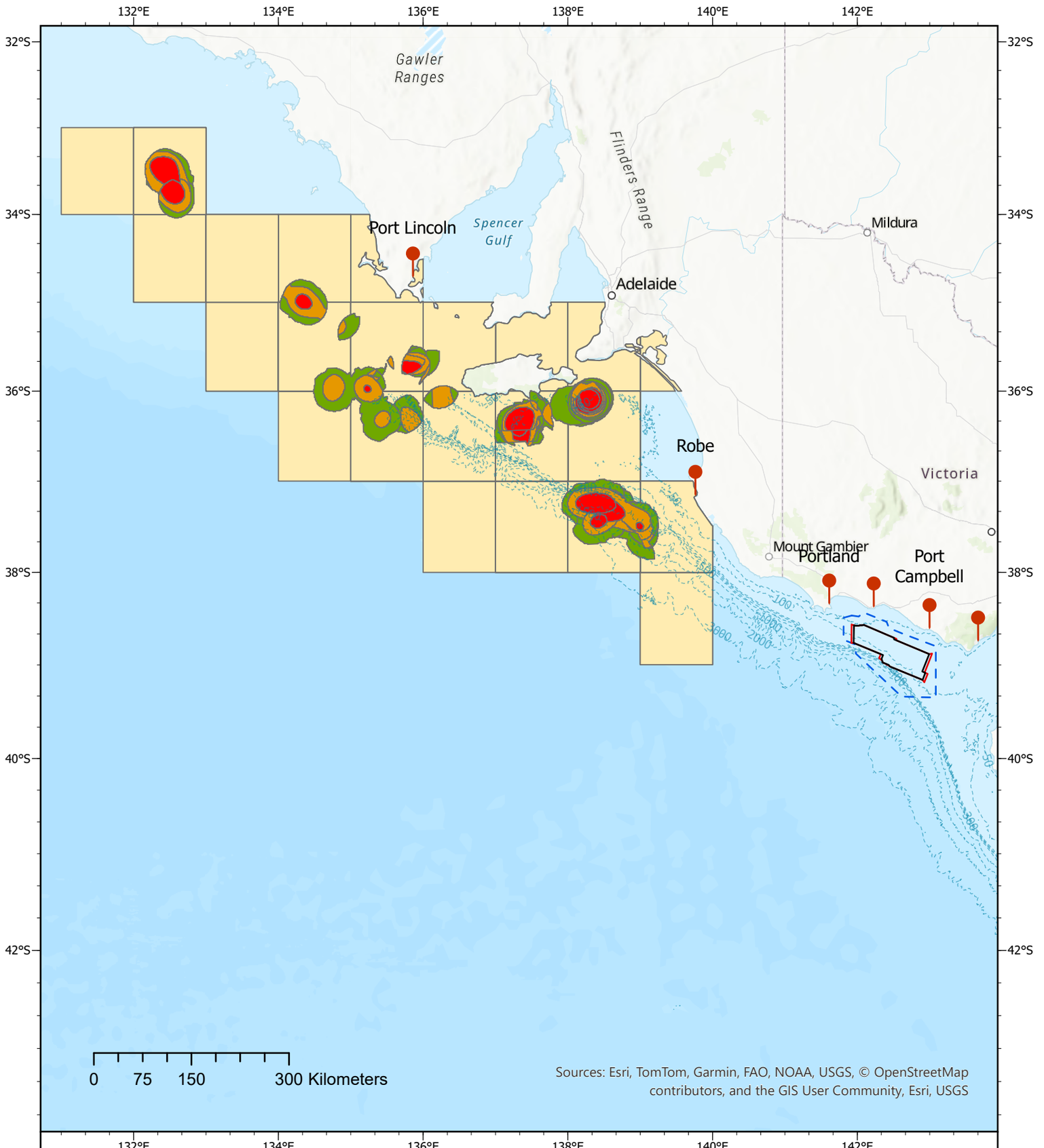
Small Pelagic Fishery - 2010-2023
Document Number - MAP-REG-EPM-127_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Small Pelagic Fishery Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



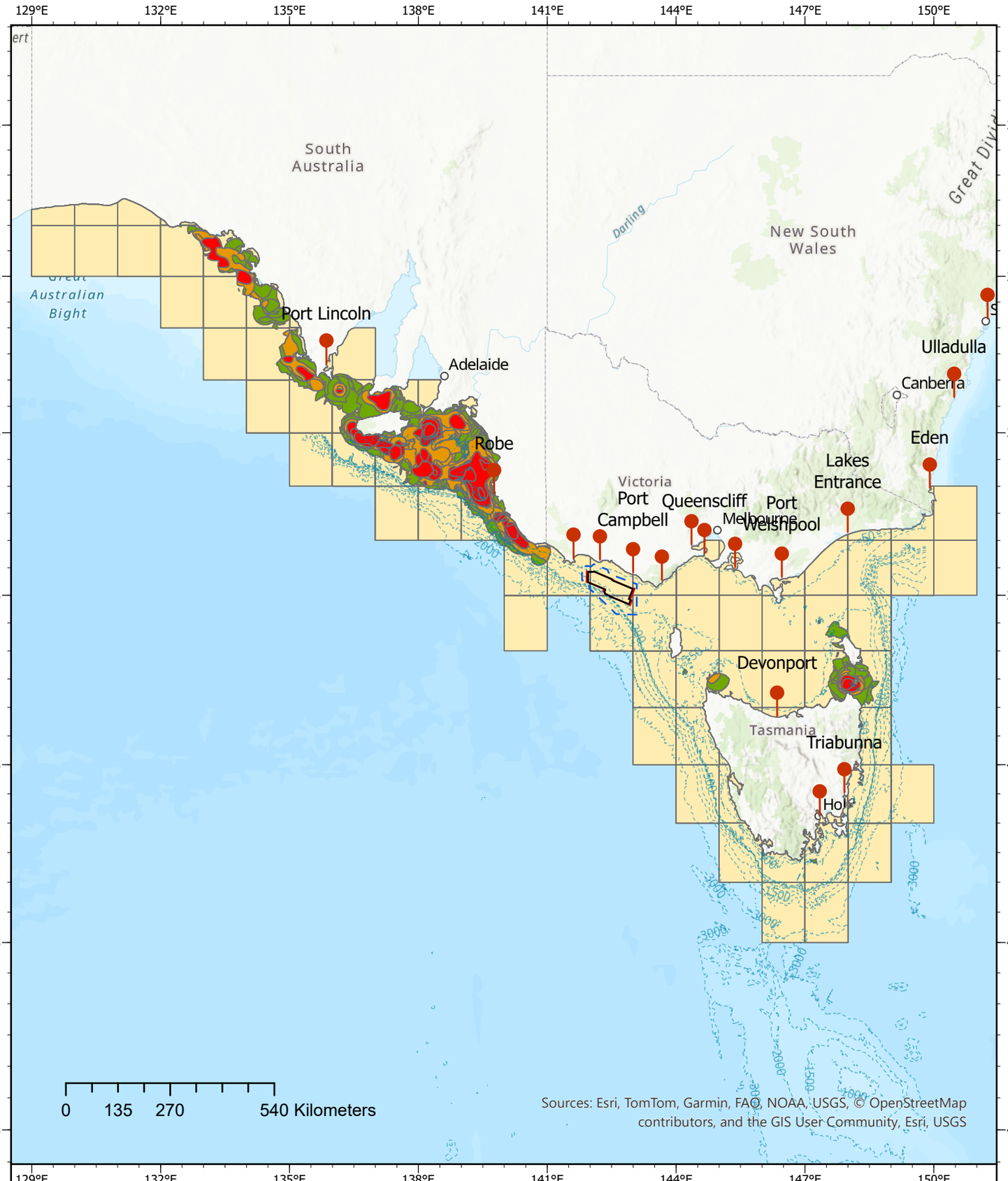
Southern Bluefin Tuna Fishery Purse Seine Sector - 2010-2023
Document Number - MAP-REG-EPM-128_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SBTFPS Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



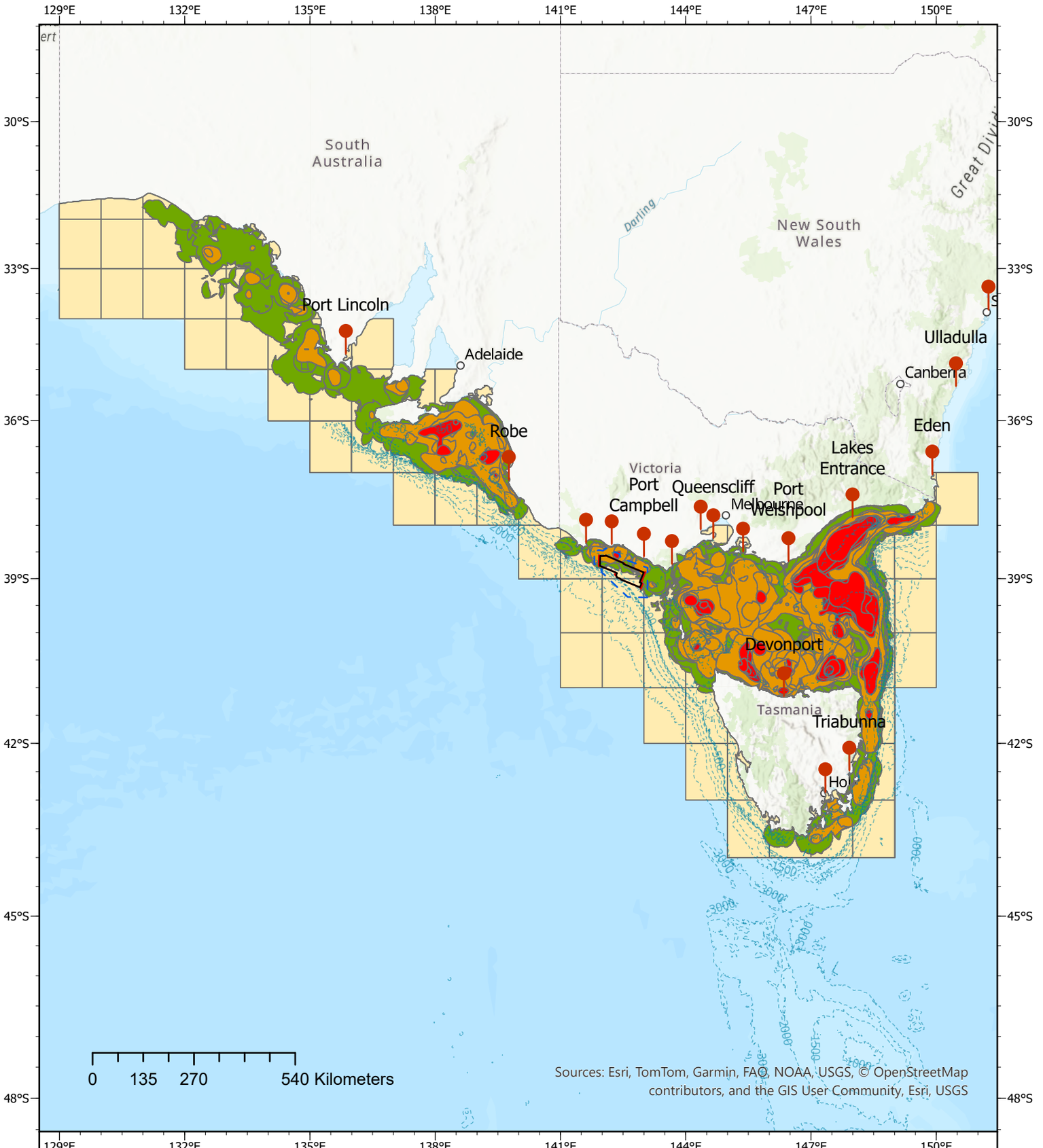
Southern and Eastern Scalefish and Shark Fishery SSKK - 2010-2023
Document Number - MAP-REG-EPM-129_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SSKK Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



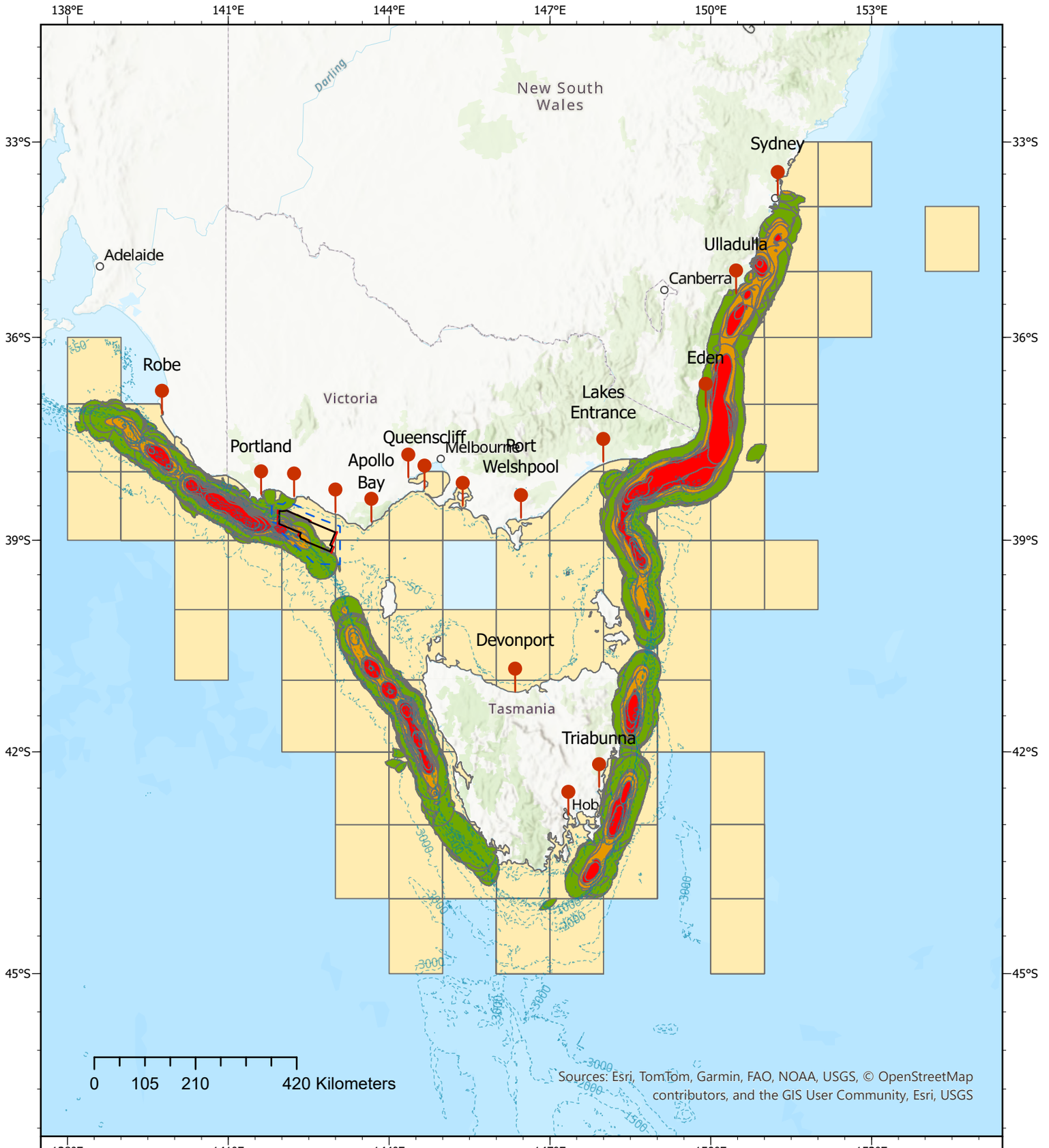
Southern and Eastern Scalefish and Shark Fishery SSKN - 2010-2023
Document Number - MAP-REG-EPM-130_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SSKN Maximum Area Fished
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



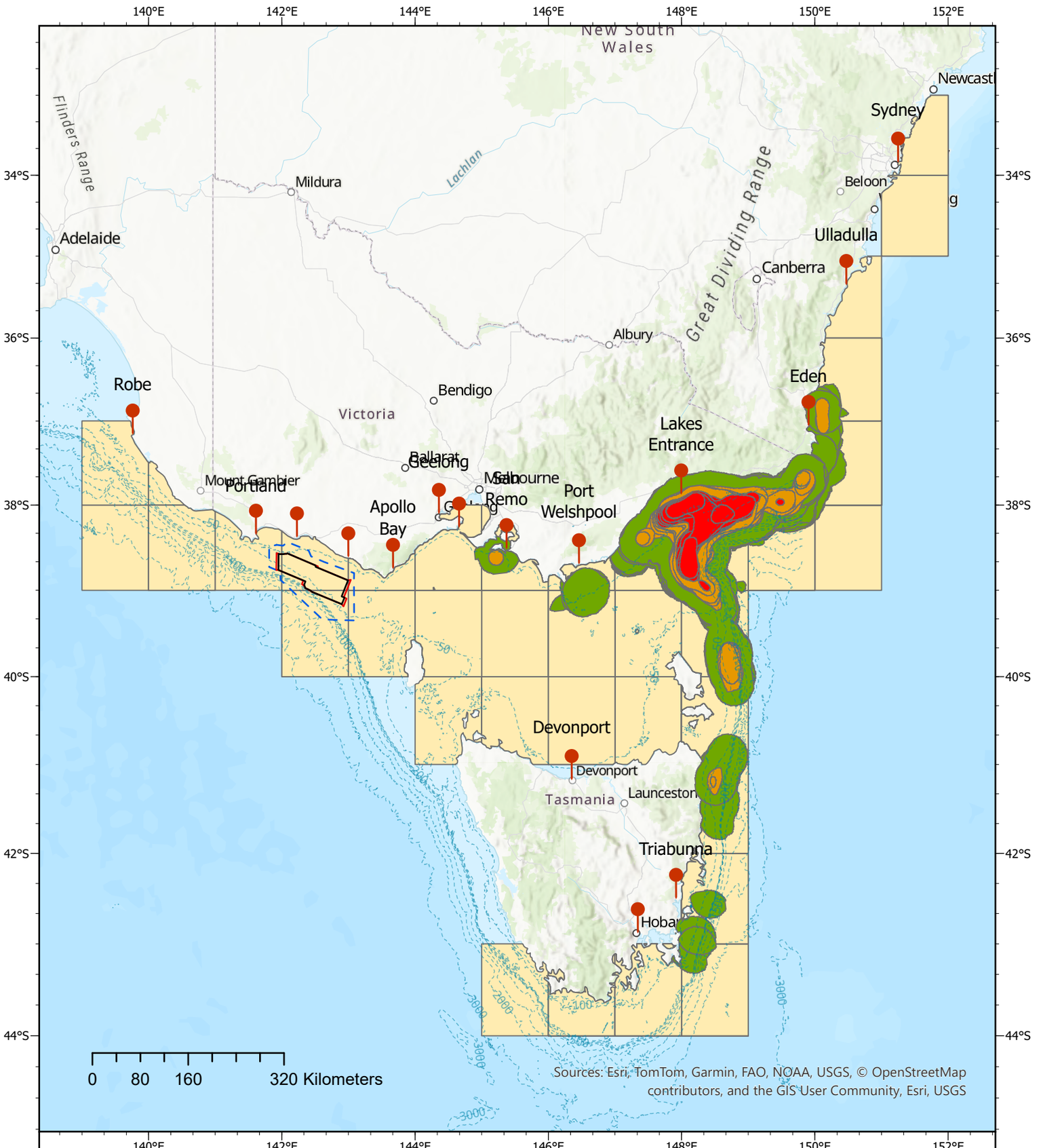
Southern and Eastern Scalefish and Shark Fishery SCTR - 2010-2023
Document Number - MAP-REG-EPM-131_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SCTR Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



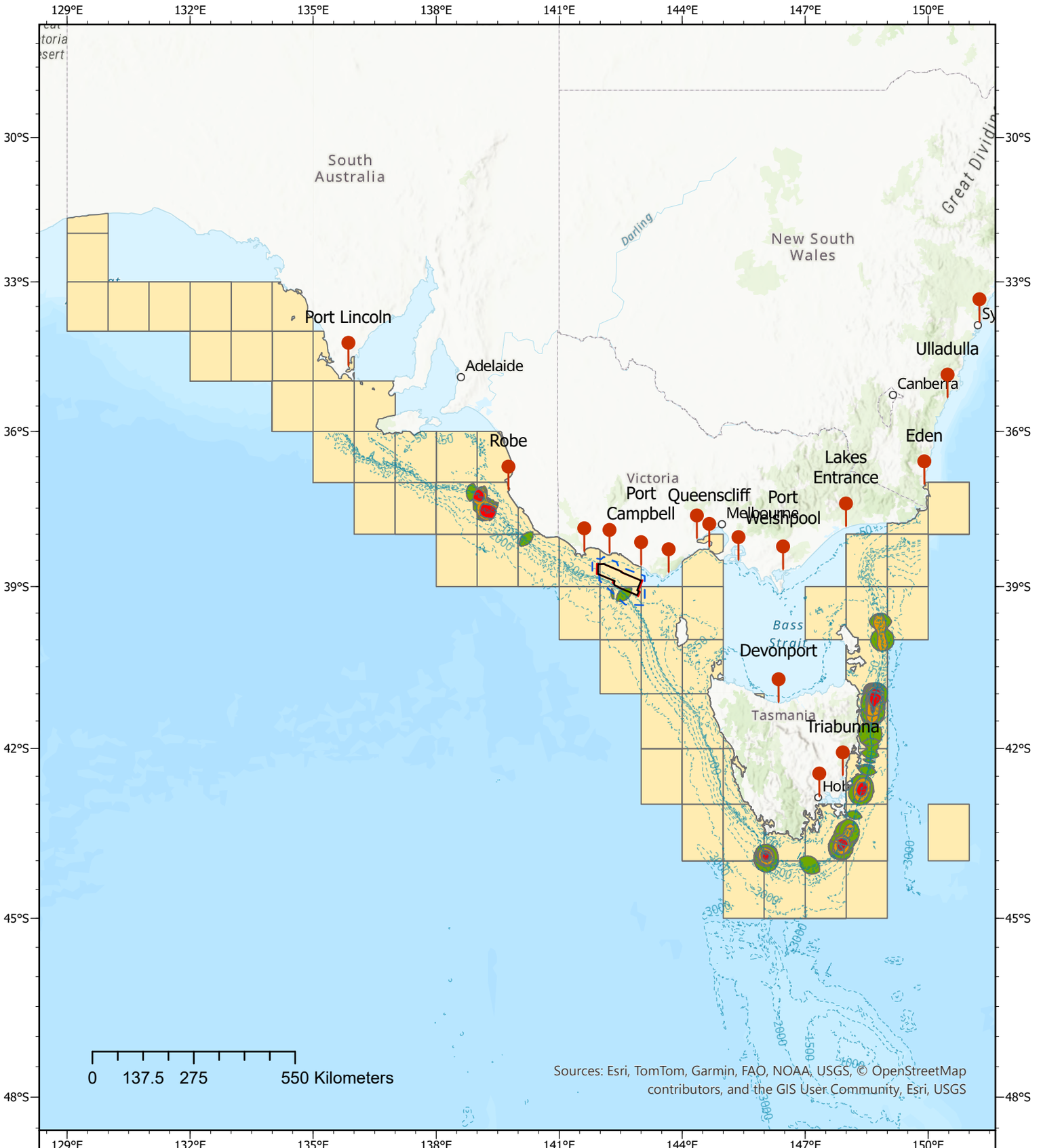
Southern and Eastern Scalefish and Shark Fishery SCDS - 2010-2023
Document Number - MAP-REG-EPM-132_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SCDS Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



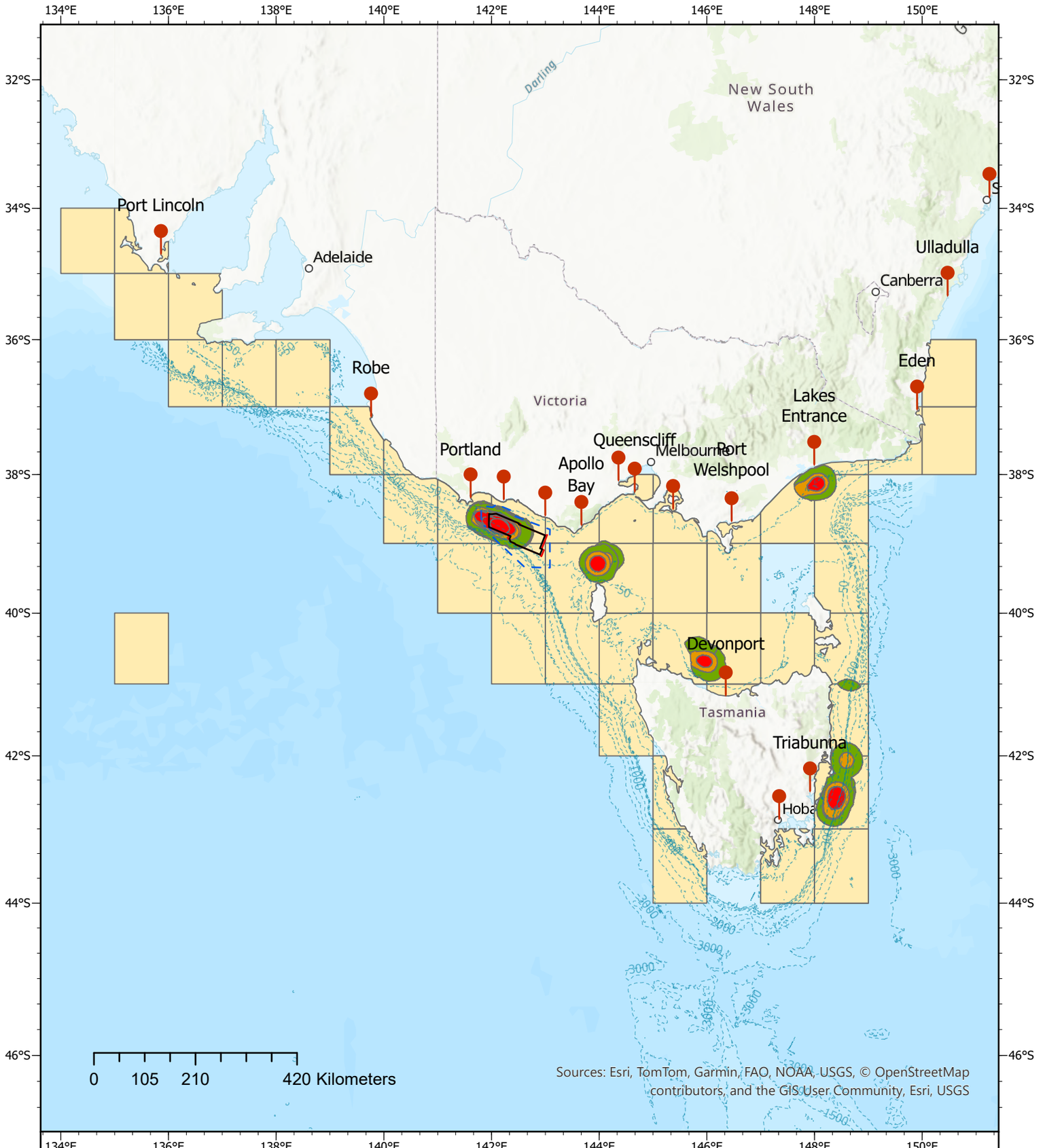
Southern and Eastern Scalefish and Shark Fishery SSCK - 2010-2023
Document Number - MAP-REG-EPM-133_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SSCK Maximum Area Fished 2010-2022
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



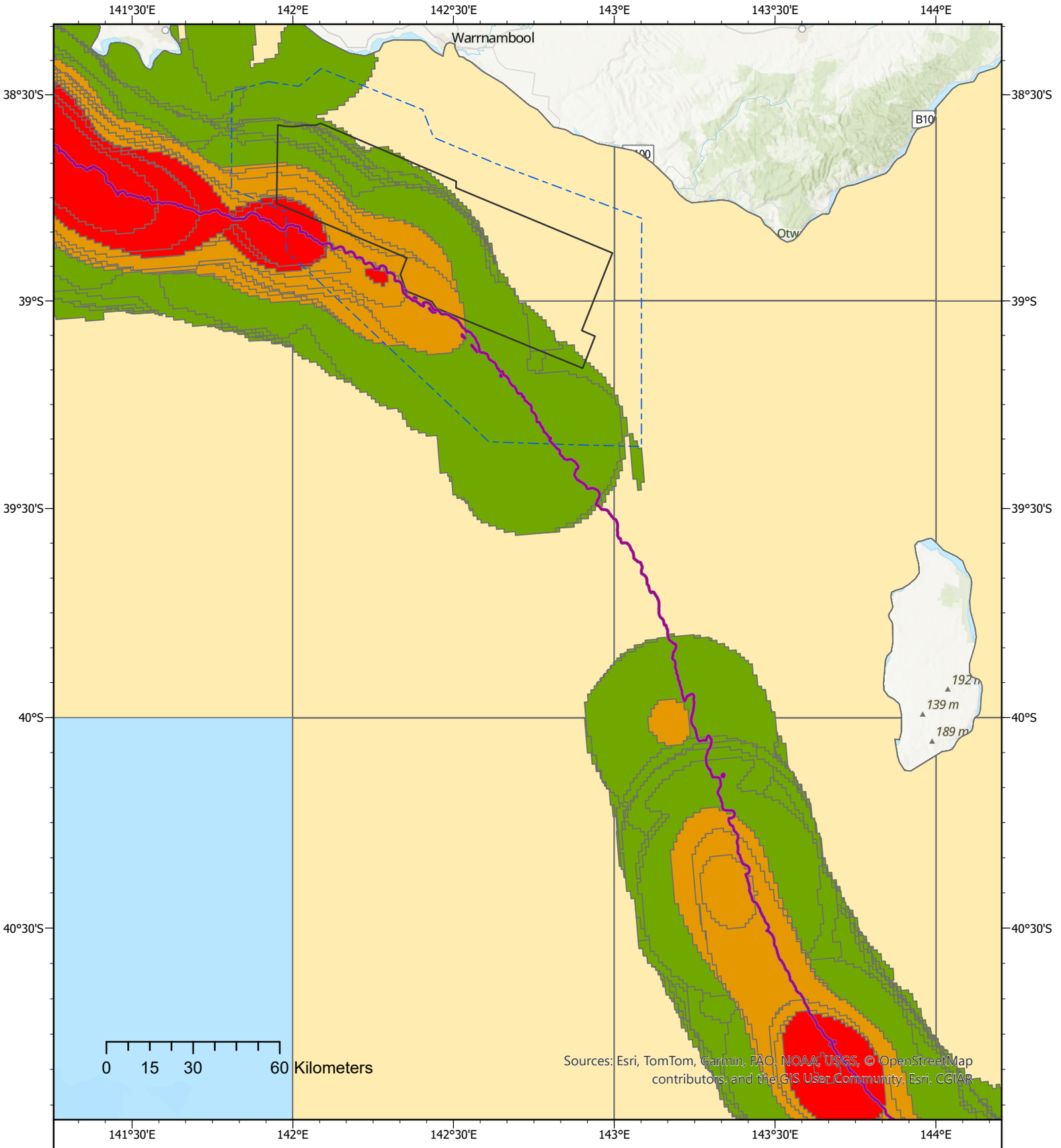
Southern Squid Jig Fishery SSJF - 2010-2023
Document Number - MAP-REG-EPM-134_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SSJF Maximum Area Fished 2010-2023
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



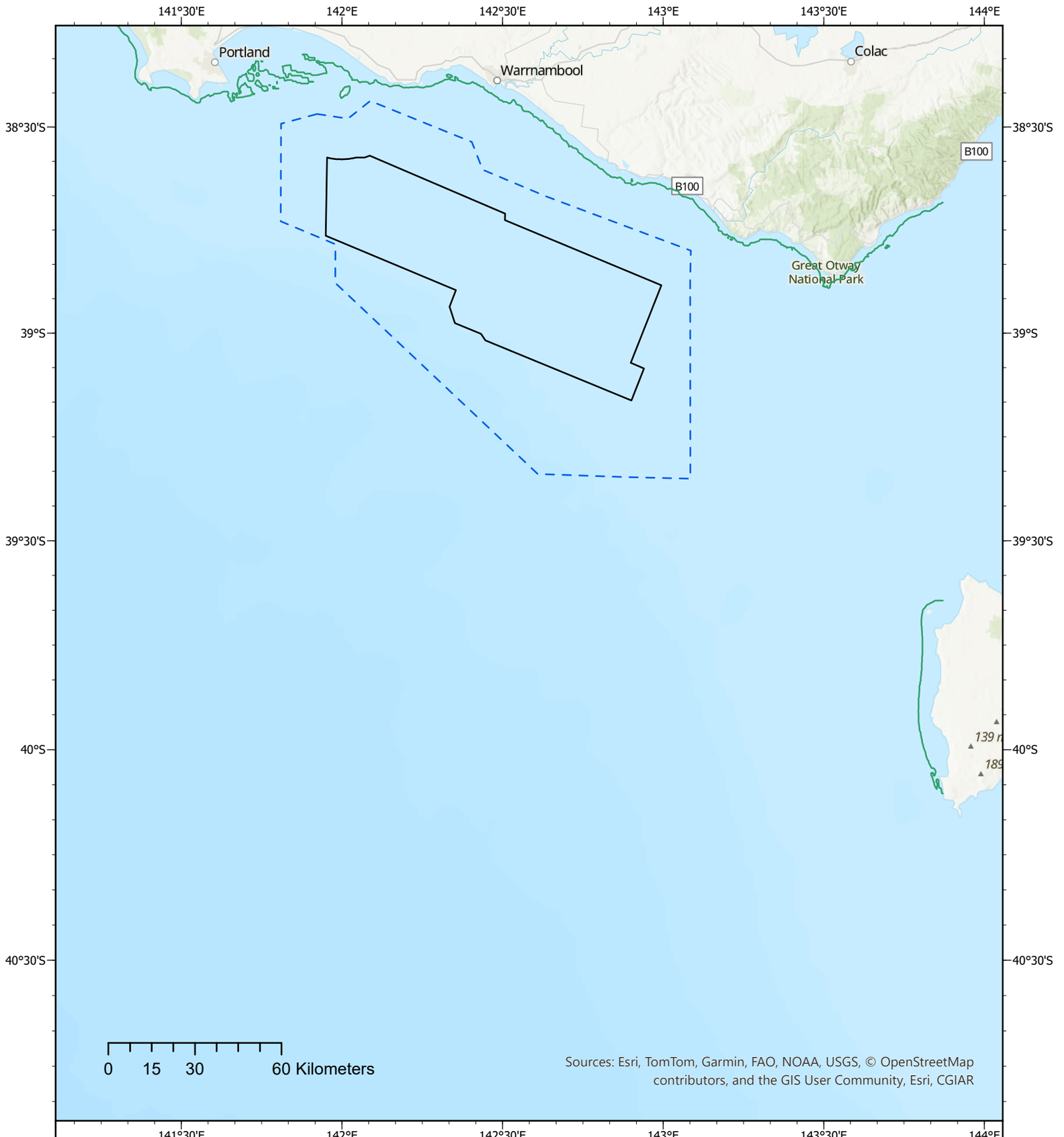
-200m Bathymetry and SESSF SCTR 2010-2023
Document Number - MAP-REG-EPM-135_A

REGIA Marine Seismic Survey

Legend

- Survey Acquisition Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SCTR Maximum Area Fished 2010-2023
- -200 contour

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



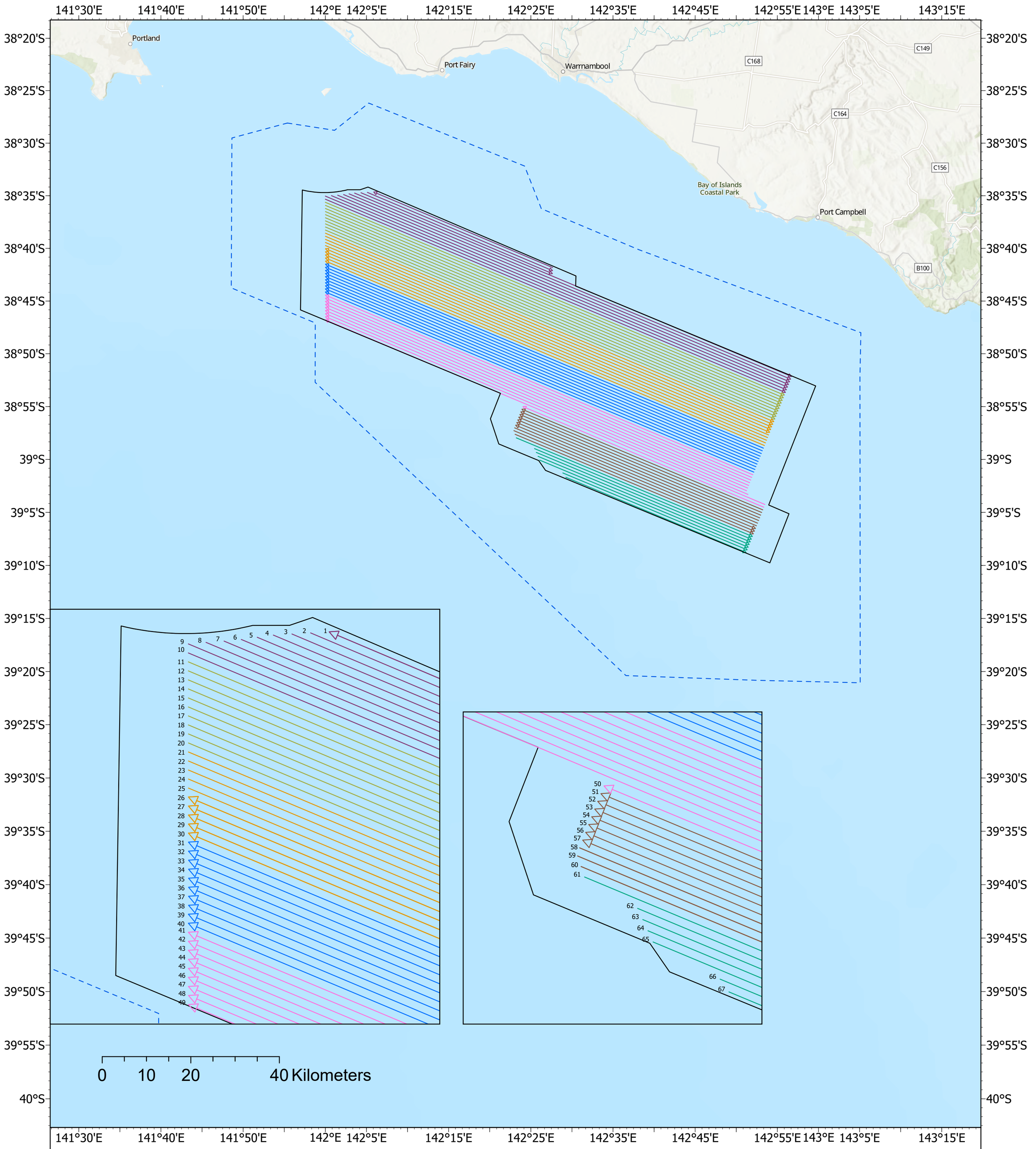
-30m Bathymetry
Document Number - MAP-REG-EPM-136_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Operational Area
- -30m contour

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



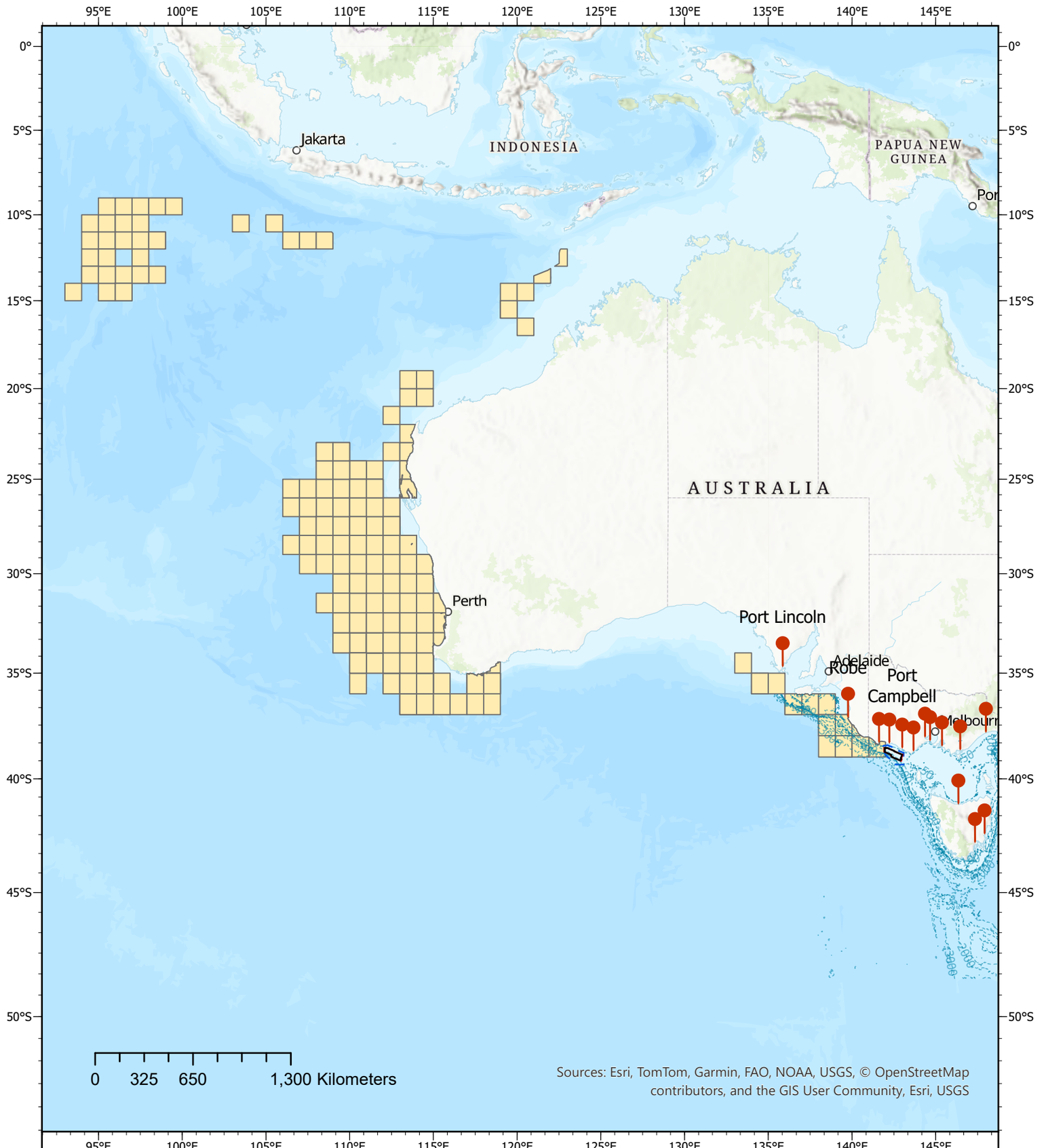
Sail Lines Numbered
Document Number - MAP-REG-EPM-137_A

REGIA
Marine Seismic Survey

Legend

- Operational Area
- Acquisition Area
- Sail Lines 1-10
- Sail Lines 11-20
- Sail Lines 21-30
- Sail Lines 31-40
- Sail Lines 41-50
- Sail Lines 51-60
- Sail Lines 61-67

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



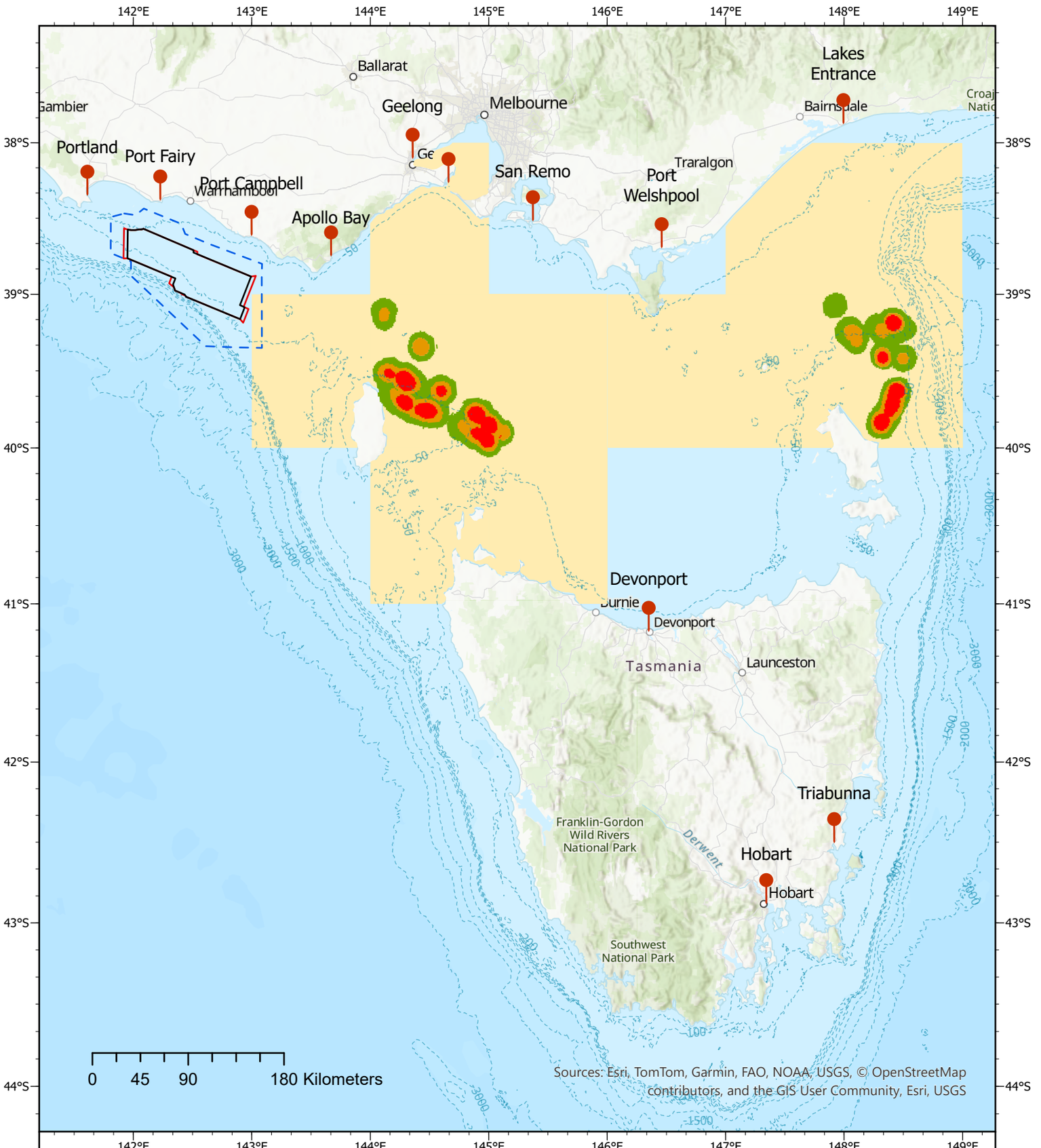
Western Tuna and Billfish Fishery
Document Number - MAP-REG-EPM-138_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- Bathymetry Contours
- Western Tuna and Billfish Fishery Maximum Area Fished 2010-2023

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



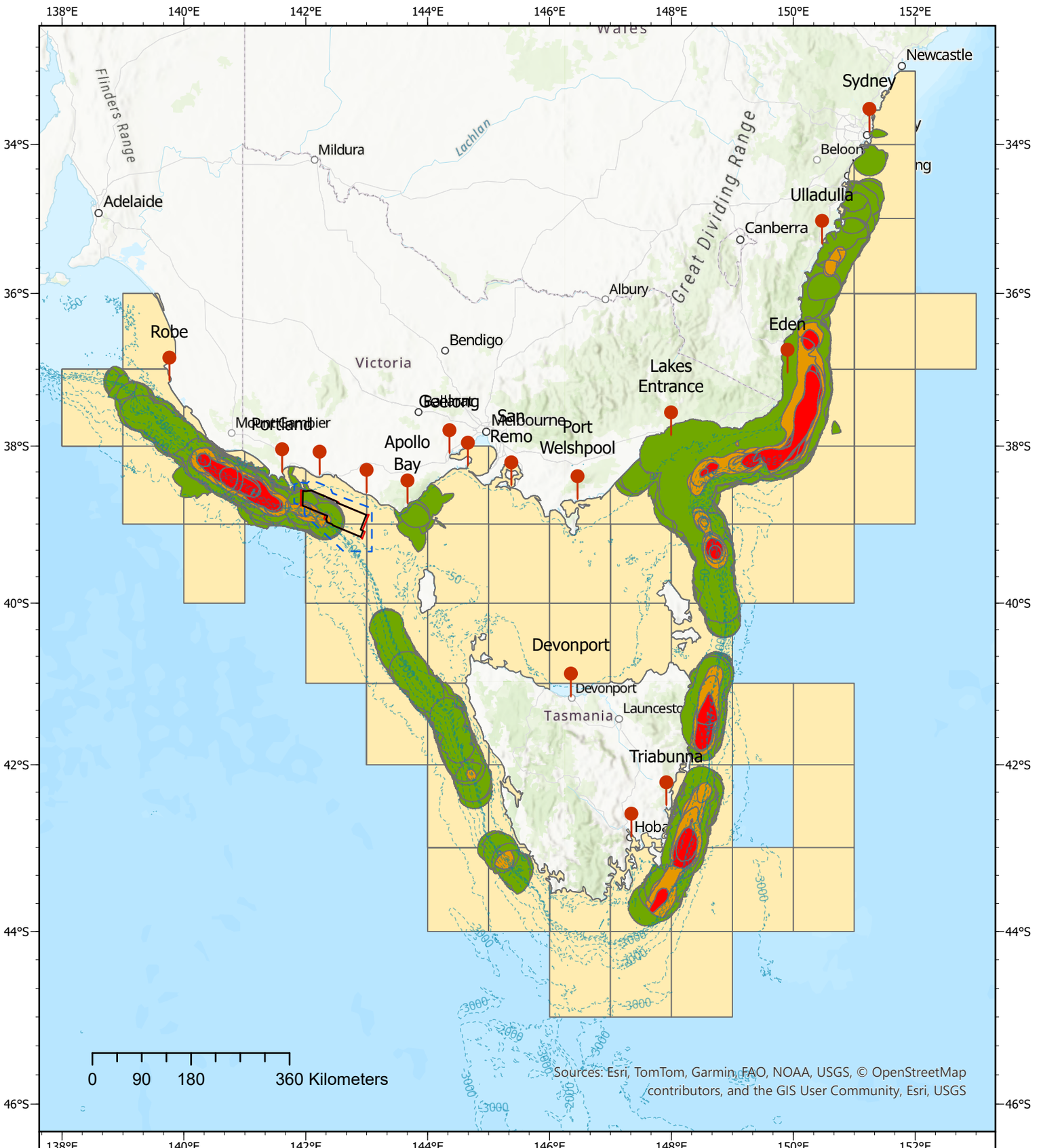
Bass Strait Central Zone Scallop Fishery - 2010-2023
Document Number - MAP-REG-EPM-139_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- Bass Strait Central Zone Scallop Fishery - Maximum Area Fished
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



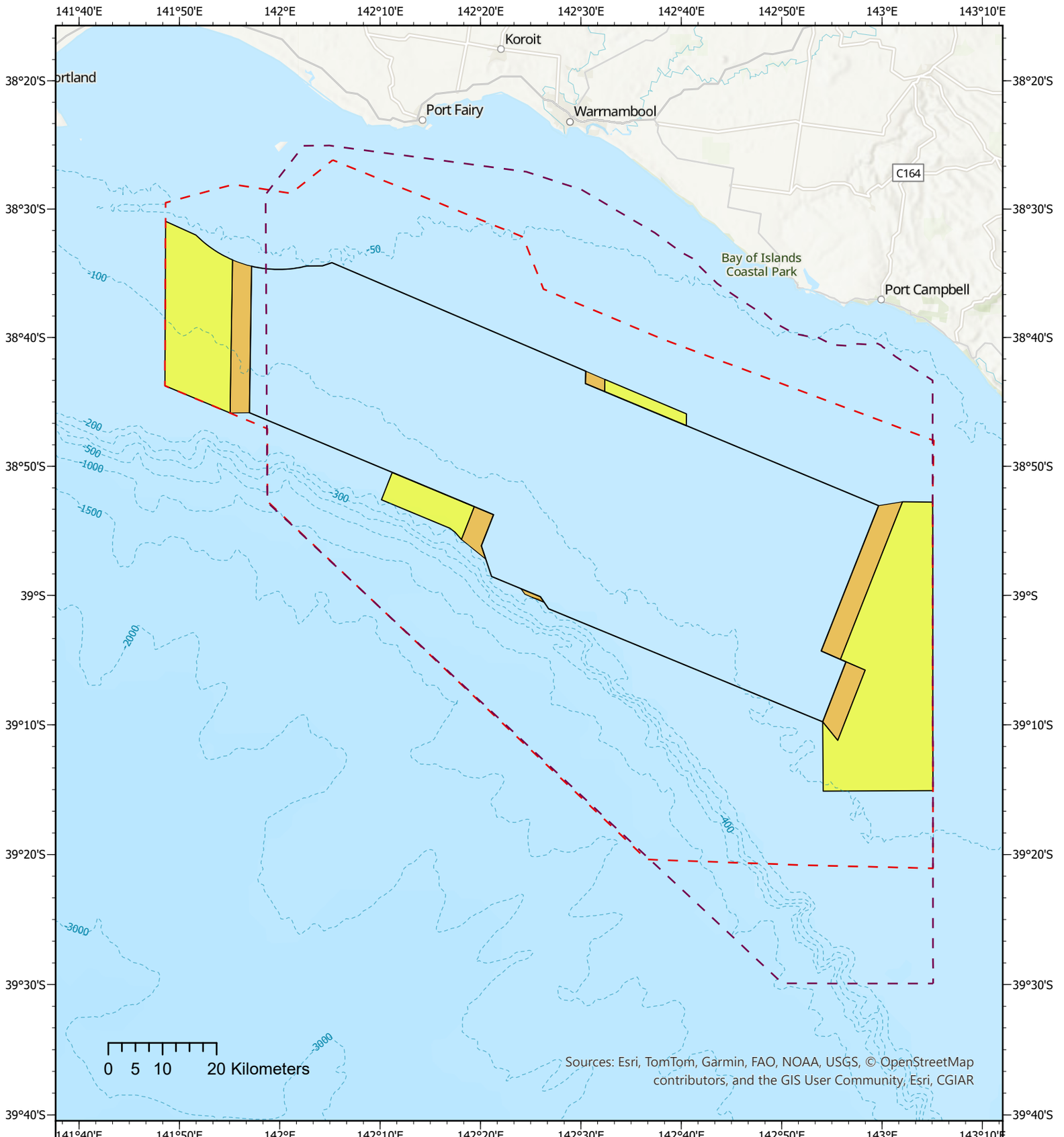
Southern and Eastern Scalefish and Shark Fishery SCSQ - 2010-2023
Document Number - MAP-REG-EPM-140_A

REGIA Marine Seismic Survey

Legend

- Acquisition Area
- Active Source Area
- Operational Area
- High RFI
- Medium RFI
- Low RFI
- SCSQ Maximum Area Fished
- Bathymetry Contours

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



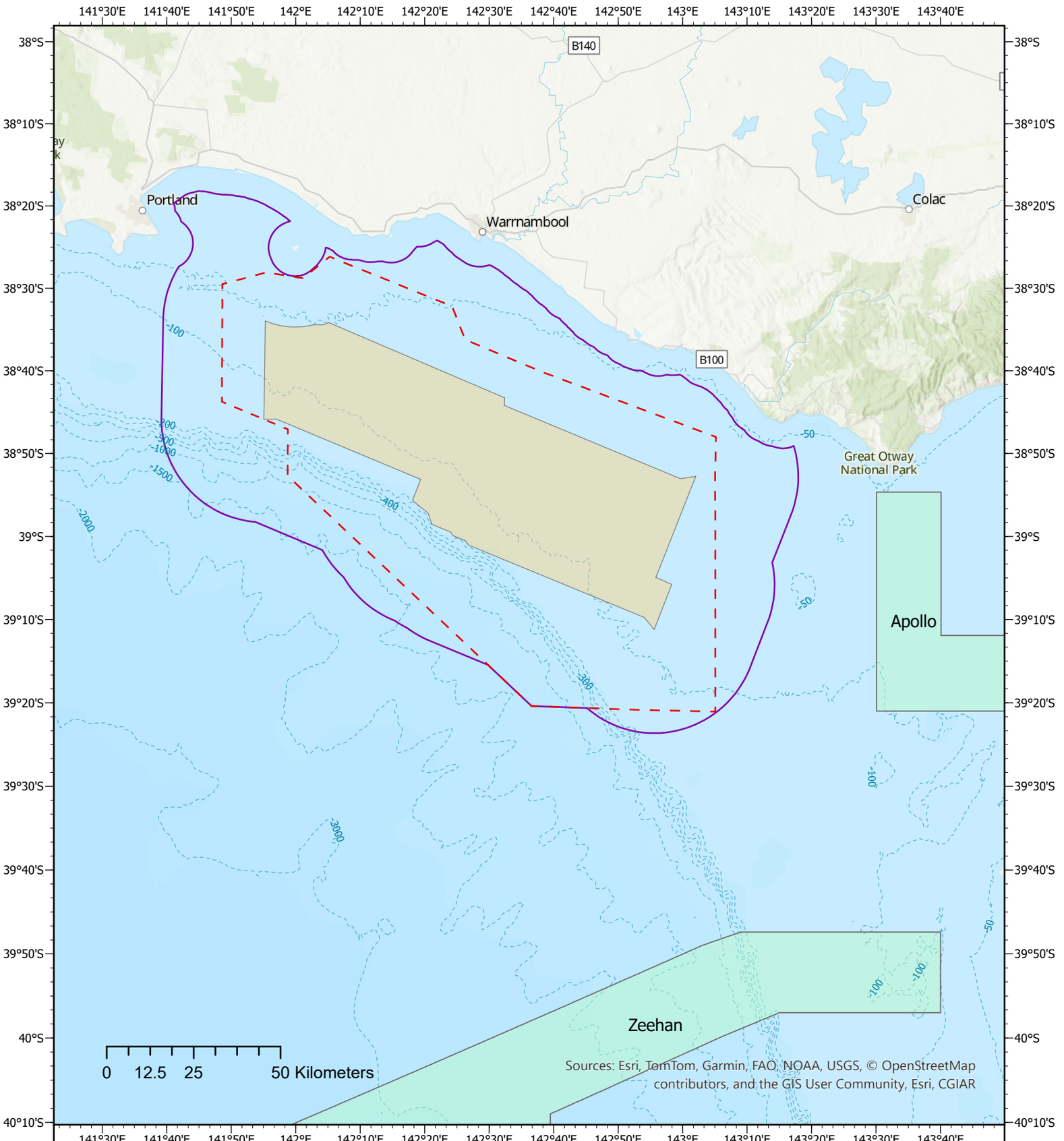
Title - Relevant Activity Areas
Document Number - MAP-REG-EPM-162_A

REGIA Marine Seismic Survey

Legend

- Operational Area
- Bathymetry Contours
- Survey Acquisition Area
- Mitigation Source Area
- Active Source Area
- Activity Planning Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



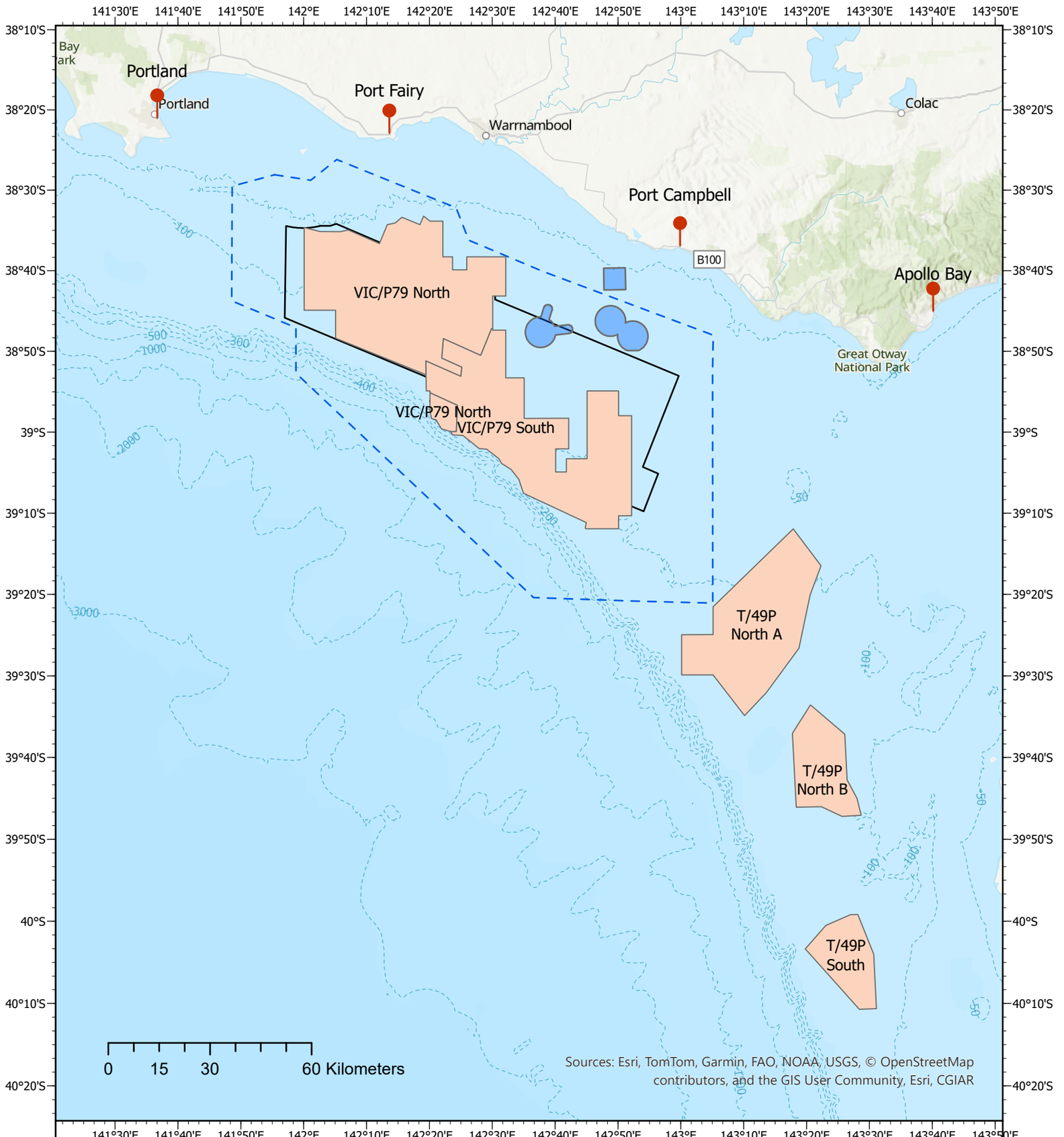
Title - Operational Area & Supporting Operations Area
Document Number - MAP-REG-EPM-168_A

REGIA Marine Seismic Survey

Legend

- Operational Area
- Bathymetry Contours
- Active Source Area
- Australian Marine Parks
- Support Operations Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



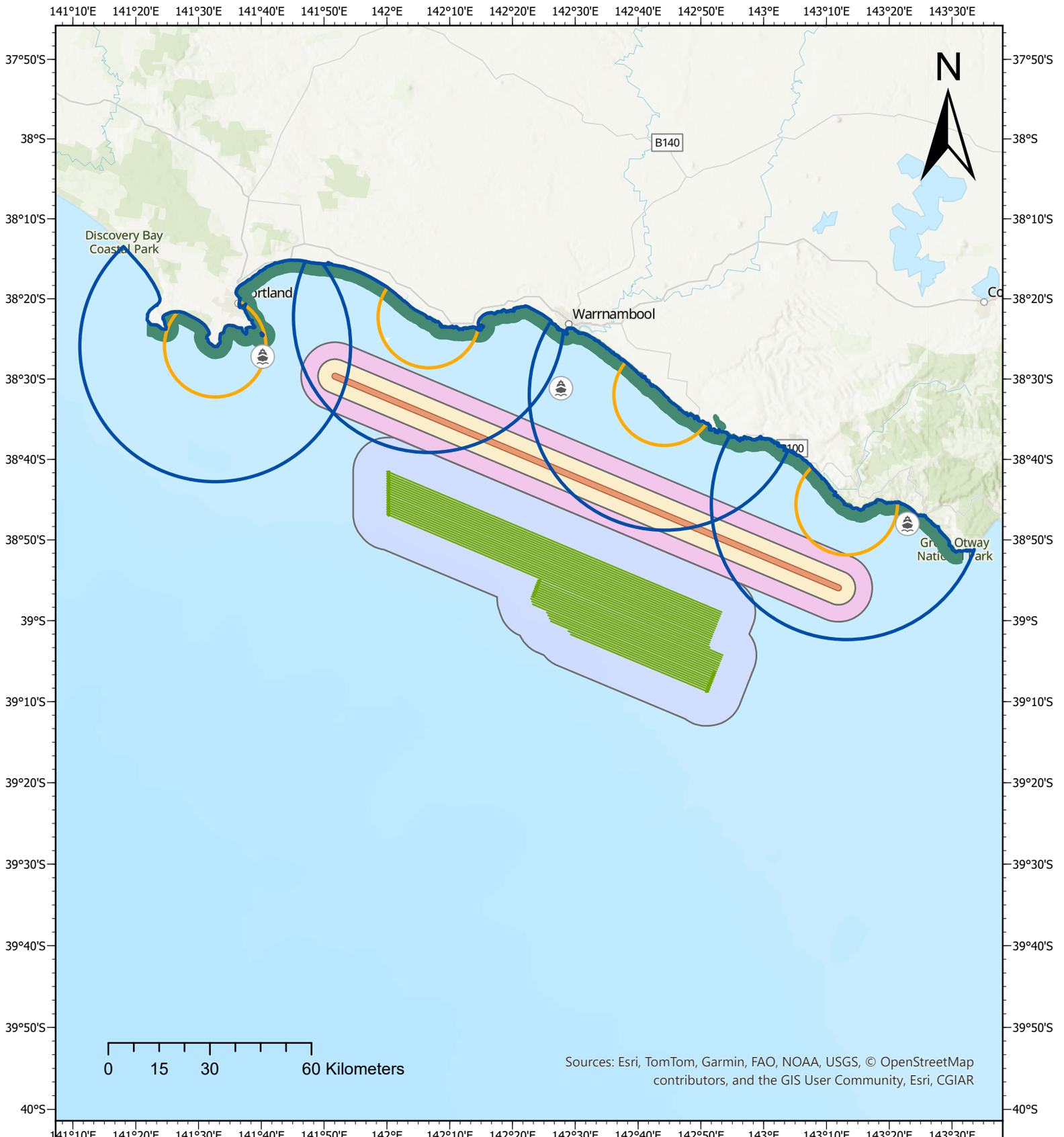
Cumulative Activities
Document Number - MAP-REG-EPM-169_A

REGIA Marine Seismic Survey

Legend

- Regia Acquisition Area
- Regia Operational Area
- Bathymetry Contours
- Amplitude Energy Operational Areas
- Conoco Phillips Operational Areas

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



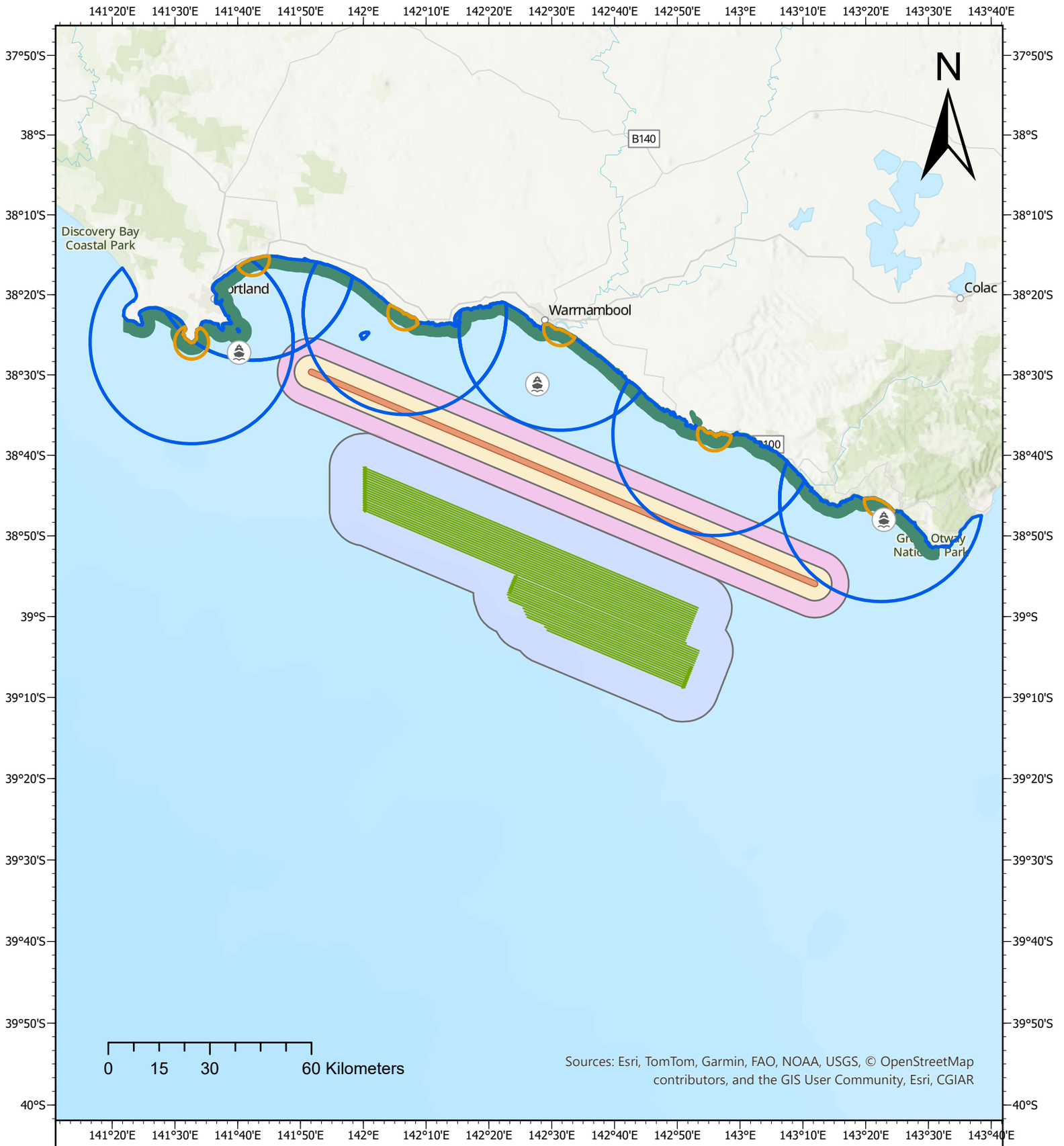
Optimal Weather Deployment Plan Coverage
Document Number - MAP-REG-EPM-180_A

REGIA Marine Seismic Survey

Legend

- SRW Reproduction BIA of Interest
- Sail Lines 31-67
- Line 31-67 PAM Range (10km)
- 15km (Drone Range)
- 40km (Drone Visual Range)
- Candidate Tethered Buoy Locations
- Spotter Vessel Track for Line 31
- Spotter Vessel MFO Range
- Spotter Vessel PAM Range

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



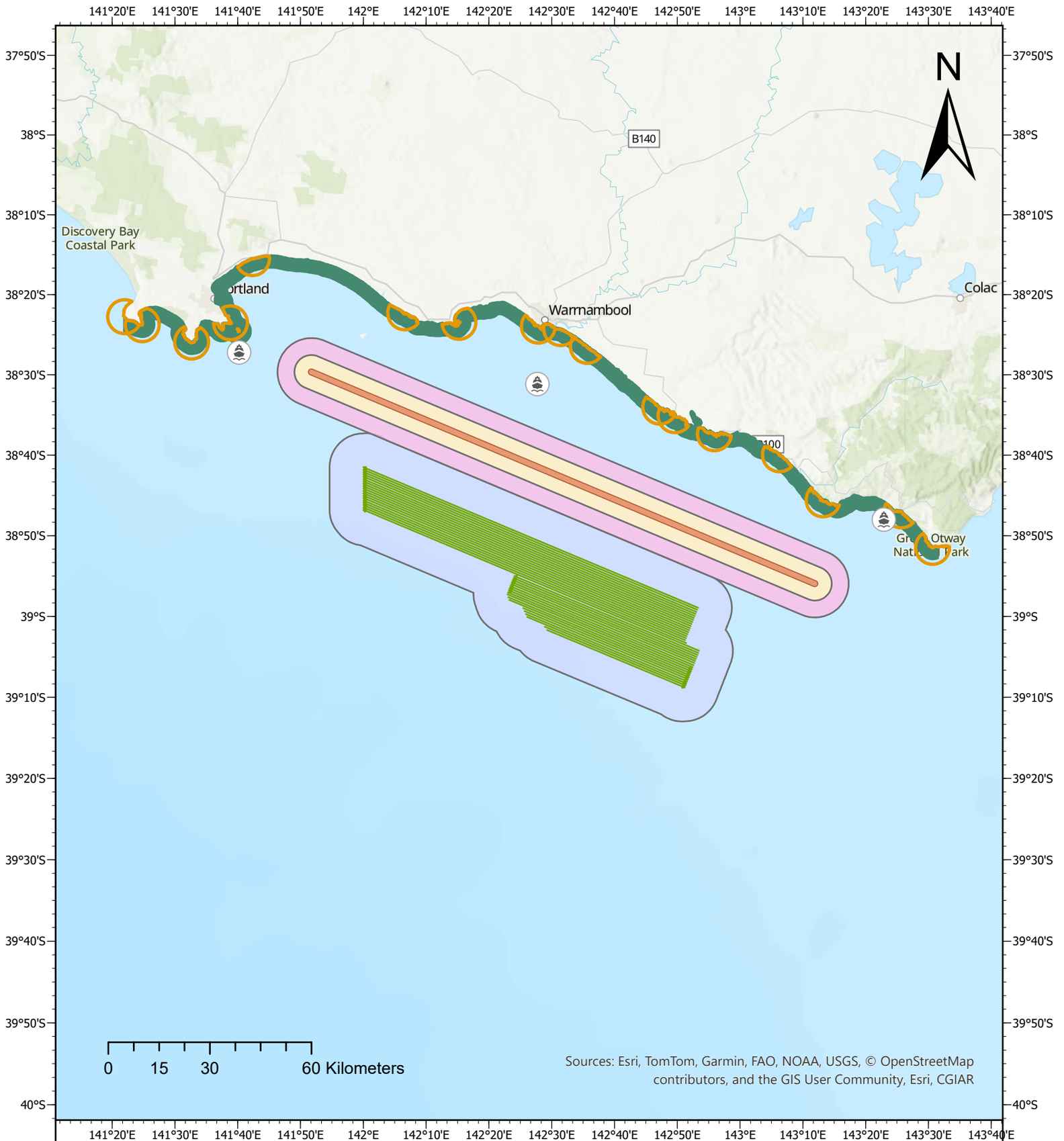
Sub-Optimal Weather Deployment Plan Coverage
Document Number - MAP-REG-EPM-181_A

REGIA Marine Seismic Survey

Legend

- SRW Reproduction BIA of Interest
- Sail Lines 31-67
- Line 31-67 PAM Range (10km)
- 5km (Drone Range)
- 30km (25km Drone Visual Range)
- Candidate Tethered Buoy Locations
- Spotter Vessel Track for Line 31
- Spotter Vessel MFO Range
- Spotter Vessel PAM Range

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



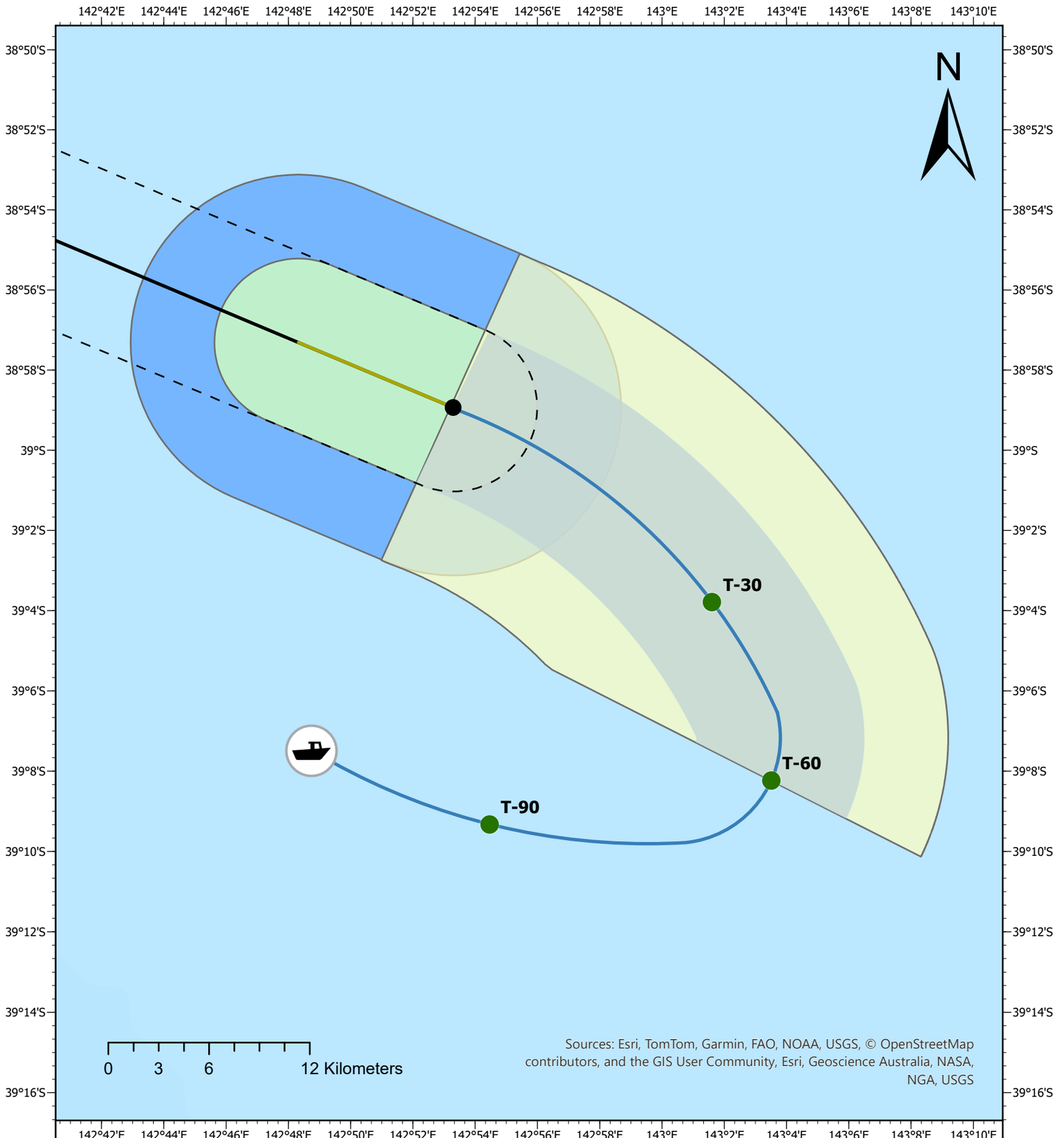
No-Fly Weather Plan Coverage
Document Number - MAP-REG-EPM-182_A

REGIA Marine Seismic Survey

Legend

- SRW Reproduction BIA of Interest
- Sail Lines 31-67
- Line 31-67 PAM Range (10km)
- 5km (Shore Observer Visual Range)
- Candidate Tethered Buoy Locations
- Spotter Vessel Track for Line 31
- Spotter Vessel MFO Range
- Spotter Vessel PAM Range

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



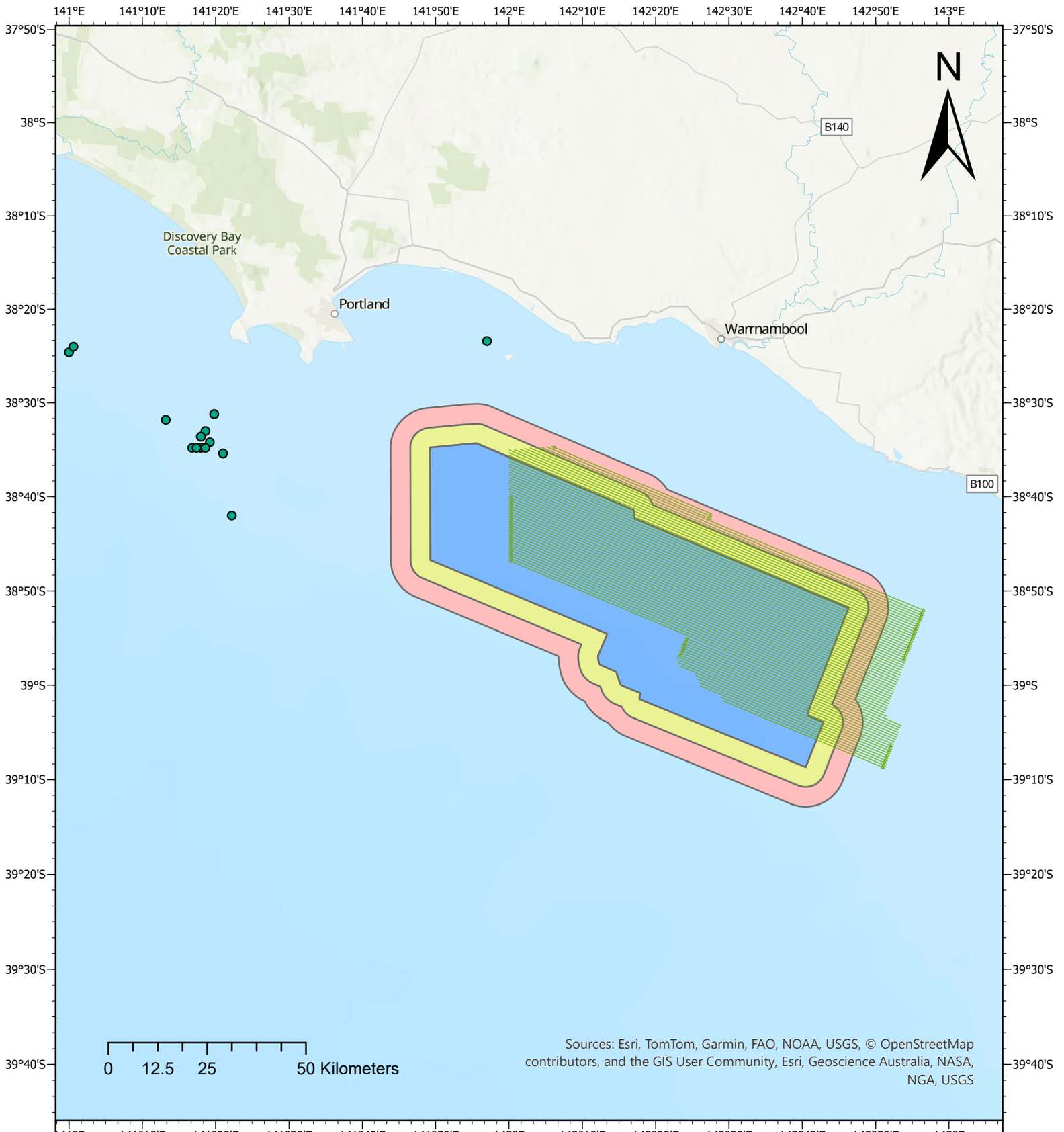
Blue Whale Restart Procedure
Document Number - MAP-REG-EPM-183_A

REGIA Marine Seismic Survey

Legend

- Survey Line
- Survey Line Start Point
- 5km Whale Shutdown Zone
- Survey Vessel Route
- 5km MFO and PAM Detection Zone
- 10km PAM Detection Zone
- Spotter Vessel Pre-Restart Route
- 5km Spotter Vessel MFO and PAM Detection Zone
- 10km Spotter Vessel PAM Detection Zone

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



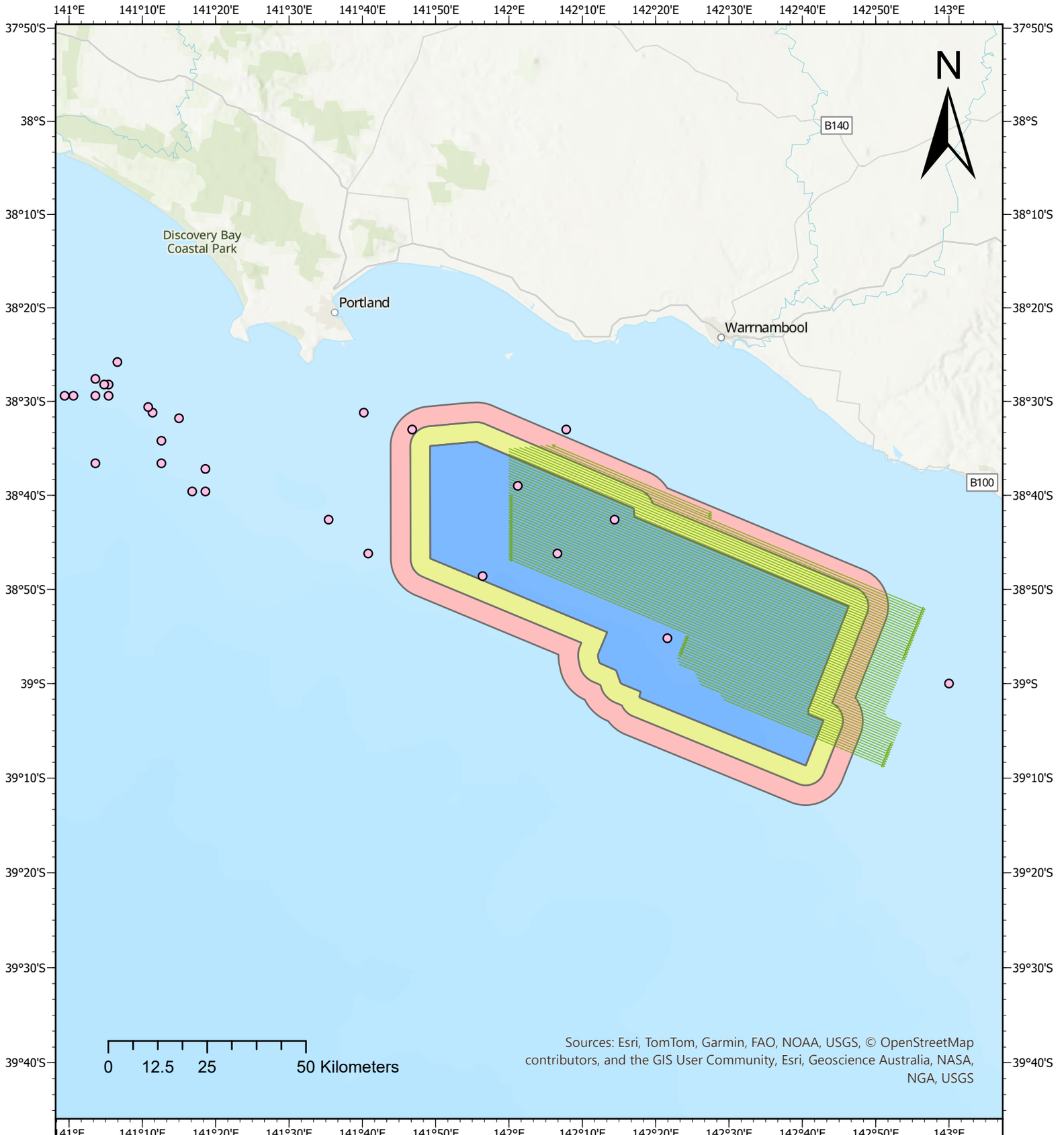
Blue Whale Historical November Data
Document Number - MAP-REG-EPM-184_A

REGIA Marine Seismic Survey

Legend

- Sail Lines 1-67
- SailLines 1-67 Spotter Vessel Position
- Sail Lines 1-67 Spotter Vessel MFO Range
- SailLines 1-67 Spotter Vessel PAM Range
- Blue Whale November Sightings

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



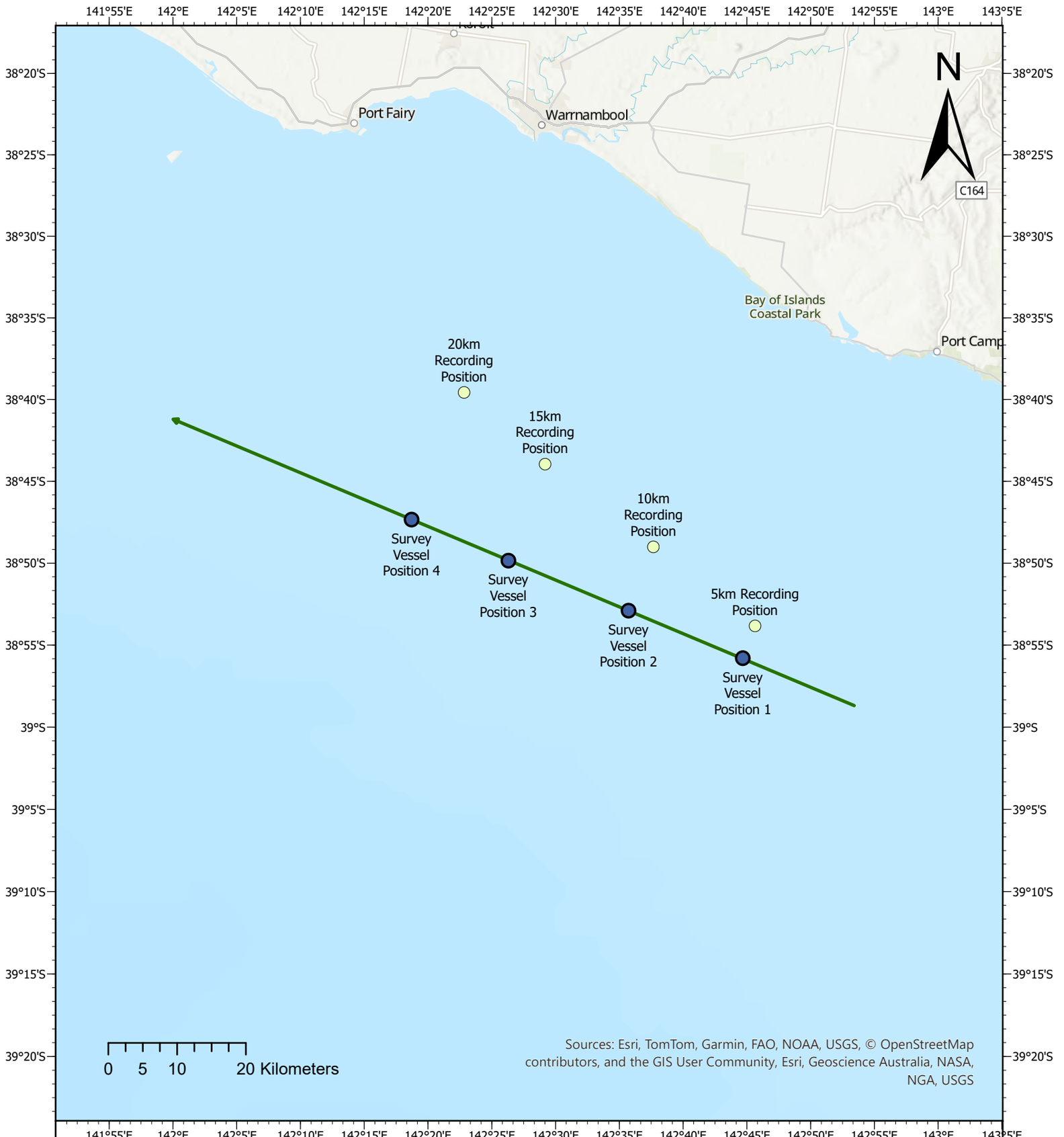
Blue Whale Historical December Data
Document Number - MAP-REG-EPM-185_A

REGIA Marine Seismic Survey

Legend

- Sail Lines 1-67
- SailLines 1-67 Spotter Vessel Position
- Sail Lines 1-67 Spotter Vessel MFO Range
- SailLines 1-67 Spotter Vessel PAM Range
- Blue Whale December Sightings

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



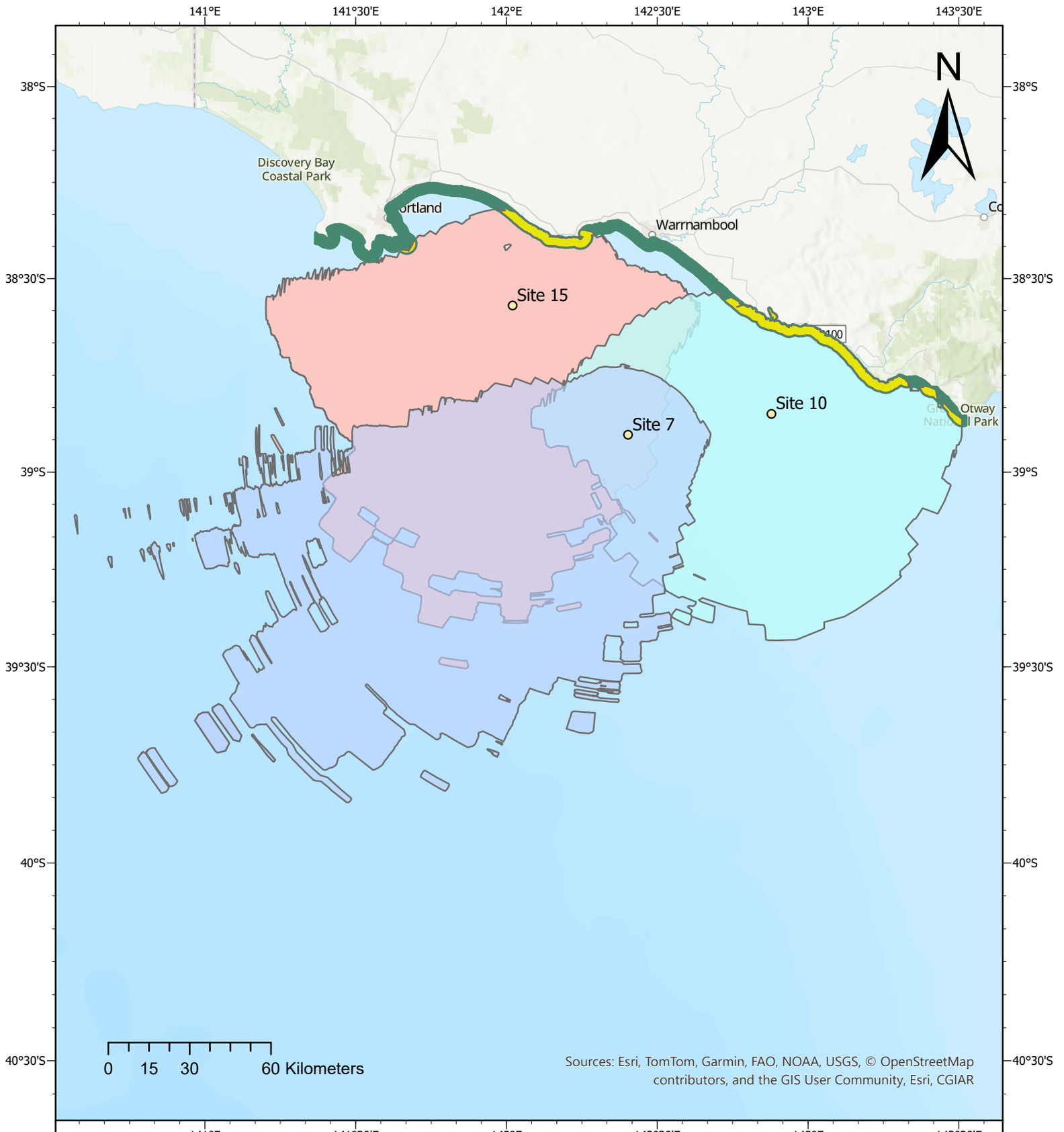
Deployment for Drift Recording
Document Number - MAP-REG-EPM-186_A

REGIA Marine Seismic Survey

Legend

- Survey Line
- Survey Vessel Positions
- Recording Positions

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



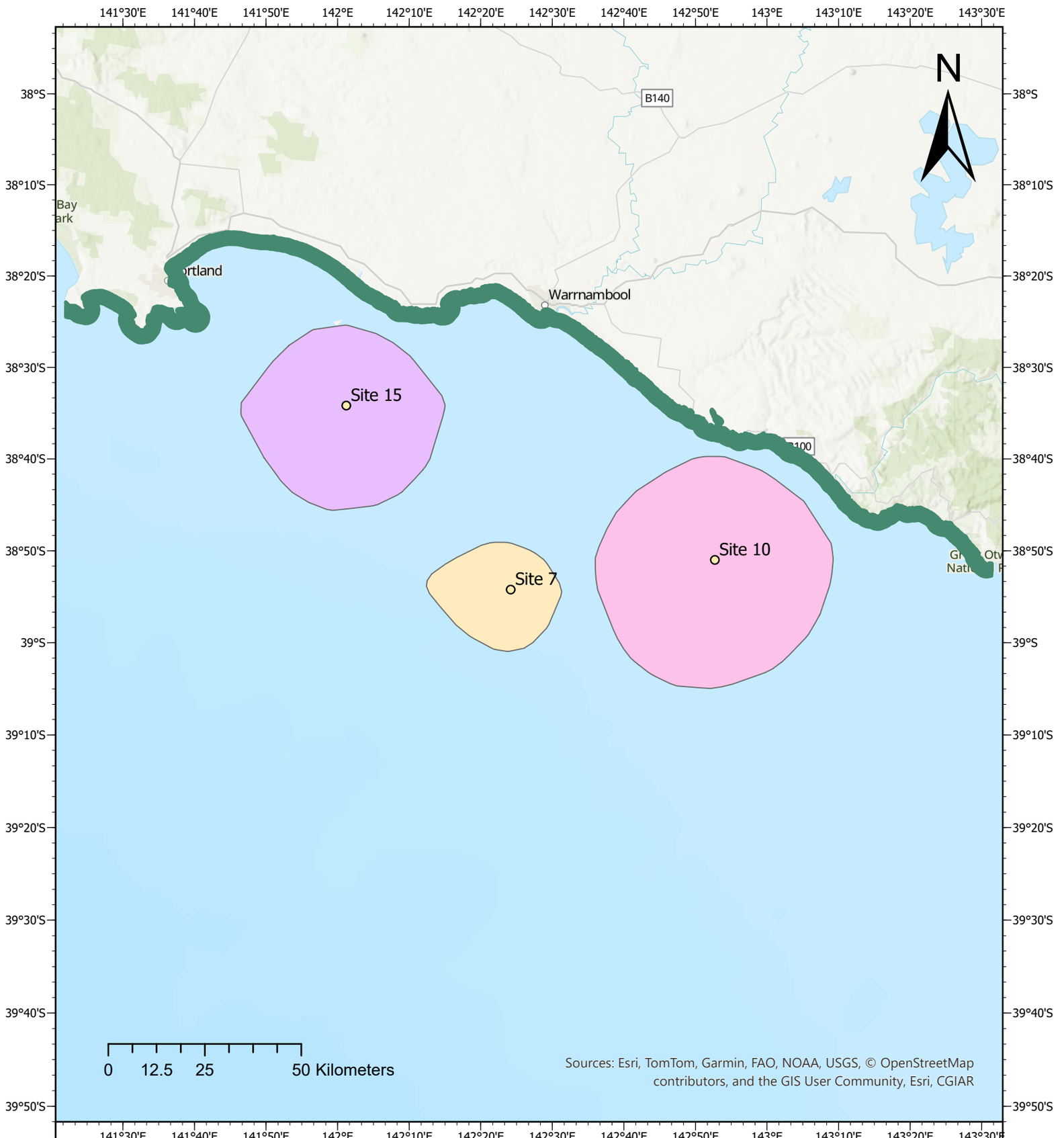
Sites 7, 10, 15 - 120 dB
Document Number - MAP-REG-EPM-187_A

REGIA Marine Seismic Survey

Legend

- SRW Reproduction BIA of Interest
- 120dB SRW BIA Overlap
- Modelled Sites
- Site 7 120dB
- Site 10 120dB
- Site 15 120dB

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



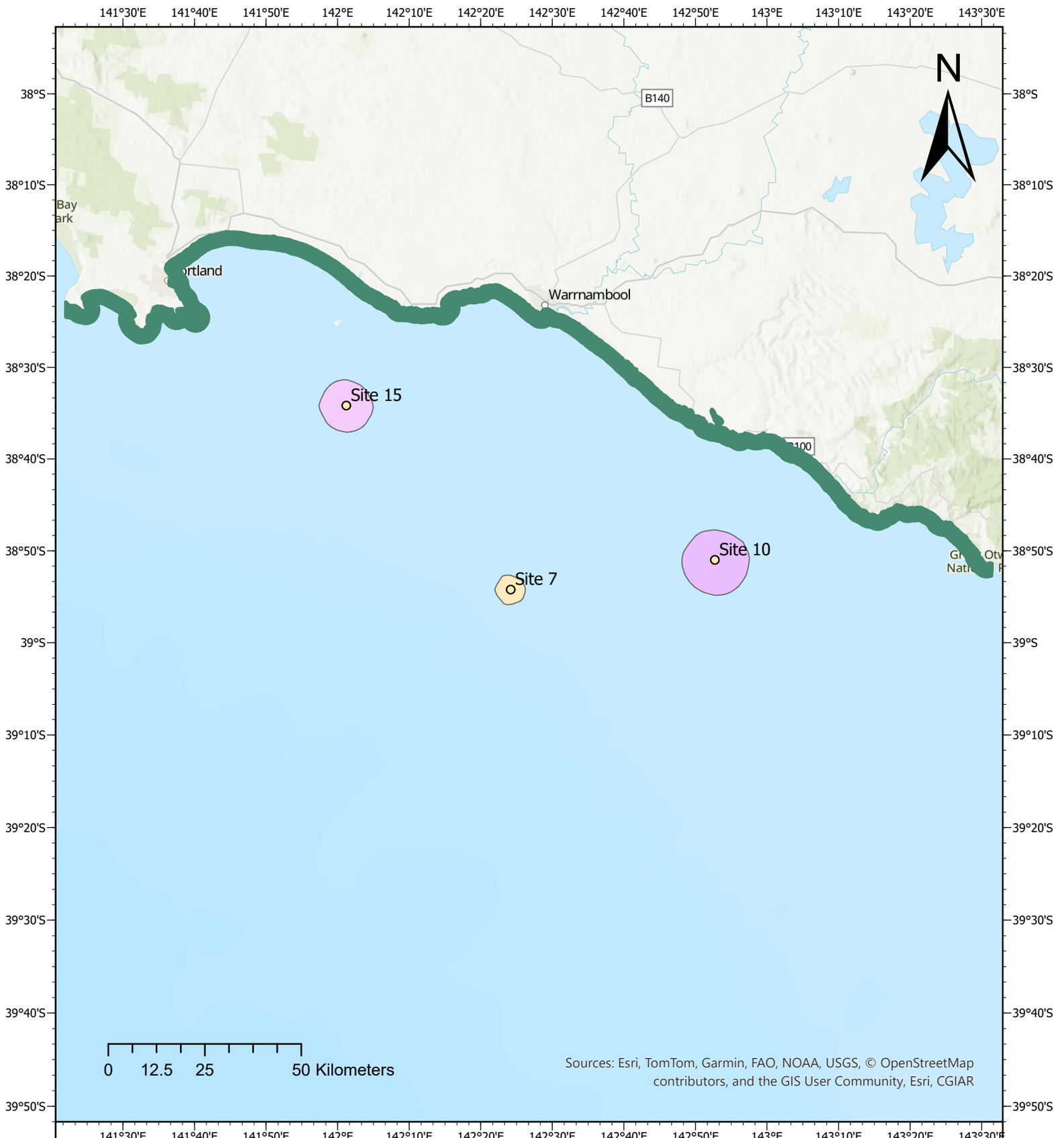
Sites 7, 10, 15 - 140 dB
Document Number - MAP-REG-EPM-188_A

REGIA Marine Seismic Survey

Legend

- SRW Reproduction BIA of Interest
- Modelled Sites
- Site 15 140dB
- Site 10 140dB
- Site 7 140dB

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



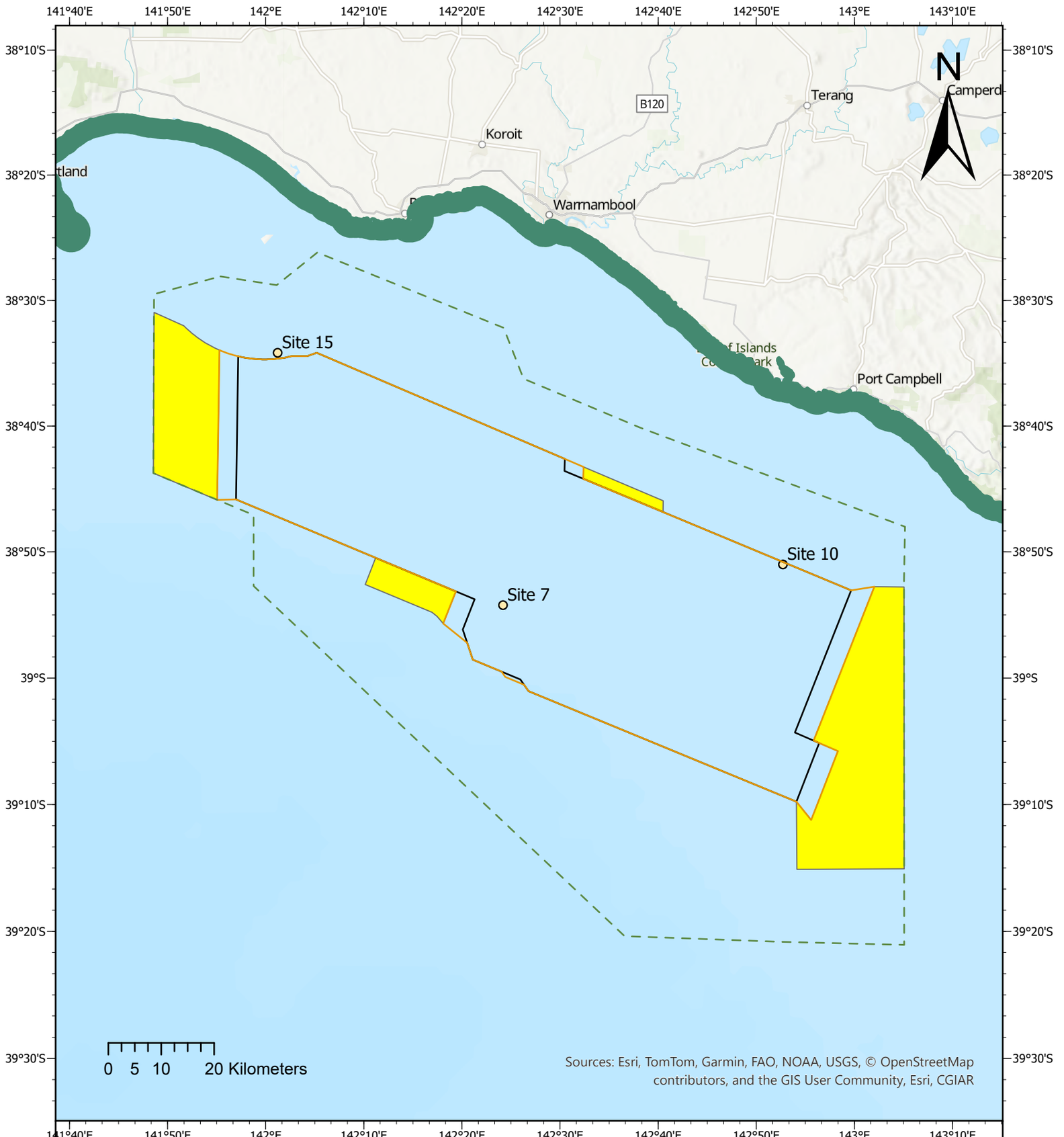
Sites 7, 10, 15 - 160 dB
Document Number - MAP-REG-EPM-189_A

REGIA Marine Seismic Survey

Legend

- SRW Reproduction BIA of Interest
- Modelled Sites
- Site 15 160dB
- Site 10 160dB
- Site 7 160dB

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



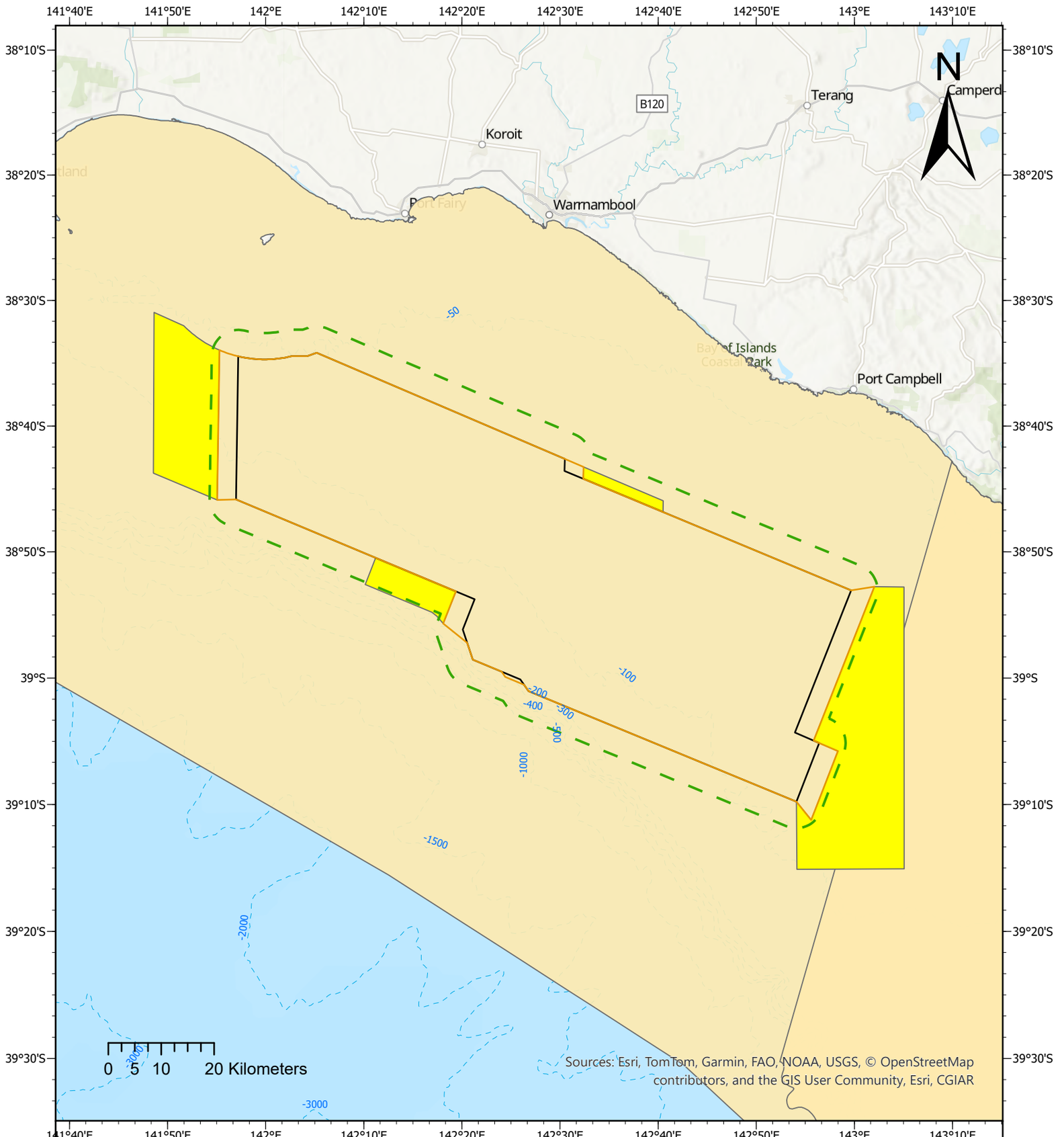
Acoustic Modelling Sites
Document Number - MAP-REG-EPM-190_A

REGIA Marine Seismic Survey

Legend

- SRW Reproduction BIA of Interest
- Operational Area
- Active Source Area
- Acquisition Area
- Mitigation Source Area
- Modelled Sites

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



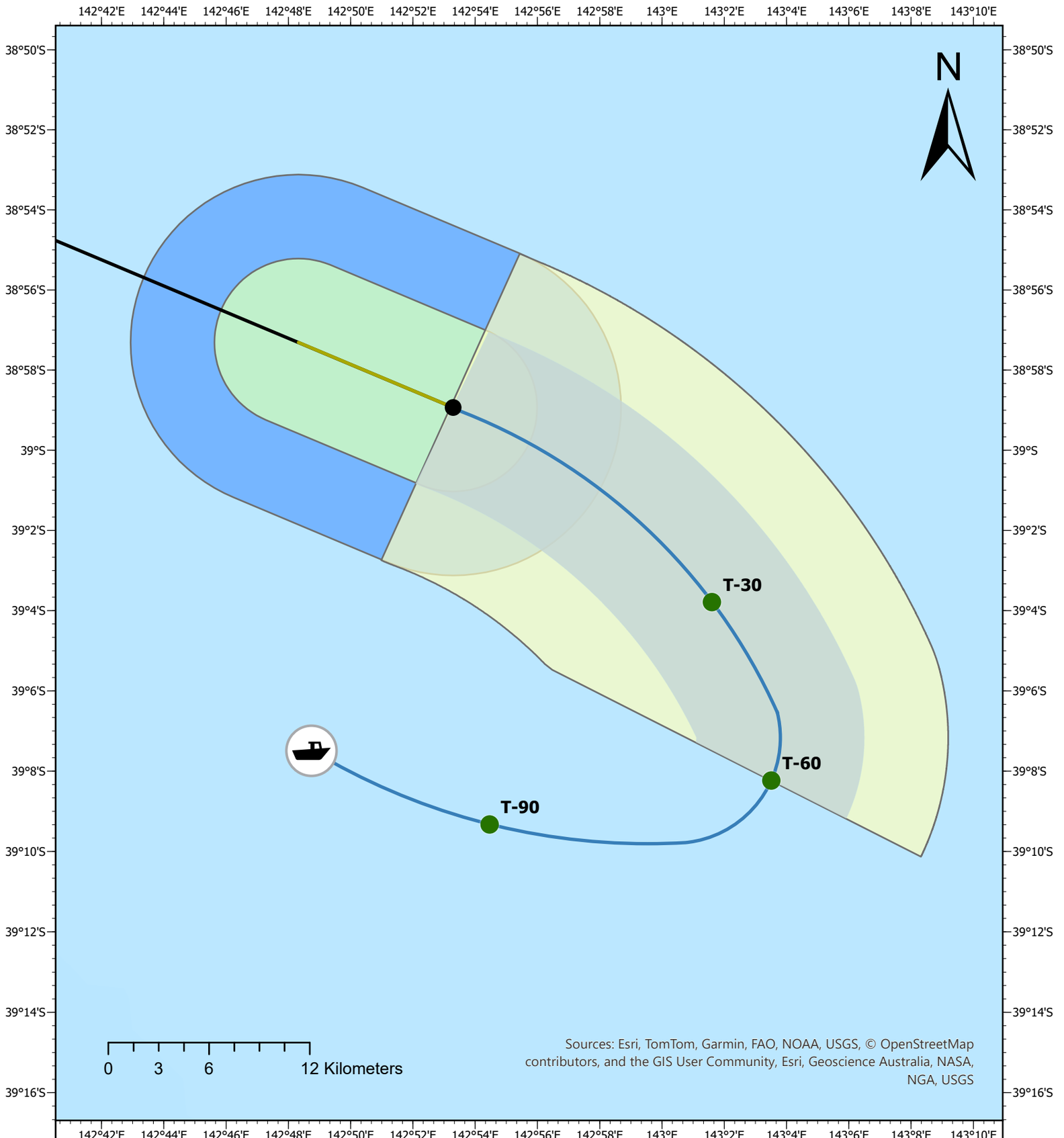
Blue Whale Foraging BIA & Noise EMBAs
Document Number - MAP-REG-EPM-191_A

REGIA Marine Seismic Survey

Legend

- Active Source Area
- Acquisition Area
- Mitigation Source Area
- Bathymetry Contours
- Blue Whale Foraging BIA
- 160 dB Behavioral Sound EMBA and 168 dB SEL TTS EMBA (5km)

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



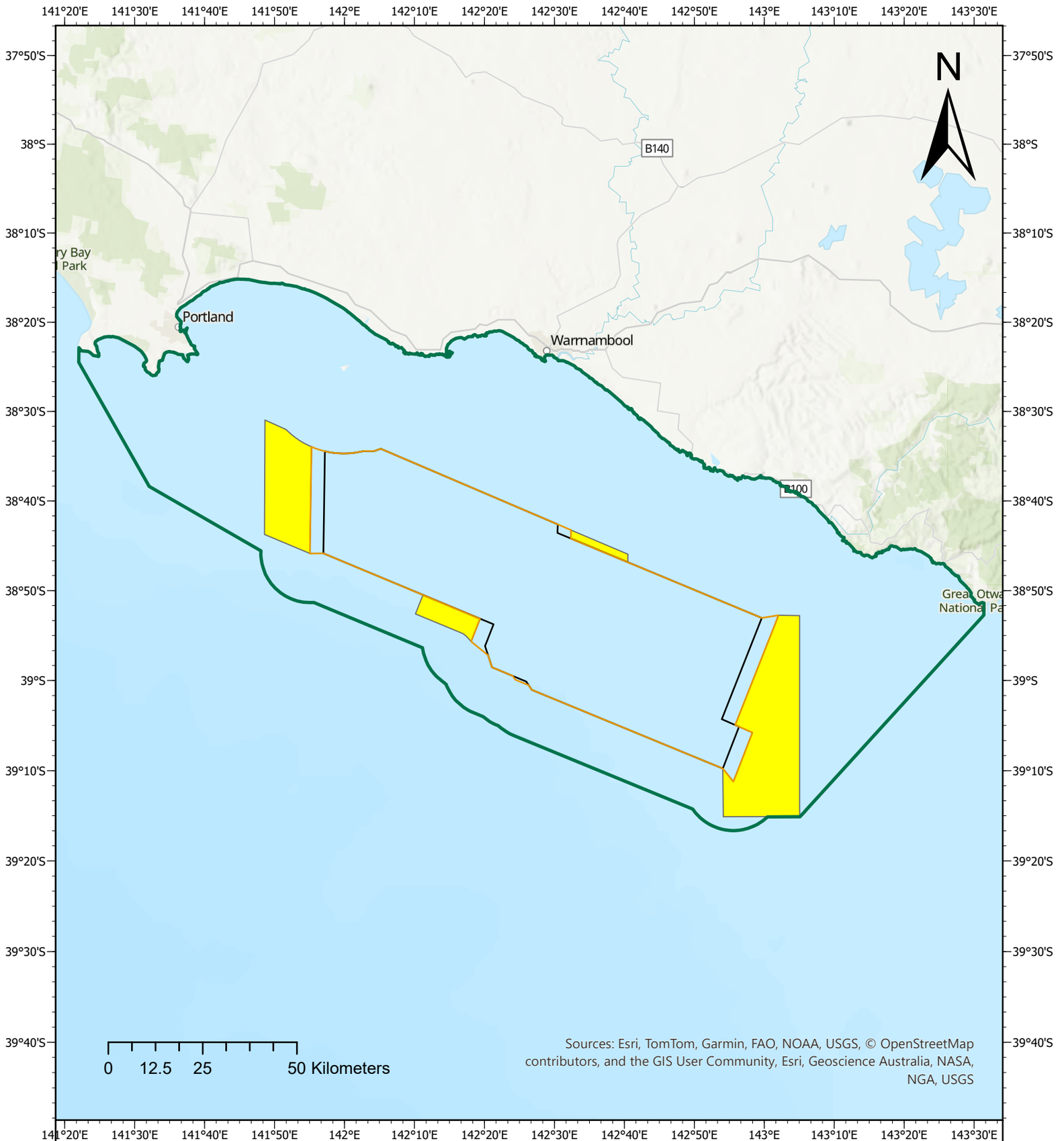
SRW Restart Procedure
Document Number - MAP-REG-EPM-192_A

REGIA Marine Seismic Survey

Legend

- Survey Line
- Survey Line Start Point
- Survey Vessel Route
- 5km MFO and PAM Detection Zone
- 10km PAM Detection Zone
- Spotter Vessel Pre-Restart Route
- 5km Spotter Vessel MFO and PAM Detection Zone
- 10km Spotter Vessel PAM Detection Zone

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



SRW Shutdown Area
Document Number - MAP-REG-EPM-193_A

REGIA Marine Seismic Survey

Legend

- Active Source Area
- Acquisition Area
- Mitigation Source Area
- SRW Shutdown Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere

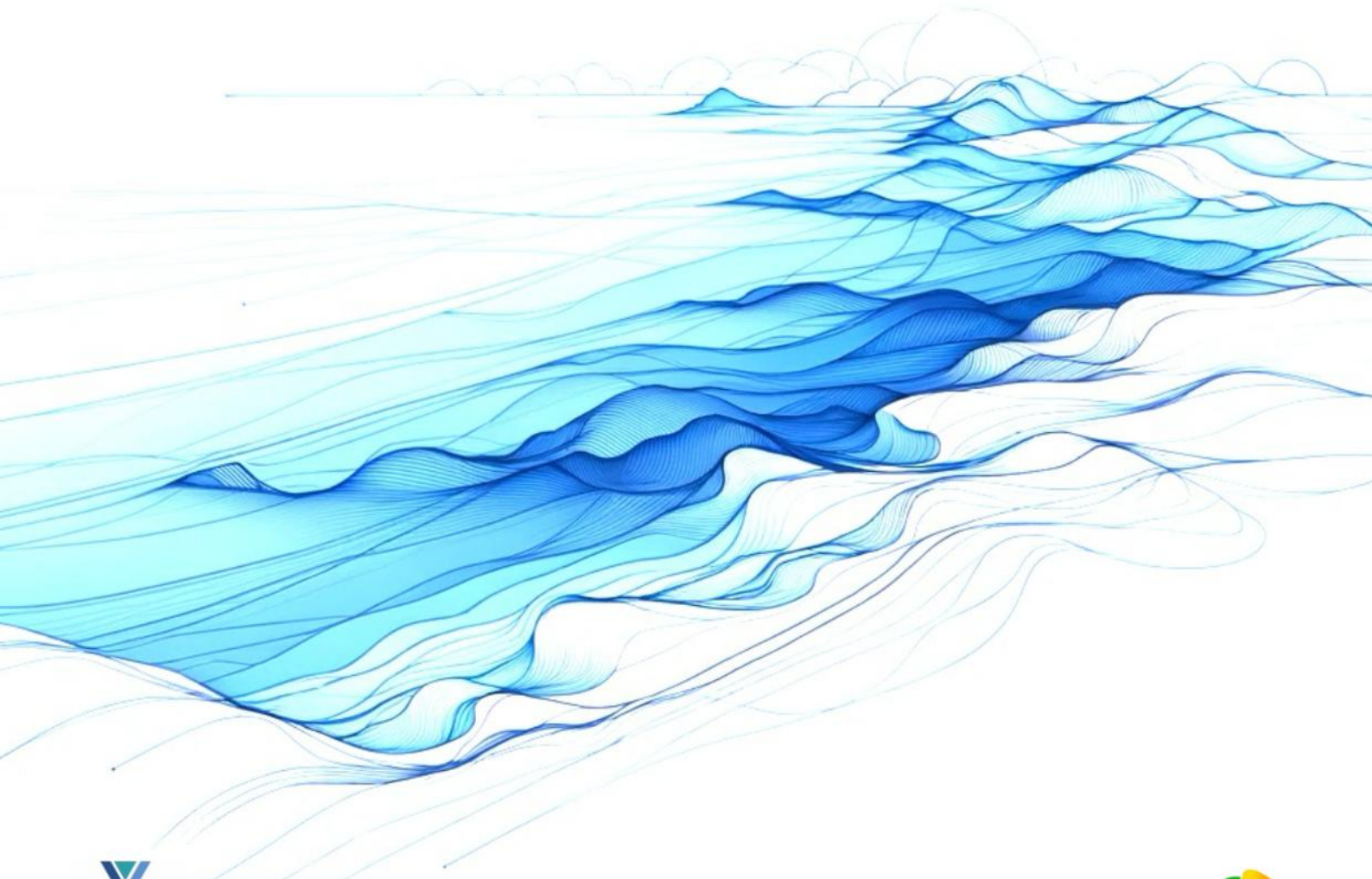
REGIA
Marine Seismic Survey

Consultation and Engagement

Appendix C1: REG-EP-012-C1

Rev 4

April 2025



Klarite

Table of Contents

1 Introduction 3
2 Background 4
2.1 Legislation and Requirements 4
2.2 CGG Consultation Principles 5
3 Consultation Methodology 7
3.1 Relevant Person Identification 8
3.2 Give Sufficient Information 15
3.3 Reasonable Period with Sufficient Information 18
3.4 Relevant Person Feedback 18
4 Record Keeping 21
5 Ongoing Consultation 21
6 Document Control 22
Annex 1 – Consultation with Commercial Fishers and Commercial Fishing Associations 23
Introduction 23
Consultation Methodology 23
Industry Appropriate Engagement and Tailored Consultation Strategies 28
Challenges in Consulting with Commercial Fishers and Commercial Fishing Associations 29
Annex 2 – Consultation with First Nations Australians 32
Introduction 32
Consultation Methodology 32
Culturally Appropriate Engagement and Tailored Consultation Strategies 35
Challenges in Consulting with First Nations Australians 36
Annex 3 – Record of Engagements 45
Annex 4 – Assertions or Concerns 48
Annex 5 – Information Received 100
Annex 6 – Information Requests 152
Annex 7 - Information available on the Regia MSS website up to Public Comment 233

1 Introduction

Pursuant to Part 4 Division 3 of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023* (**the Regulations**) and considering recent case law, CGG Geophysical Services Pty Ltd (**CGG**) has performed consultations as required. This appendix aims to document how CGG undertook the consultation process, managed risks to as low as reasonably practicable and an acceptable level, and appropriately responded to, incorporated, and adopted measures based on relevant persons objections, claims, and other feedback.

By capturing sufficiently broad people and information through desktop research, community outreach events, and various targeted media and advertising techniques, CGG were able to identify relevant persons, provide them with sufficient information on the possible consequences of the activity on their functions, interests, or activities, allow a reasonable period for consultation, time to respond appropriately, and document details of such a process.

This chapter will outline the guidelines set out by NOPSEMA, legislation and case law and demonstrate how CGG has satisfied these requirements. The following appendices should be read in conjunction with the consultation chapter.

Appendix C2: Consultation Report

Section 24(b) requires an environment plan that includes a report on all consultations under Section 25 of any relevant person by the titleholder. This report must include the following:

- A summary of each response; and
- An assessment of the merits of objections and claims regarding adverse impacts of activities proposed; and
- A statement of CGG's response as titleholder where they were given.
- This appendix is sorted separately by organisations and persons, so each specific case by case response by the titleholder and the relevant person can be assessed on their merits and easily referred to.

Appendix C3: Sensitive Information Part (16(b)(iv))

To comply with sub-section 26(8) of the Regulations, the full text of all responses by relevant individuals engaged under Section 25 and any other sensitive information (if applicable) must be included in a sensitive information report.

This report satisfies the remainder of section 24 and sub-section 26(8) by containing full text responses by relevant persons and any additional sensitive information. This report will not be published.

Appendix C4: Full Text copies

Full text copies of consultations with relevant persons. This information will not be publicly available.

Appendix C5: Consultation Materials

CGG have a further appendix which highlights extra efforts and methods used to find every possible relevant person in the community and raise awareness of the ability to self-identify through several mediums, such as the Regia website.

Appendix C6: Public Comment Report

CGG received nearly 15,000 submissions through public comment which we believe is in the top 3 of total submissions submitted to NOPSEMA as part of an EP application This document provides a summary of the process used to ensure all submissions have been considered in the EP.

2 Background

CGG are required by legislation to prepare an Environment Plan (**EP**) to carry out the Regia Marine Seismic Survey (**Regia MSS**). This EP must then be accepted by the National Offshore Petroleum Safety and Environmental Management Authority (**NOPSEMA**). A key part of this EP is the consultation and co-design process, that must be carried out in preparation for the EP. CGG adhered to an iterative consultation process that was developed with consideration and in accordance with legislation, case law and NOPSEMA guidelines.

The foundations of this consultation process included:

- Maximising the broad capture of relevant persons through appropriate, targeted and subject-specific advertisements; and
- Allowing multiple channels for relevant persons to self-identify; and
- Encouraging relevant persons to share activity details with others; and
- Gathering knowledge about specific environmental, cultural, and societal values; and
- Providing concise yet sufficient information allowing relevant persons to make informed decisions; and
- Communicating with relevant persons through their preferred medium and in appropriate language through established information channels; and
- Allowing appropriate timeframes and encouraging feedback and queries; and
- Incorporating relevant persons input into the EP where appropriate; and
- Ensuring all relevant persons are aware of the consultation period and process, and affording the opportunity to participate in preparation and co-design of the EP.

The following principles outlined in Table C1-1 from the former Ministerial Council on Mineral and Petroleum Resources were also pillars of CGG's communication and consultation procedures.

Table C1-1 - Principles of Consultation

Principle	CGG's approach
Communication	Undertook effective two-way engagement to encourage feedback on relevant, accurate information provided.
Transparency	Transparency was fundamental in the consultation process and continues to be so. All feedback was addressed, and comments posted on the Regia website were responded to, and EP documents uploaded into the public document library hosted on the activity website.
Collaboration	Relevant persons were heard and collaborated with, which helped to adapt approaches and outcomes based on merit. The collaborative approach resulted in outcomes beneficial to both relevant persons and the titleholder.
Inclusiveness	All identified relevant persons were involved in the consultation process. This will last throughout the life of the Regia MSS through CGG's implementation and ongoing consultation strategies.
Integrity	The process fostered respect through freedom of information on the Regia website and trust through tailored two-way communication.

2.1 Legislation and Requirements

The following legislation was strictly adhered to during the consultation process:

- *Offshore Petroleum and Greenhouse Gas Storage Act 2006*
- *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009/2023*

- *Environmental Protection and Biodiversity Conservation Act 1999*

The following NOPSEMA guidelines were also considered and complied with:

- NOPSEMA Guideline GL2086 – Consultation in the course of preparing an environment plan – May 2023
- NOPSEMA Guidance Note GN1847 – Responding to public comment on environment plans – July 2022
- NOPSEMA Guidance Note GN1344 – Environment plan content requirements – December 2022
- NOPSEMA Guideline GL1721 – Environment Plan Decision Making Guideline – December 2022
- NOPSEMA Guidance Note GN1488 – Oil pollution risk management – July 2021
- NOPSEMA Guidance Note GN1785 – Petroleum activities and Australian Marine Parks – June 2020
- NOPSEMA Guideline GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area – January 2023
- NOPSEMA Brochure – Consultation on offshore petroleum environmental plans – May 2023
- NOPSEMA Policy PL2098 – Engaging gender-restricted information Draft Policy – May 2023
- NOPSEMA Policy PL1347 – Environment Plan Assessment Policy – December 2022
- Recent case law developments also moulded CGG's consultation process:
- *Santos NA Barossa Pty Ltd v Tipakalippa* [2022] FCAFC 193
- *Cooper v National Offshore Petroleum Safety and Environmental Management Authority* (No 2) [2023] FCA 1158

Other resources and guidelines used:

- *NOPSEMA* Guidance framework: Supporting cooperative coexistence of seismic surveys and commercial fisheries in Australia's Commonwealth marine area.
- Victorian Aboriginal Heritage Council: Registered Aboriginal Parties (RAPs) - Fact Sheet.
- Victorian Aboriginal Heritage Council: Victorian Aboriginal Heritage Council - Fact Sheet.

2.2 CGG Consultation Principles

During the consultation process there was significant clarification about the consultation requirements that apply to preparing an EP arising from case law. As this clarification was delivered over time, CGG decided to create consultation principles that supported communicating the purpose of consultation with relevant persons. These principles were:

1. **Co-design:** Incorporating a co-design principle into the consultation process emphasises collaboration and mutual agreement on how consultations are conducted. This principle is essential when relevant persons may have their preferred engagement processes that may or may not align with the regulatory requirements of the Regulations. By adopting a co-design approach, CGG aimed to ensure that all parties had a say in shaping the consultation methodology, fostering a sense of ownership and acceptance among all relevant persons.
2. **Voluntary Participation:** Ensuring that participation in the consultation process is voluntary respects the autonomy of all relevant persons. This principle recognises that while input and engagement are highly valued, mandating participation could lead to procedural compliance rather than genuine dialogue. Voluntary participation encourages more meaningful and constructive contributions from those who choose to engage, ensuring that

any feedback is driven by a genuine interest in the outcomes of the project rather than compulsion.

3. **Not Seeking Consent:** By not seeking explicit consent through the consultation process, CGG acknowledges that the purpose of consultation is to inform, discuss, and consider the perspectives and feedback of relevant persons, not to obtain approval. This approach aligns with the regulatory framework under which CGG operates, where the final decision-making authority rests with regulatory bodies like NOPSEMA, not with the relevant persons, nor the public. This distinction helps maintain clarity in the roles and responsibilities within the consultation process.
4. **Regulatory Permission for Impacts:** The principle that regulations allow NOPSEMA to permit impacts underscores the structured regulatory environment within which environmental impacts are assessed and managed. It highlights that while relevant person input is crucial and valued, there are established legal and scientific frameworks in place to evaluate and mitigate environmental impacts. This ensures that decisions are made based on comprehensive environmental assessments and best practice standards, balancing economic, cultural, and social factors. CGG often encountered a misconception that 'no impact' was the requisite standard that had to be met.
5. **Absence of Requirement for Universal Participation:** Acknowledging that not every relevant person must participate in the consultation process recognises the practical limitations of engagement and avoids the logistical and procedural complexities that attempting to achieve full participation would entail. It ensures that the process remains efficient and manageable while still being inclusive and comprehensive. This principle also respects the diversity of interest and the varying degrees of impact on different relevant persons, allowing for a focus on those most affected or most knowledgeable without diluting the quality of engagement with mandatory universal participation.
6. **Multidimensional Nature of Relevant Persons:** CGG decided it was important to acknowledge the multidimensional nature of relevant persons and not to assume the primary reason for contacting a relevant person was the exclusive reason they were a relevant person. For instance, a commercial fisher may also be a recreational diver and have different pathways to being affected. This approach ensures a comprehensive understanding of how the Regia MSS affects all aspects of relevant persons lives, fostering more meaningful engagement and building trust. This holistic view not only enhances stakeholder participation but also ensures that strategic decisions are informed by a broad spectrum of perspectives, leading to more equitable and sustainable outcomes.

These principles were frequently referred to during the community consultation forums and subsequent consultations with relevant persons.

3 Consultation Methodology

CGG proposed a process that allowed relevant persons to co-design both the development of the consultation process and the preparation of the EP. This process was designed with the context of the objects of the Regulations.

As stated by Justice Lee in *Santos NA Barossa Pty Ltd v Tipakalippa* [2022] FCAFC 193 at [141], these objects are "best achieved by a consulting process that is practicable but is sufficiently broad so as to collect available input into the possible risks and environmental impacts of the activity and ways of reducing those risks and impacts and managing them to an acceptable level." CGG adapted this statement to include the following:

1. Broad capture of all relevant persons.
2. Develop knowledge of and describe relevant values and sensitivities of the environment that may be affected.
3. Provide sufficient information.
4. Create two-way channels for communication from relevant persons.
5. Allow a reasonable period for relevant persons assessment and feedback.
6. Respond to each claim or objection where appropriate.
7. Continue ongoing consultation throughout the life of the project.

This approach was underpinned by and upholds the principles of the International Association for Public Participation spectrum (IAP2 spectrum), which helped to achieve the goals set out by the NOPSEMA guidelines and legislation. The project-specific Regia website not only helped with community engagement and co-design of consultation but further aligned goals and outcomes between CGG's consultation methodology and the IAP2 spectrum.

The decision-making criteria was captured in a document (Decision Making Criteria in the Environmental Assessment Process – March 2023). This document was uploaded in to the 'Establishing Context' section of the activity webpages' document library. It was also featured on the landing page, with a feedback function that facilitated public discourse regarding the decision-making criteria.

The Environmental Planning Area (EPA) was established to frame the initial studies and community consultation effort. Set at 155 km around the Activity Planning Area, this distance was selected using professional judgement and a review of previous impact and risk assessments for similar activities in the region. Further justification for this distance can be found in Appendix B11.

CGG identified several subject-centred groups in its planning process and the consultation methodology was tailored to the cultural, social, and economic features of these people and communities. The discussion in the subsequent sections of this document apply to all subject-centred groups. Through the consultation process two, subject-centred groups (Commercial Fishers and First Nations Australians) warranted elevated tailoring of the consultation method. Demonstrations of compliant consultation with these groups have therefore been provided in Annex 1 – Commercial Fishers and Annex 2 – First Nations Australians.

The streams of relevant persons consultation and public engagement are shown in Figure C1-1. Further details are available from the Community Consultation Hub on the Regia website (regiamss.com.au).

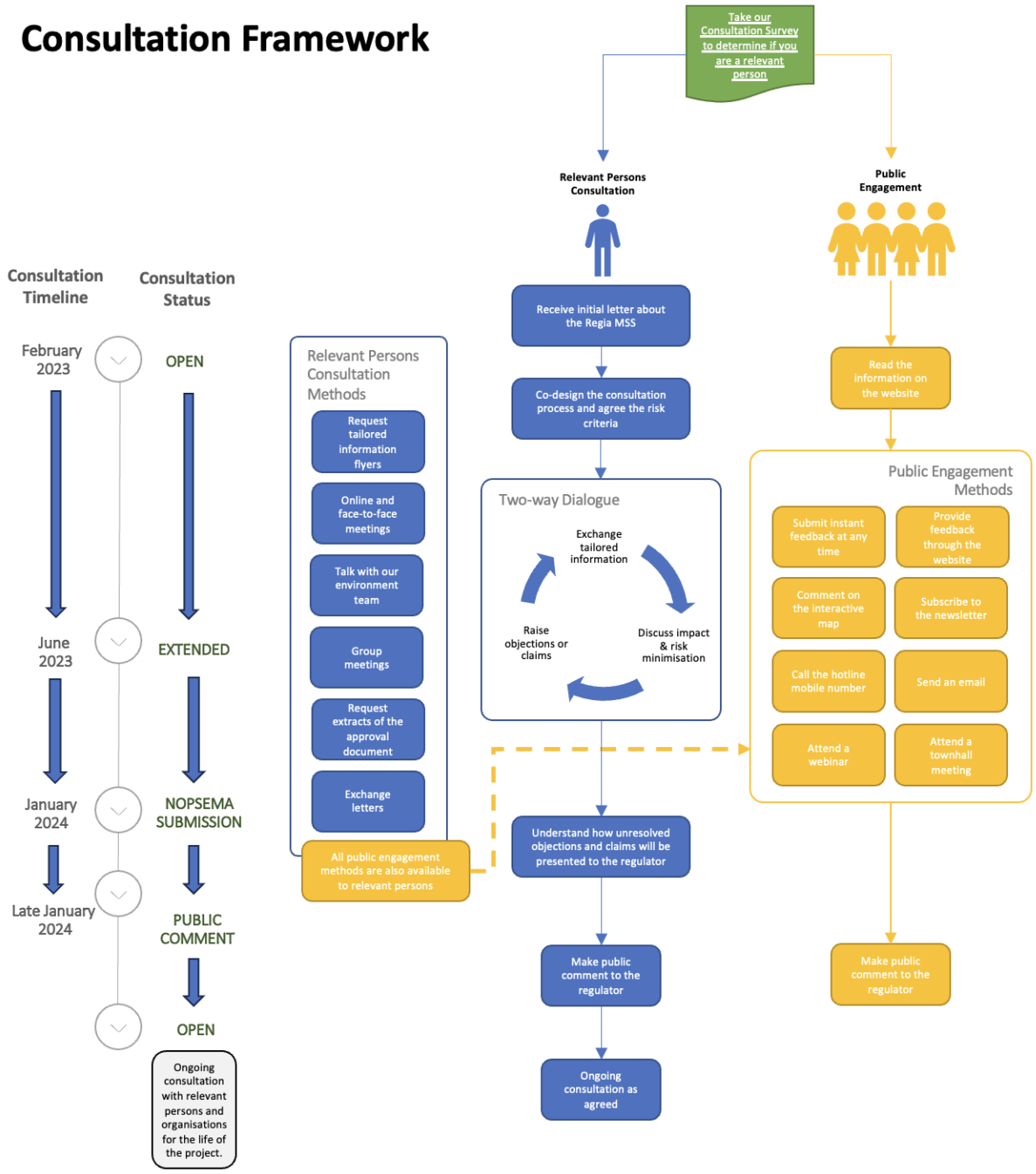


Figure C1-1 - Regia MSS Consultation Activities

3.1 Relevant Person Identification

Titleholders are required to identify and consult with each authority, person or organisation who fits the definition of a relevant persons pursuant to Section 25 of the Regulations. This section clearly demonstrates who is a relevant person, and the rationale used to determine that status. Key factors considered by CGG in this process included the nature of the activity, the environment in which it is being undertaken and the impacts and risks associated with it.

3.1.1 Broad Capture of People and Information

Identifying relevant persons is essential in designing a consultation method that is inclusive, effective, and legally compliant. It promotes fairness, transparency, and accountability in decision-making processes and can lead to more successful outcomes and reduced risks for all parties involved. CGG's process for relevant persons identification provided for the broad capture of relevant persons such that each relevant person who can be identified, was identified (GN1344: Section 12.3; GL2086: Section 6). CGG also understands that despite our best endeavours, there may still be some unidentified relevant persons. Despite this, the methodology used by CGG was capable of identifying each relevant person.

The search for persons or organisations who are relevant persons starts as a global public search because the definitions of functions, interests and activities are not geographically constrained. However, certain groups, such as other marine users, are likely to be proximate to the activity.

By categorising people within the community, engagement was tailored to specific subject-centred groups. The legislation provides guidelines to this effect using four categories: the public, authorities, organisations, and persons. For the purposes of Part 4 Division 3, there is a clear, explicit difference between the public and *relevant persons* (organisations, authorities, and persons) who unlike the public, are mandatory consultees in preparation of the EP.

CGG has identified and evaluated all potential environmental impacts and risks based on the information and relevant persons identified. If new information or relevant persons are identified, CGG has appropriate change management procedures in place, which are outlined in our ongoing consultation strategy (See Appendix B3).

3.1.1.1 Method(s) used for the identification of relevant persons

CGG used the following methods to identify authorities, organisations and persons who may be affected by its activities. Table C1-2 also provides further details on the strategies employed by CGG to identify relevant persons and engage with them using tailored, subject-centred consultation approaches. These strategies were designed to address the specific cultural, social, and economic needs of each group effectively. Annex 3 Table C1-9 shows CGG's record of engagements.

- **Contacted government agencies and organisations:** Relevant government agencies provided information about individuals and organisations potentially affected by the activity.
- **Consulted with local community groups:** CGG reached out to local community groups, such as those focused on environmental conservation or fishing, as they may have had members with interests or activities impacted by the activity.
- **Engaged with local Indigenous groups:** Indigenous groups, with specific cultural or spiritual interests, were consulted to ensure their rights and beliefs were respected. See Annex 2 Consultation with First Nations Australians for further information.
- **Conducted online research:** CGG searched for news articles or press releases about similar activities in the area to identify individuals or organisations mentioned.
- **Advertised in local newspapers and on local radio stations:** Local media outlets were used to inform the public about the planned activity and encourage individuals with specific interests to come forward.
- **Reached out to industry associations:** Industry associations related to fishing, shipping, and oil and gas exploration in the area were contacted, as their members' interests could have been impacted.
- **Contacted local businesses:** Local businesses, such as tour operators were approached since their customers' interests or activities could have been affected.

- **Engaged with local educational institutions:** CGG reached out to universities and research centres, as they might have had researchers or students whose interests or activities were impacted.
- **Used social media:** Social media platforms were used to identify relevant persons by searching hashtags or keywords related to the activity, following local groups, and reaching out to those who engaged with posts on similar topics.
- **Conducted surveys:** Surveys were distributed widely to gather information from people whose interests or activities could be affected.
- **Attended local community events:** CGG identified and participated in local community events, where it engaged with groups and individuals potentially affected by the activity.

In addition to the above methods, CGG had an online survey available for anyone to determine if they are entitled to consultation as a relevant person, or if they should engage as a member of the public. The survey remained live in the preparation of the EP, the public comment period, and throughout NOPSEMA's assessment period.

The streams of relevant persons consultation and public engagement are shown in Figure C1-1 above.

3.1.2 Opportunity to Self-Identify

To combat the challenges faced by a requirement to identify every relevant person, CGG launched the Regia website (regiamss.com.au), which created two channels of communication with the public and with relevant persons. This website, advertised at community events, and via print (both link and QR code), social, radio and television media, helped reach and locate interested members of the public and provided a simple survey to determine if a person was relevant for Section 25. This survey helped self-identification as it enabled individuals to provide their functions, interests, and activities, or request more information to determine if they were relevant. In total, the website reached over 3700 unique users, with over 12,200 total visits, 852 document downloads, and the consultation survey was taken 121 times, identifying 108 relevant persons.

To facilitate use of the Regia MSS website, 13 social media boosted adverts were run, the audience being 18-65+ within the Environment Planning Area (**EPA**) and matching potentially affected interests. The adverts encouraged people to visit the Regia MSS website to self-identify, access or request information and submit comments. These advertisements were through Facebook (META), LinkedIn and Instagram, with an estimated target audience of 270,300-318,000. A full report detailing Thruplay, Reach and Impressions is available in Appendix C5. A total of 10 advertisements were run through traditional media, with a QR code and written website link, and 13 through social media, which were also used to publicise community information sessions.

The streams of relevant persons consultation and public engagement are shown in Figure C1-1 above.

3.1.3 Raising Awareness

CGG published a total of 299 notices in local and national print media, social media, and local radio and television interviews to:

- Provide sufficient information to allow individuals to make informed decisions on potential impacts on their functions, interests, or activities.
- Facilitate information and consultation requests.
- Promote self-identification through the Regia website.
- Notify the public of commencement of the EP and consultation process.
- Advertise information sessions.
- Access recordings of previous webinars.

- Allow individuals to sign up for newsletters and webinars.
- List 'Frequently asked questions' and, as engagement progressed, thematic 'What we've heard so far' feedback, with assessment of merit and measures adopted.
- Publish summaries, implementation strategies and risk assessments.
- Allow individuals to make both public (interactive map) and private instant feedback.

The notices were placed in media where the audience were potentially relevant to the activity, such as located in the EPA and a First Nations newspaper. In addition, the initial community sessions were run jointly with another titleholder who also had a proposal in the Otway, they placed 4 print adverts and 142 radio spots within the EPA to advertise these sessions.

All identified relevant persons were contacted via email and/or phone or post and informed of their rights and the role they play as a relevant person. Each person was also asked what their preferred line of communication was and how they would like to co-design the consultation in a way which best suits their interests, availability, and needs. A full record of these communications can be found in Appendix C2 and C3, but some of the techniques employed by CGG included:

- 11 Community information sessions.
- 6 online webinars, which were recorded and uploaded to the activity website.
- 10 Campaign email project newsletters.
- 23 Letters via postal service.
- 121 Consultation surveys.
- Feedback surveys.
- 7 Instant feedback.
- 11 Commercial fisher engagement surveys.
- 17 Webinar series registrations.
- 38 Newsletter registrations.
- 78 Interactive map comments.
- 13 Boosted social media targeted adverts.
- 25 Face-to-face meetings.
- 19 Virtual meetings.
- 10 print advertisements.
- 272 radio adverts over 6 local stations and their websites.
- 9 Tailored information summaries.
- Commercial fisher group meetings.
- 1 ENGO group meeting.
- Local radio and television interviews/comments.

In addition to this, the project-specific website, which can be accessed at www.regiamss.com.au, was designed to create an open-book space where people can publicly or privately raise concerns, share and/or access information and stay informed. On the website, the consultation survey empowered CGG and the public to determine the best way for them to engage with the Regia project and decide if they are a relevant person for the purposes of Section 25 of the Regulations. The Regia website goes beyond industry standards for consultations, and assisted CGG in locating a further 118 relevant persons through self-identification on the website.

In a bid to mitigate consultation fatigue, initial community information events were held in conjunction with another proponent who was also promoting an offshore activity in the Otway. Following these events, CGG received feedback from some attendees that this was confusing and requested Regia MSS only events (Event ID806 & ID919). CGG worked with these groups and held the standalone events (Event ID's 4112, 1731), working with them to ensure the location and date was suitable, and advertising via email notice (ID987 & ID1020) and in the local newsletter a community member suggested during the first community event (ID762 & ID1199).

During these information events, individuals were informed of the ways they could participate and the classification of a Relevant Person. They were encouraged to self-identify by contacting the Regia team via one of the points of communication, and to forward information to any potentially relevant person they may know.

In three of the community events (Event ID1481, ID1731 & ID4112) an attendee requested that a vote be taken on who opposes the project, at all events the majority were against the activity. The Regia Environment Manager informed each event that a 'for and against' vote is not part of the community or relevant person engagement but would nevertheless be recorded in the consultation record. This was reiterated to individuals who were unable to attend the event and subsequently emailed in a 'no vote'.

In total there were 37 in-person engagements with the Regia Environmental Manager in the south-west region, this included visiting wharfs and local fishing businesses to raise awareness of the activity.

The streams of relevant persons consultation and public engagement are shown in Figure C1-1 above.

3.1.4 Tailored Engagement Methods

CGG employed a range of communication techniques which were tailored based on different audiences, preferred mediums, and technological availability. Consultation consisted of two-way dialogue, where relevant persons were given sufficient information through a medium of their choice, allowing them to make an informed decision on the potential consequences of the Regia MSS on their functions, activities, or interests. These mediums included emails, phone calls, face-to-face meetings, tailored presentations, webinars, and website interactions. An outline of the engagement methods used by CGG is in Annex 3. This approach was underpinned by the principles of the International Association for Public Participation spectrum (IAP2 spectrum). The assessment of effectiveness of a communication channel included consideration of the following:

- Accessibility to the channel.
- Accessibility of information.
- Depth and quality of information able to be communicated.
- Least burden on the person.
- Opportunity to respond to the information.
- Ability to show genuine consideration of the views prior to a decision.

Table C1-2 – Consultation goals

IAP2 Spectrum Element	Consultation goal
Inform	Provide balanced and objective information to assist persons in understanding the problems, alternatives and/or solutions. To seek and further understand the environmental values and sensitivities in the EMBA.
Consult	Obtain specific feedback on analysis, alternatives and/or decisions from potentially relevant persons.
Involve	Work directly with relevant persons throughout the process to ensure that their functions, interests and activities are consistently understood, considered and addressed.
Collaborate	Partner with the public in each aspect of CGG's decision making including the development of alternatives and the identification of the preferred solutions.
Empower	Provide the opportunity to co-design the consultation process and directly influence the final design of the activity.

3.1.5 Reasonable Period of Raising Awareness

To promote best practice, CGG took a broad interpretation of the reasonable period required in sub-section 25(3) to mean not only a reasonable period with sufficient information but a reasonable period of raising awareness as well. CGG commenced consultation on 03 February 2023, over 330 days before first submission to NOPSEMA.

3.1.6 Statutory categories

Section 25(1) stipulates the categories titleholders must search for relevant persons. How CGG covered these categories is discussed below.

3.1.6.1 Section 25(1)(a), (b) and (c)

Identifying relevant persons under these categories is simple as they are all government agencies and statutory authorities that have functions, interests, or activities within the EPA. The exhaustive list of these relevant persons and a summary of communications can be found in Appendix C2.

3.1.6.2 Section 25(1)(e)

Nobody was identified under this section as all identified relevant persons fit into 25(1)(a)-(d). This is because CGG has treated everyone engaged as a relevant person and only people who positively opted out of consultation have not been subject to the full methodology.

3.1.6.3 Section 25(1)(d)

The factors in Section 3.1 helped determine which individuals, authorities and persons had functions, interests or activities that may be affected. The definition of the terms "functions", "activities" and "interest" were used as per the recent Federal Court judgements and NOPSEMA guidelines. CGG contacted persons whose functions, interests or activities could not be easily ascertained and validated any assumptions about whether they may be affected by the Regia MSS.

Contrary to section 25(1)(a), (b) and c, the list of relevant persons here was and is non-exhaustive, as it can change as the project developed, but the Regulations and NOPSEMA understand and cater for this. A total of 688 people and organisations were identified as relevant persons for the purposes of this regulation. For each of these the consultation process was applied, with an aim to engage in two-way dialogue, inviting co-design of consultation, including engagement via their preferred medium, whether it be email or a meeting. See Appendix C2 for a summary of these consultations and Appendix C4 for full text responses.

3.1.7 Identification of Subject Centred Groups and Relevant Persons

CGG used subject-centred groups and tailored consultation strategies to identify relevant persons and subsequently engage with them in a way that was appropriate to their cultural, social, and economic needs. Table C1-2 outlines the strategies used. The search for persons or organisations who are relevant persons starts as a global public search because the definitions of functions, interests and activities are not geographically constrained, for example, national environmental non-governmental organisations. However, certain groups, such as other marine users, are likely to be proximate to the activity and as such the Activity Planning Area (APA) and the Environmental Planning Area (EPA) were used. This is captured in the table below.

For a complete list of relevant persons identified, see Appendix C2.

Table C1-2 - Subject-centered groups

Subject-centred group	Tailored identification strategies	Relevant persons identified
Commerce	Contacted Chamber of Commerce offices adjacent to the EPA to identify relevant marine based businesses. Online searches for news articles or press releases about marine-based businesses in the area.	7
Commercial Fishers	Annex 1, Consultation with Commercial Fisher describes in detail how CGG undertook a tailored approach to identify this group. In summary, studies were performed to identify state and commonwealth fisheries that overlap the EPA. This information was then used to obtain relevant commonwealth fisher's details and to support identification of relevant state fishers via engagement with peak associations and in-community.	290
Conservation Groups	Reviewed EP's previously submitted on the NOPSEMA website, identifying conservation groups listed in similar offshore activities. Conducted online searches for conservation groups with interests in similar activities, and using keywords like "marine conservation" and "environmental advocacy". Looked for conservation groups with a history of engagement in offshore energy discussions or campaigns, ensuring relevancy to the current activity. Including online searches for news articles.	42
Educational Bodies	Contacted Persons/institutions with research programs related to the EPA (such as Blue Whale) from previous activity database and desktop research.	3
Fishing Associations	Annex 1, Consultation with Commercial Fisher describes in detail how CGG undertook a tailored approach to identify this group. In summary, details of relevant fishing associations were provided in engagement with AFMA and VFA, in addition to desktop research for associations related to the identified species.	23
State Government **Commonwealth Government**	Previous databases and desktop research undertaken for government agencies and statutory authorities that have functions, interests, or activities within the EPA. Accessed the Australasian Underwater Cultural Heritage Database.	33
Interested member of the public	List compiled through project awareness raising, including local adverts (print, social, media, TV adverts), and community information sessions.	172
Local councils	Searched the Victorian Electoral Commission database and targeted local government entities (councils, shires and cities) proximate to the EPA.	16
Traditional Owner Group	See Annex 2 – Consultation with First Nations Australians, describes in detail how CGG undertook a tailored approach to identify this group. In summary, an approach including desktop research, databases of registered native title claims, Indigenous government agencies, and lists of local land councils in and around the EPA was undertaken.	16

Subject-centred group	Tailored identification strategies	Relevant persons identified
Petroleum title holders	Utilised the NEATS database to find titles and titleholders within the EPA. Used the NOPSEMA EP database to find other titleholders with activities in the EPA area. Subscribed to NOPSEMA EP submission pages for all activities in the Otway region to track ongoing and relevant developments.	2
Other Marine Users	Harbourmasters adjacent to the EPA contacted to enquire about frequent users. Online searches conducted for businesses located at wharves in ports adjacent to the EPA. Performed online searches for groups who use or have a connection to the marine environment within the EPA.	48
Recreational fishers	Desktop research was undertaken to identify recreational fishing associations and recreational fishing clubs and business, located in areas within and adjacent to the EPA.	17
Tourism operators	Conducted online searches for marine tourism services, and recreational experiences within the EPA, such as marine mammal observations, and diving. Specific keywords such as “marine tours”, “diving”, “scuba diving”, and “fishing charters”were used.	20

3.1.8 Non-responsive Relevant Persons

Where the identified, or self-identified, Relevant Person was non-responsive a follow up attempt to make contact, and confirm receipt, was undertaken using an alternative method of communication, where CGG could access this. For example, Commonwealth Fisher's contacted via email and SMS. Where an additional contact method was not able to be obtained, even following additional desktop research, a follow-up was made using the initial method. If a response was still not obtained, CGG continued to provide project updates, encouraging engagement and continuing to keep the Relevant Person informed of developments and changes.

Where CGG learnt from desktop research, or other Relevant Persons that a non-responsive Relevant Person did want to discuss the activity and their functions, interests and activities, CGG deemed it appropriate to modify this approach and make further attempts at direct requests for engagement. This is evidenced in the Relevant Person Summary in Appendix C2.

3.2 Give Sufficient Information

Under sub section 25(2) of the OPGGE(S)R, titleholders must give relevant persons sufficient information to allow them to make an informed assessment of the possible consequences of the proposed activity on their functions, activities, and interests.

As a minimum, all relevant persons were given initial information including:

- An activity description summary.
- A map indicating the activity planning area and environmental planning area.
- An overview of the consultation process proposed by CGG.

The initial information pack was specifically designed to provide sufficient information for readers to understand if they may be affected, and if they wanted to participate in the consultation process. In giving this information CGG informed each relevant person of their rights in the consultation process and that they could request information provided, be kept confidential.

Once it became available the Preliminary Environmental Impact and Risk Assessment (**PEIRA**) was used to provide further information in a digestible shortened format. CGG were able to empower relevant persons to make informed decisions and engage in the construction of positive outcomes by:

- Tailoring information, responses, and communication mediums to relevant persons; and
- Providing further information when requested to ensure relevant persons understanding and comprehension; and
- Published Decision Making Criteria: and
- Offering summaries or further explanation if required; and
- Producing receptor and industry specific reports and summaries; and
- Directed relevant persons to the NOPSEMA guidelines; and
- Published all relevant information on the Regia MSS website document library; and
- Community information sessions; and
- Webinars; and
- Group and individual meetings.

A detailed list of information requests and how they were addressed is captured in Annex 6 of this document, Appendix C2 and Appendix C4.

Project newsletters were utilised as a tool to capture important information, within a single correspondence to limit consultation fatigue, and to provide information on changes made throughout the consultation process. The newsletters provided information such as when the team would be in the area and inviting meeting requests, how to refer a potentially relevant person, changes to timings, how to request information is kept sensitive, distribute the NOPSEMA community consultation brochure, and to inform of, and request feedback on, measures implemented through the engagement process. Project newsletters were sent to all organisations and people in the database (both relevant and non-relevant) and uploaded to the project website. Located on the project website was also a link to provide details to sign up for the newsletter.

3.2.1 Information Formatting

The original provision of information was broad, simplistic, and easily accessible to the public to engage and capture the maximum possible number of relevant persons. Once these groups and individuals had been identified, they were consulted regarding which communication channel they preferred and the detail of information they required; helping build the framework for ongoing consultation with CGG.

Rather than using a one-size-fits-all approach, CGG understands that different people digest and respond to information differently. Information was therefore uniquely tailored to different requirements through multiple techniques, some of these include:

- **Changing the format of information flow depending on the person's needs:** For example, some First Nations groups (Event ID 1891) required in person, face-to-face meetings, whereas some groups preferred online (Event ID 2937).
- **Changing the content and complexity of the information based on a person's needs:** Rather than overwhelming people with information, CGG provided concise information and evidence surrounding the function, interest or activity that was being affected by the Regia MSS. Information was broken down into themes, topics and receptors, to mitigate concerns of information being inaccessible. For example, the environmental impact and risk assessments were both published online, in chapters, relating to their specific receptors. This allowed information relating to a specific concern to be easily accessed and reviewed. These

chapters were also released with cover letters requesting feedback, directing the reader to context documents, relevant studies, and offering a summary and/or to discuss further with a member of the Regia team.

- **Subject-specific information summaries:** Flyers were produced to complement the consultation process and assist in capturing a broad group of relevant persons. These flyers were unique to the subject-centred groups previously discussed, to facilitate the understanding of risks and response from interested persons.
- **Regia website:** The project-specific Regia website allowed all members of the public and persons with interest to access every piece of information they would need to make informed decisions and objections, or request information in a form and delivery method appropriate to their needs. There are multiple industry-exceeding features of this website which include:
- **An interactive map for the Regia MSS:** This map included a boundary of the EPA and invited members of the public to place a 'marker' and share feedback for the activity. There were also instructions indicating that leaving a marker is a contribution as a member of the public and not as a relevant person pursuant to the Regulations. These instructions also provided an email, phone number, and a link to the consultation survey should someone believe they were a relevant person and mandatory consultee. Where questions were asked, they were responded to in a thread, so answers were available for public viewing.
- **Consultation survey:** This key feature provided members of the public a non-confrontational, simplistic way to check if they were a relevant person under the Regulations.

Through the design and nature of this publicly available information, interested parties were able to access the exact information they required to make informed decisions, without needing to request it, however, they were also afforded the opportunity to request the information in a format suitable to their specific needs.

A total of 40 relevant documents are published and publicly available for review and comment on the Regia website. The full list of documents available on the website prior to Public Comment can be found in Annex 7 along with the original publication dates. This transparency employed by CGG promoted trust within the community and far exceeds the level of sufficient information required to make an informed decision.

3.2.2 Further Information

In addition to the efforts put into tailoring the delivery and content of information to the relevant persons requirements, CGG invited relevant persons to request further information, in their preferred form, and engage in two-way consultation. Where requested, further relevant information was provided and relevant persons were referred to the Regia website, if necessary, which is supported in the full text responses annexed in Appendix C3 and listed in Annex 6 of this document, and in the 'Information Requested' tables in the Relevant Perso Summaries in Appendix C2.

3.2.3 Iterative Process for Reaching Sufficient Information

CGG has adopted an iterative and collaborative approach to provide relevant persons with sufficient information to allow an informed assessment of any possible effects of the activity on their functions, interests, or activities. When a relevant person requested further information, CGG promptly provided it. The iterative nature of the consultation process is best demonstrated where there were multiple occasions of information, questions, and feedback exchange between CGG and relevant persons.

3.2.4 Community sessions

The community sessions were incredibly valuable in identifying relevant persons. A total of 11 community sessions were held at strategic locations based on their proximity to the EPA. Information exchange at, and following, these events allowed engagement to be co-designed. Initially, in a bid to mitigate consultation fatigue, events were held with another titleholder who had a proposal in the

area. When requests were made to hold standalone events, in requested areas, these were organised (Event ID's 1005, 806).

The sessions were advertised in 9 local print newspapers, 3 targeted social media adverts and 272 radio adverts over 6 local stations and their websites. In addition, the collaborating titleholder placed 4 print adverts and 142 radio spots within the EPA to advertise these sessions.

3.3 Reasonable Period with Sufficient Information

Pursuant to sub-section 25(3) of the Regulations, relevant persons must be afforded a reasonable period for consultation. NOPSEMA guidelines reiterate that for consultation to be genuine and meaningful, relevant persons must be given a reasonable period with sufficient information to allow them to make an informed assessment of the possible consequences of the activity on their functions, interests, or activities (GL2086: Section 9).

CGG understood that a reasonable period is contextually different for different groups and subsequently applied different interpretations of the term 'reasonable period' to different subject-centred groups and relevant persons. The provision of a reasonable period is therefore closely linked to the iterative nature of consultation and can change on a case-by-case basis. It is also inappropriate to assimilate the term reasonable period with a strict time frame as both relevant persons and a titleholder could misuse this interpretation against the spirit of consultation and the regulations. Subsequently and as an example, CGG considered multiple attempts to engage and the provision of subsequent information and project updates as a reasonable period.

CGG also considered the subjective context affecting a relevant person's communication important to determining what a reasonable period might be. For example, due to the professional nature of a government agency, an initial email and a 30-day minimum period may constitute a reasonable period. By comparison, a First Nations organisation may have technological or cultural barriers preventing the application of an email and 30-day minimum being appropriate. Full details of these communications, efforts and timeframes can be found in Appendix C2 and C4.

When stakeholders expressed concern and burden, due to other proposed activities with similar engagement timelines and internal resourcing (Event ID 3413 & 3384), the decision was made to cancel the consultation pause, moving intended Public Comment period to 2024, and keeping engagement open (Event ID 3331).

All identified potentially relevant persons were contacted on a minimum of two separate occasions, and timeframes were extended on a case-by-case basis. Consultation time frames and response times were highly variable between different relevant persons, and as such a standard period is difficult to conclude. What can be said is that as an absolute minimum, all relevant persons were afforded a 30-day minimum for consultation, and where no response was received after 30 days, project updates continued to be provided, inviting engagement as the project design evolved. Further, phone calls were made to confirm receipt where details were available, and a final written or SMS follow-up was made.

3.4 Relevant Person Feedback

Another expectation of the titleholder is to utilise consultation and feedback to improve the predictive outcomes for the environment. CGG used multiple approaches to engage relevant persons and seek feedback on how the activity conducted would affect their interests, activities, or functions. These approaches were tailored to different subject-centred groups and individuals to ensure that feedback was encouraged and facilitated in an appropriate manner. There were multiple feedback channels available to relevant stakeholders, which included face-to-face meetings, phone calls, emails, and the Regia website to name a few.

3.4.1 Types of Feedback

Feedback was received via various communication methods, including in writing in emails and verbally during meetings. In all cases, feedback from relevant persons was assessed to determine its type so that it could be processed properly. The feedback types were determined to be either an:

- An assertion or concern
- Objection or claim
- A request for information

All feedback was assigned a type, assessed, and addressed. The full record of each feedback made by a relevant person, and how it was addressed, has been provided in Appendix C2.

3.4.1.1 Assertions and Concerns

During the consultation in preparation of the EP, CGG received numerous assertions and concerns that were not about the adverse effects of the activity:

- **Objection to Gas Development:** 80 feedbacks (11.59%)
- **General Seismic Activity in the Otway:** 6 feedbacks (0.87%)
- **Titleholder Consultation:** 53 feedbacks (7.68%)
- **First Nations Consultation:** 17 feedbacks (2.46%)
- **Regulator Consultation:** 7 feedbacks (1.01%)
- **Positive Consultation:** 1 feedbacks (0.14%)
- **Research and Data Specific:** 12 feedbacks (1.74%)
- **General Environmental Concerns:** 8 feedbacks (1.16%)
- **Local Community Concerns:** 7 feedbacks (1.01%)
- **No Assertions and Concerns:** 499 events (72.32%)

The assertions and concerns received from relevant persons, and how they were addressed by CGG, are shown in Annex 4.

3.4.1.2 Objections or Claims

During the consultation in preparation of the EP, CGG invited relevant persons to raise objections or claims about the adverse effects of the activity on their functions, interests, or activities. Each objection or claim was assessed for merit in accordance with the process outlined below and can be found in the relevant persons consultation report (Appendix C2). They were assigned to each of the environmental assessment chapters and are not repeated in this appendix.

3.4.1.3 Information Received

CGG also invited relevant persons to share information that may be relevant to the activity or about the adverse effects of the activity on their functions, interests or activities. There were 385 pieces of information shared and considered in the activity design. The information received is shown in full in Annex 5.

3.4.1.4 Information Requests

During the consultation process, relevant persons made requests for more information that may be relevant in their assessment of the adverse effects of the activity on their functions, interests or activities. There were 293 feedback(s) shared, which are shown with the titleholder response in Annex 6.

3.4.1.5 Third-party Correspondence Provided By NOPSEMA

In some instances, relevant persons may choose to send information relevant to the Regia MSS environment plan directly to NOPSEMA, without providing the correspondence to CGG. This correspondence is then provided to CGG, as part of procedural fairness as it may contain information that may be relevant to the EP. This feedback is then assessed for relevancy and when required the process described in sections 3.4.2 and 3.4.3 is undertaken.

Information was received in this manner on the 17th of March 2025 from Surfrider Foundation, an organisation who has previously engaged in the consultation process (Org ID's 117 and 245). The submission was items taken from the previous RFWI, as such the information provided within was found at the time of assessment to be outdated, incorrect, or beyond the purview of CGG or Surfrider Foundation. Examples of this were statements that clear demonstrations of mitigations were not, and cannot, be made. The appropriate authority to determine this is NOPSEMA, as regulator. There were incorrect statements made, such as assumptions on the size of a survey vessels fuel tank, claims of the absence of shut down consideration for marine fauna (Appendix G2), and the misunderstanding of MDO/MGO Group 2 non-persistent oils. Other examples include claims of missing appendices on the project website, when the RFWI response (also published) states *'Appendix B9 has been removed from the submission and the relevant parts of the environmental assessment have been included in Appendix B3'*. It should also be noted that there is no requirement for CGG to publish its EP or the NOPSEMA decision letters on the project website, however this has been committed to, to maintain transparency and build trust.
Therefore, as the information was not new or relevant, no updates to the EP were required.

3.4.2 Tailored and Appropriate Feedback

CGG recognised that relevant persons have varying information requirements and preferred channels of communication. To avoid overloading relevant persons with irrelevant content, information was customised to provide the necessary material for informed decision-making in a manner that best suited each RP. For instance, Government agencies were primarily contacted via email with periodic project updates, while some First Nations organisations requested face-to-face meetings on Country, which CGG accommodated as a sign of respect for cultural values. Appendix C2 contains a list of all events undertaken by CGG in consultation with relevant persons. Where feedback was revealed from any event, Appendix C2 also provides a summary of the feedback(s) arising from that event.

Occasionally CGG has extensive engagement with relevant persons (e.g. Org ID 98/195 and Person ID 1715) which elicited multiple instances of similar, potentially repetitive, feedback. It can be easy to dismiss feedback that appears repetitive at first glance and miss nuance and deeper substantive issues. CGG was careful not to make this mistake and always engaged further with the relevant person to reveal underlying objections and claims.

3.4.3 Assessment of Merit

The merit of all feedback received from relevant persons during consultation was assessed. A record of all feedback received, the assessment of merit, and the response provided is included in Appendix C2. A relevant person's feedback was deemed to have merit when one or more of the following criteria was met:

- About the adverse effects of the activity.
- About the provision of sufficient information and a reasonable period.
- An information request that supports the management of environmental impacts and risks.
- Relevant to the persons functions, interests, and activities.
- Can be resolved through the adoption of additional control measures, an activity design variation/limitation, or through changes to the implementation strategy for the EP.

Where feedback had merit CGG considered what measures could be adopted and separately recorded what measures were adopted because of the consultation. Mostly, the measures adopted because of the consultations were an activity limitation, a legislative requirement, a control measure (or part thereof), a performance standard, or implementation strategy commitments that had already

been adopted through the environmental assessment process. Those that were new measures were often characterised as an activity limitation, a control measure, a performance standard, or implementation strategy commitment for ease of compliance monitoring. Requests were usually related to further information required by the relevant person and this information was subsequently provided. Where feedback did not have merit CGG did not progress through the process beyond the assessment of merit.

CGG has informed, or has a planned response, to every relevant person who raised feedback about the outcome of this process. The information provided includes whether the feedback was substantiated, how it was assessed, and what measures, if any, were put in place to manage the impact or risk.

4 Record Keeping

CGG created and maintained a confidential database of relevant persons using a bespoke consultation management system, an ISO27001/9001 compliant product, to ensure accurate record-keeping. Viewing access is only granted to authorized persons by CGG's authorised Administrator.

5 Ongoing Consultation

It is a requirement that ongoing consultation is part of the titleholder's implementation strategy, as stipulated by section 14(9) of the Regulations. External communications with relevant persons will occur on an ongoing basis, with the intent to understand and cater for how relevant persons functions, interests and activities are being affected. CGG's implementation strategy includes ongoing consultation processes that are in place to manage and fulfil this requirement (see Appendix B3).

6 Document Control

Table C1-3 - Revision History

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	20 December 2023	MS	Initial preparation for CGG review.
0.1	5 January 2024	LB/SR	Review and update.
1	9 January 2024	MS	Review and update for submission.
2	11 May 2024	MS	Updated following public comment.
3	11 November 2024	MS/SR/DS/MG	Updated following NOPSEMA assessment.
4	16 April 2025	MS/SR/SS	Updated following NOPSEMA OMR 1 Letter
5	8 December 2025	SR/MG/MS	Updated following NOPSEMA OMR #2 Letter

Annex 1 – Consultation with Commercial Fishers and Commercial Fishing Associations

Introduction

In the planning and execution of the Regia MSS, CGG recognised the critical importance of engaging with commercial fishers, a key subject-centred group directly affected by maritime activities. Understanding the unique challenges and operational realities of commercial fishing, CGG committed to a tailored and co-designed consultation approach. This strategy was developed to ensure that the consultation process was not only compliant with the Regulations, but also respectful and responsive to the specific needs of the commercial fishing community and drew from NOPSEMA's 'Supporting cooperative coexistence of seismic surveys and commercial fisheries in Australia's Commonwealth marine area' guidance framework.

Consultation Methodology

A tailored and co-designed consultation approach was applied to allow for a broad capture of commercial fishers who operate in the activity area, and for sufficient information to be provided to allow for assessment of the potential impacts of Regia MSS on their functions, interests, and activities. Underpinned by CGG's consultation methodology (Appendix A3) engagement was adapted and co-designed to remain fit-for-purpose (Table C1-4), understanding that due to the nature of the industry some methods may be more suitable than others. For example, for a government fishing agency an email with information attached would be appropriate, however for a commercial fisher, an SMS with a link to the information is likely easier to access.

Table C1-4 outlines the methods and outcomes of communication that were used to facilitate two-way information share with commercial fishers and their associations, allowing for co-design of both the engagement and activity, minimising any potential impacts.

Table C1-4 - Commercial fisheries communications

Method	Description	Outcome
Email	Emails sent to/from dedicated activity inbox.	Fishers able to send and receive information, can also be accessed by others involved in running the fishing operation
Phone	Calls to landline or mobile.	Used to confirm receipt of information and on request
SMS	SMS to mobile.	Links to relevant information were sent to mitigate accessibility when undertaking fishing operations, and confirm receipt of data
Online consultation surveys	In addition to the general consultation survey hosted on activity website, identified commercial fishers through AFMA were provided with a link to a tailored survey.	Allows for self-identification, to request information, and preferred contact method. The commercial fishers specific survey allowed fishers to indicate if they wanted to be contacted directly, through their association or opt-out, and state if functions, interests, or activities outside of commercial fishing
Online instant feedback	Instant feedback posted on activity website.	Offers opportunity to make instant private comment, feedback or requests

Method	Description	Outcome
Registered letter	Printed letter to fishers (Event ID 4098), with commercial fishers' information sheet.	Registered letters were sent to fishers where an email or SMS second form of contact was not available
Fee-for-service arrangements	Associations engage on behalf of their members, providing two-way information exchange in the appropriate manner for their members.	Fee-for-service arrangements were undertaken with four fishing associations, allowing for co-design of consultation and EP.
Commercial Fishing Information sheet	Comprehensive information sheet with activity overview, timing, map, coordinates, identified fisheries, potential impacts and measures in place, schematic of vessel and streamers, photo of tail buoy, links to website, fisheries report and contact details.	Provided to all identified commercial fishing associations, commercial fishers, and fishing industry organisations, providing a further opportunity for informed assessment of relevancy. Also available on the activity website and promoted on activity social media
Commercial Fisheries Analysis Report (Appendix B6)	Commercial Fisheries Analysis Report produced using Australia Fisheries Management Authority (AFMA) and Victorian Fisheries Authority (VFA) data to identify Commonwealth and State fisheries that have the authority to fish within the activity and/or environmental planning area	Available on the project website and supplied to individuals upon request/when appropriate to engagement.
Local presence	In person visit to commercial fishing related locations by Environment Manager	The Environment Manager made multiple visits to local areas, including drop in's to fishing industry related businesses and wharf's
Individual meetings	In person or online one on one meetings offered	In person and online meetings with activity Environment Manager were held with fishers and their associations
Group meetings	In person or online group meetings offered	Where requested group meetings for commercial fishers and their associations were held
Social media	Instagram, Facebook and LinkedIn activity dedicated pages	Project announcements and updates, including promotion of fishing specific items (information sheet and NERA feedback). Information shared to association Facebook under fee-for-service arrangement
Website	Dedicated activity website	Allowed for easy access of up-to-date activity information, comprehensive document library, alternative contact methods, and hosted tools such as interactive map and consultation surveys (Appendix C5).
Interactive Map	Hosted on the activity website	The map being interactive allowed fishers to focus on their area of interest, facilitated public comments and questions as well.

Method	Description	Outcome
NERA protocol document link and instant feedback	Located on the landing page of the website, the NERA protocol document was made available with an instant feedback comment box	This allowed for easy access to the document and a convenient way to submit feedback. Commercial fishers and associations were notified when this became available

Identification and Initial Contact

A Commercial Fisheries Review (Appendix B6) was commissioned by CGG, to identify which fisheries may be affected by the activity. This allowed identification of Relevant Persons and how they may be affected.

Contact information for individual fishers within the identified Commonwealth commercial fisheries were obtained through a data request to AFMA, who also provided the contact details for the fisheries peak associations. Contact information for individual State licensed commercial fishers is not made available to titleholders, as stated on the Victorian Fisheries Authority (VFA) website (Org ID 13). CGG followed VFA's directive to engage with VFA directly, VRFish (Org ID 18) and Seafood Industry Victoria (Org ID 9), to assist in identifying Victorian state fishers. Desktop research was also undertaken, with the parameters being commercial fishing organisations and associations within the Environmental Planning Area.

Consultation through peak associations is an approach that is recognised and recommended by government and industry bodies, including VFA[1], FRDC[2], and NOPSEMA[3]. Three fishing associations (Org ID 9, 196 & 98/195), detailed below, were identified as having members within fisheries relevant to the activity. In order to facilitate the provision of information to their members and allow for fishers to nominate the associations to consult on their behalf, engagement agreements were arranged (Event ID's 3901, 3898, 3899).

- Org ID 9, Seafood Industry Victoria (SIV): '*SIV is the representative peak body for the Victorian seafood industry with a membership encompassing a broad range of stakeholders from across the seafood supply chain.'* With its members being defined as '*a person or entity who holds a commercial fishing Access Licence, Aquaculture Licence, Fish Receiver's Licence, quota entitlement or permit under the Fisheries Act (1995) Victoria in respect of which a peak body levy is paid for the funding of SIV, or - at the relevant time is a voting member or voluntary member of SIV*'
- Org ID 98/195, Southeast Trawl Fishing Association (SETFIA) & Southern Shark Industry Alliance (SSIA): '*The South East Trawl Fishing Industry Association (SETFIA) is an association representing the interests of trawl fishermen, quota owners, wholesalers and others with a stake-holding in the Commonwealth Trawl Sector. Around 80% of this fishery's quota owners and fishers are members of SETFIA.' 'The Southern Shark Industry Alliance (SSIA) represents stakeholders with an interest in the Gillnet, Hook and Trap (GHaT) fishery.'*
- Org ID 196, Tuna Australia: '*Tuna Australia is the industry association representing statutory fishing right holders, fishing companies, fish processors and sellers, and associate members*

[1] 2017). Available at: https://vfa.vic.gov.au/about/publications-and-resources/undertaking-seismic-surveys-in-victorian-managed-waters (Accessed: 10 October 2024).

[2] Telfer, C. (2022) *Oil and Gas: National coordination - seismic and other issues*, *Fisheries Research and Development Corporation*. Available at: https://www.frdc.com.au/sites/default/files/products/2017-186-DLD.pdf (Accessed: 10 October 2024).

[3] https://www.agriculture.gov.au/sites/default/files/documents/guidance-framework-supporting-cooperative-coexistence-seismic-surveys-commercial-fisheries.pdf

of the Eastern and Western Tuna and Billfish fisheries of Australia. Tuna Australia is considered the peak body for the longline fishing sector by the Australian government. Tuna Australia's members hold more than 90% of the Statutory Fishing Rights (SFRs) issued in the Eastern Tuna and Billfish Fishery, and more than 70% of SFR holdings in the Western Tuna and Billfish Fishery.'

The outcomes of engagement with both individual fishers and fishing associations was the contribution to identification of Relevant Persons and facilitating co-design of engagement through the fisher being able to elect to consult directly with CGG, or through their association.

Using the individual Commonwealth fishers contact details, Commonwealth fishers were contacted via two points of contact, with information, including the comprehensive Commercial Fishing Information sheet, allowing an informed assessment to be made. It was also highlighted in the communications that they may have functions, activities, or interests, that may be affected by the activity, in addition to their commercial fishing activities (respecting the multidimensional nature of relevant persons).

Twenty-three fishing associations were provided with information and invited to engage. These were both national and state associations. In addition to Victorian state associations, Tasmanian and South Australian peak bodies were also contacted. Although not in the Activity Planning Area, and as such not impacted by planned activities, some blocks do have overlap with the Environmental Planning Area.

Commercial fishers, as community members, were also able to self-identify and refer others, through the broad capture undertaken by CGG, including public information sessions and group commercial fisher in-person meetings. A representative of CGG's also visited wharfs and dropped into related businesses in the local areas, to inform of the proposed activity and upcoming community events (Event ID 1280, 1500).

Industry related organisations and local industry related businesses, such as co-ops and government agencies, were also contacted, provided with initial information, and invited to engage on a co-design design basis, with project updates being provided as planning progressed.

Giving Sufficient Information

Once contact details for a commercial fisher were obtained, for fishers' convenience, a link to a survey was provided, where the individual was able to state if they were a relevant person, choose their form and method of engagement, including through their association, and indicate other functions, interests, and activities. They were also able to opt-out of receiving any communications.

A Commercial Fisheries Analysis Report (Appendix B6) was produced, using Australia Fisheries Management Authority (**AFMA**) and Victorian Fisheries Authority (**VFA**) data to identify Commonwealth and State fisheries that have the authority to fish within the activity and/or environmental planning area. This allowed for initial identification of relevant fisheries and the relative fishing intensity. A commercial fishers information brochure to support the consultation efforts with commercial fishers was provided to fishers, directly and via the fishing associations, as well as being made available publicly on the activity website, with this availability highlighted on social media. This brochure drew on the information in the analysis report (Appendix B6), listing identified fisheries, but also providing activity, timing and location information, maps, potential impacts and measures in place, and how to make contact. In addition, fishers were encouraged to state any other functions, interests, or activities they may have, and share the information with anyone they know who may be relevant.

The report was made available publicly, through the Consultation Hub Document Library, and contained detailed effort maps to assist with determining how functions, activities, and interests may be impacted. This report and the maps within, were printed and shared during in person meetings and provided electronically to fishing associations. Fishing associations were also employed to provide information about the Regia MSS and their nominated engagement process followed, with

three fee-for-service arrangements being undertaken. These services include providing their members directly with supplied information, social media posts, and engaging on members behalf to provide a two-way information exchange and feedback on engagement, the activity, and proposed measures.

For full transparency, the environmental assessments, including those about the predicted impacts on fish and invertebrates, were made publicly available on the website, with feedback encouraged, and commercial fishers informed when they were available (e.g. Event ID 1182 & 2561). Detailed analysis was shared with relevant fishers during the group meetings held on location.

Where individual requests for information were made, this can be seen, along with the titleholder response, in the Relevant Person Summary (Appendix C2), in the Information Request table.

Reasonable Period with Sufficient Information

To discharge the commercial fishers and commercial fishing associations consultation obligation, CGG understood that they must demonstrate that these groups have been afforded a reasonable opportunity to be consulted with. Further, all group members should be afforded a reasonable opportunity to participate in consultation with clear, simple, and directly expressed terms. The fulfillment of this duty is evidenced in the consultation records (Appendix C).

Recognising the seasonal and often prolonged nature of fishing trips, CGG extended the typical consultation period, allowing a minimum of 45 days. This adjustment accounted for long hours and/or days commercial fishers often spend away from home, ensuring they had ample opportunity to carefully review and respond to consultation materials upon their return. The FRDC funded paper '*Oil and Gas: National coordination - seismic and other issues*'[4] describes the consultation challenges between commercial fishers and the offshore oil and gas sector as arising from ongoing consultation fatigue and cumulative pressures. Therefore, it is CGG's view that the consideration of an extended reasonable period allowed for sufficient opportunity to participate and was crucial for inclusivity, ensuring that commercial fishers were not disadvantaged, unfairly burdened or excluded from the consultation process.

Relevant Person Feedback

Throughout the consultation process, CGG made a concerted effort to ensure that all feedback received was carefully considered and, where appropriate, integrated into the project planning and execution. This feedback significantly influenced several aspects of the project, including the mitigation strategies employed to protect commercially productive areas. Information received from an individual, along with Objections and Claims, Assertions and Concerns, and Request for Information, can be found in the relevant table in their Relevant Person Summary (Appendix C2).

Nearly every fisher and fishing association consulted with, identified the long-term effects on fishery recruitment from the known mortal effects on zooplankton arising from seismic surveys as a concern. CGG performed numerous additional studies on key target species, plankton communities, and upwelling events to look for scientific corroboration of anecdotal feedback. In all cases, CGG has not found any statistically significant or measurable effect to fish populations. Notwithstanding this effort CGG remains willing to complete further analysis, however fishing data from individual fishers will be required to provide the level of detail necessary. To date, no fisher has agreed to provide permission for CGG to access such data.

CGG committed to ongoing engagement with the commercial fishers and commercial fishing associations, ensuring that consultation did not end with the initial regulatory approval but continued throughout the lifecycle of the Regia MSS.

[4] Telfer, C. (2022) Oil and Gas: National coordination - seismic and other issues, Fisheries Research and Development Corporation. Available at: https://www.frdc.com.au/sites/default/files/products/2017-186-DLD.pdf (Accessed: 10 October 2024).

Appropriate Measures Adopted

There are several measures adopted through feedback received during the consultation process with commercial fishers and commercial fishing associations. These include measures to avoid interference between the Regia MSS and historical commercial fishing efforts such as:

- Depth limitations on the active source area.
- Spatial restrictions around productive fishing grounds.
- Seasonal avoidance of the most productive summer months.
- Notification procedures to avoid interference.

CGG recognised that the Regia MSS may not be able to avoid all interference with commercial fishers and other commercial marine users. Hence a commitment to an evidence-based adjustment protocol for reasonable compensation claims was adopted early. CGG recognises that the details of the protocol need to be refined through ongoing consultation and is collaborating with other titleholders in the region, and fishing associations, to institute a fit-for-purpose compensation protocol.

Industry Appropriate Engagement and Tailored Consultation Strategies

To engage effectively with commercial fishers in an industry appropriate manner, CGG adopted a nuanced and tailored approach that recognized the unique aspects of their work life and community dynamics. The strategies employed aimed to provide a conducive environment for meaningful dialogue and ensure that all information pertaining to the Regia MSS was accessible and comprehensible to this subject-centred group.

1. **Small Group Meetings:** Recognising the close-knit nature of the fishing community, CGG organized small group meetings which provided a comfortable and secure setting for fishers to voice their concerns and opinions. These smaller and less formal settings encouraged participation by offering an atmosphere where individuals could express themselves without feeling isolated or spotlighted. This approach facilitated more open exchange of ideas and the adoption of measures to protect their interests.
2. **Individual Meetings:** CGG recognised that due to commercial confidentiality concerns, some fishers may require one-on-one meetings to divulge sensitive information.
3. **Facilitation Through Respected Representatives:** To further enhance the engagement process, CGG worked through respected representatives from sub-communities within the fishers' communities, categorised by target species or fishing methods. These representatives, who were well-regarded and trusted within their groups, played a crucial role in mediating discussions and gathering collective input. By leveraging these established relationships, CGG ensured that the consultations were respectful of community hierarchies and communication norms, leading to more effective and representative feedback.
4. **Progressive Information Sessions:** Over several months, CGG conducted multiple in-person group sessions, each providing progressively more detailed information about the project. This gradual dissemination allowed fishers to digest complex information over time and develop informed questions and feedback in subsequent sessions. Such a structured yet less formal approach ensured that fishers could engage with the consultation process at a deeper level, building their understanding and involvement as the project details became more comprehensive.
5. **Extended Timeframes for Engagement:** As previously discussed.
6. **Multiple Forms of Correspondence:** Given the transient lifestyle, lack of digital literacy of some fishers and the importance of ensuring that every individual received and acknowledged the receipt of consultation documents, CGG utilised multiple communication channels (see Table C1-7, above), respecting the fishers' need for tangible, accessible

information best suited to their needs. These culturally appropriate engagement strategies were carefully designed to respect the unique characteristics and preferences of the commercial fishing community, ensuring that the consultation process was not only effective but also respectful of the fishers' working conditions and community norms.

Challenges in Consulting with Commercial Fishers and Commercial Fishing Associations

In general, CGG has been able to develop strong relationships with individual commercial fishers in the region. CGG notes most engagements were positive and respectful of each other's rights and activities. Unfortunately, there were some engagements that were less productive with circular arguments about the anecdotal impacts from seismic activities (particularly related to long-term productivity) and what the scientific evidence produced by CGG indicated.

During consultation with some commercial fishing associations, it was strongly preferred that we only engage with fishers through their peak associations. CGG noted this preference and agreed to the fee-for-service arrangements for engagement with fishers through the associations but informed the associations that we would also be consulting with individual fishers directly. This decision was made to mitigate several challenges identified in using the fishing associations solely as consultative bodies on behalf of their members, these challenges included:

- Some associations were not willing to provide a written record of the consultation they intended to carry out.
- Some associations agreed to provide general feedback and information on behalf of their members but could not produce evidence of the individual member providing authority to their association to act on their behalf.
- Most of the associations were not able to represent all the diverse functions, interests, and activities for their members beyond their status as commercial fishers, which is an issue considering the principle of the multidimensional nature of relevant persons.
- Some associations did not engage further once the fee-for-service agreements had been signed. CGG recognises that fishing associations have other priorities than supporting consultation for petroleum titleholders.
- Engagement with many individual fishers occurred where CGG was instructed to consult only with the fisher and explicitly asked not to consult thorough the fishing associations.

There was no instance where a fishing industry association was able to entirely satisfy CGG that using them exclusively to consult with their members was an appropriate and sufficient method of consultation, or one that could be appropriately evidenced as such. CGG recognises that this diminished role of fishing associations in the consultation process, could lead to duplicative consultation with some individuals, risked overloading fishers with too much information, and not be viewed positively by some associations. However, given the nature and scale of potential effect on commercial fishers, these drawbacks were insufficient to warrant reliance on fishing associations to perform the consultations.

SETFIA/SSIA/Atlantis Consulting

Our consultation process has faced significant challenges, particularly with the Southeast Trawl Fishing Industry Association (SETFIA, Org ID 98), the Southern Shark Industry Alliance (SSIA, Org ID 195), and Atlantis Consulting (Org ID 127). The primary concerns raised by SETFIA/SSIA have centred around the perceived inadequacy of the data provided by CGG, which they argue is crucial for accurately assessing the impacts of our survey operations on trawl fishing activities.

Throughout the consultation, SETFIA/SSIA has consistently requested more detailed economic information on the overlap of our survey activities with fishing zones, emphasizing the importance of this data in understanding, and managing impacts on trawl fishing, but without providing an

explanation as to how this information could be of benefit. This is despite CGG providing the information in its own form (from another reputable consultancy using the same ABARES data obtained via AFMA that SETFIA use) and explaining that the information being requested had no utility in managing impacts on commercial fishers. As requested, the overlap, including tonnage, was calculated and provided to SETFIA multiple times, alongside other relevant information such as assessments on receptors and details of adopted measures put in place to manage impacts on fishers (Event IDs 4803 & 4805). The fishery overlap data is available in Appendix E1, Annex 3.

Desktop research discovered multiple SETFIA reports for other planned petroleum activities in the Otway. As part of our preparation of the Regia MSS Environment Plan, we reviewed these EP's and found that SEFTIA/SSIA has previously and regularly reported that the CTS and all other Commonwealth fishing generally occurs been 400m and 1,000m. This information differed to the information received from CTS fishers during consultation who stated that they do occasionally fish down to 200m. The fishers' claims were supported by the ABARES data. Ultimately, the fishing effort is assessed as relatively low, as demonstrated by the ABARES data, previous SETFIA/SSIA/Atlantis reports, and the prevalence of confidentiality limitations on the data (i.e. less than 5 fishers). CGG noted the sensitivities around conflicts of interest present in the information request and this is crucial in understanding our engagement with SETFIA/SSIA. Throughout the consultation process, concerns were raised regarding data accuracy and the perceived impartiality of the analysis provided. This scepticism was partly due to historical instances where SETFIA/SSIA believed that data might have been selectively presented or interpreted to minimise impacts on fishing activities. CGG consulted with AFMA to validate use of the ABARES data to ensure its accuracy and reliability (Event ID 3672). In this feedback (Feedback ID 1237), AFMA confirmed the reliability of the ABARES data, stating it uses logbook and other AFMA collected data. They did note that industry associations have previously been critical of the economic aspects of the ABARES data, however this data is based on in field surveying of fishing industry operators.

In response to these initial challenges, CGG adopted several strategic measures aimed at addressing the concerns raised by SETFIA/SSIA. One of the earliest measures was the adoption of a compensation protocol, which aimed to provide financial redress for any displacement of fishing activities. This protocol was designed with other Titleholders in the region, in consultation with the fishing communities, to ensure it adequately compensates for any economic disruptions, whilst reducing burden on stakeholders. To further our efforts in fostering a productive relationship, we implemented several operational adjustments based on direct feedback from the fishing communities. This included modifying our survey timelines and exclusion zones to minimize overlap with peak fishing periods and critical depths, as detailed in Feedback ID 4276 and 1280, Appendix E1, section 8 and Appendix A2, section 4. On request from SETFIA, CGG also committed to the activity limitation of no sound source discharges within the Orange Roughy research program sites (Feedback IDs 4124 & 4125).

CGG's attempts to provide more localised and specific data were met with continued requests for even more detailed analysis, particularly concerning the tonnage and economic value of the catch in the Activity Planning Area, with SETFIA stating this was required in order for CGG to know how much they may need to pay via a compensation plan (Event ID 3382). This was deemed to have no utility for minimising impacts as the reports obtained by CGG allowed for consultation with commercial fishers to identify potential high impact areas and manage these, as described above. For a previous activity, the data report had been purchased from SETFIA/Atlantis and was not accurate to the compensation paid. Therefore, the advantage of purchasing another report, which also uses the same ABARES data, cannot be deduced by CGG nor offered by SETFIA when asked. The data would not improve or add to the minimisation of interactions with SETFIA's members, all concessions possible have already been made, as documented in Appendix E1, section 8 and Appendix A2, section 4.

The concessions made by CGG in co-designing the activity to minimise interference with commercial fishers were communicated through a series of email updates and consultations, where CGG provided revised maps and operational plans to demonstrate our commitment to reducing the impact on local fisheries.

Despite these efforts, challenges persisted, particularly in maintaining consistent and productive communication. As noted in several emails, there were moments of frustration, which underscored the need for even more robust and considered communication strategies. In response, CGG provided a comprehensive summary of the consultations that included not only regular updates but also proactive outreach to ensure that all parties were informed and engaged throughout the process. Recent communications have included repeated requests for the tonnage and economic value of the catch. As our response and position has been clearly stated many times, and our repeated request for the explanation of how this information can inform mitigation measures is yet to be fulfilled, we have refrained from continuing to address this, due to the risk of causing an incendiary reaction, deteriorating communication further.

SETFIA had also stated that they would be unable to assist with on-water communication SMSs to their members, without the obtainment of the tonnage report. Further consultation with individual commercial fishers has identified that due to 3G shutdown in the area, they no longer have mobile coverage on their vessels (Event ID 6876). Therefore, internet and VHF are more reliable, though CGG managed SMS's will also be offered to fishers.

In conclusion, our consultation process has been a complex interplay of addressing detailed data requests, adapting operational plans, and enhancing communication strategies to foster a cooperative and mutually beneficial relationship with the fishing communities affected by our survey operations. Through a combination of compensation measures, operational adjustments, validated data sharing, and comprehensive stakeholder engagement, the activity's level of interference is no greater than is necessary to exercise the right to carry out exploration by the titles granted.

We have strived to maintain a productive relationship despite the significant challenges encountered. These efforts are ongoing, and we remain committed to continuous improvement and adaptation in response to feedback and environmental considerations.

Annex 2 – Consultation with First Nations Australians

Introduction

In accordance with the requirements outlined in the Regulations, CGG undertook extensive consultations with First Nations Australians to ensure their deep cultural connections, values, and environmental concerns were identified and comprehensively addressed in the planning of the Regia MSS. Recognising the unique consultation needs of First Nations groups, CGG adopted a multi-faceted approach to engage in a culturally appropriate way.

Consultation Methodology

As part of the Regia MSS consultation, this method was developed to ensure that the consultations were not only compliant with regulatory requirements but also respectful and inclusive of the cultural protocols of the First Nations communities involved.

Identification and Initial Contact

For clarity, the broad capture process (section 3.1.1), the opportunity to self-identify (section 3.1.2), and the awareness raising activities (section 3.1.3) all apply to First Nations Australians.

The tailored consultation process for First Nations Australians began in parallel to the previously referenced activities with comprehensive desktop research aimed at identifying First Nations groups who might be impacted by the Regia MSS. CGG undertook to identify and contact First Nations organisations in and around the Environment Planning Area. Understanding that First Nations interests may be direct and/or indirect, such as a spiritual connection to Sea Country, this was undertaken with a broad capture approach, identifying not-for-profit and First Nations groups and organisations, in addition to those with functions related to native title and Country management.

This research was crucial in ensuring that all potentially relevant groups were included from the outset. CGG employed a variety of sources, including databases of registered native title claims, Indigenous government agencies, and lists of local land councils, to compile a comprehensive list of contacts.

Following this identification phase, CGG initiated contact through a series of initial outreach efforts, including sending detailed letters and making follow-up phone calls. These communications were designed to explain the scope of the Regia MSS, the nature of potential impacts, and the reasons these groups were being contacted. The letters invited recipients to engage in the consultation process and offered various forms of follow-up, including face-to-face meetings, to discuss the project in further detail. The opportunity to co-design the consultation process was explicitly offered at the commencement of consultation.

The other methods of raising awareness about the proposed activity and the opportunity to consult with CGG apply equally to all Australians and they should be considered when deciding whether the broad approach taken to finding all relevant persons has suitably contributed to finding each First Nations group and individual.

Table C1-5 lists the organisations identified through the dedicated First Nations Australians searches and initial contact. First Nations individuals also had the opportunity to engage as relevant persons. In addition to outreach advertising covered in (3.1.3), an additional First Nations focused placement was made in the Koori Mail (Appendix C5), a National First Nations newspaper. This was a further step taken to help raise awareness, and allow self-identification of, relevant First Nations people inside and outside of Victoria. The list of First Nations persons is available in the Sensitive Information Report (Appendix C3).

Table C1-5 - First Nations organisations identified and consulted

ID	Name of organisation	Functions, Interests, Activities
12	National Native Title Tribunal	Providing for the recognition and protection of native title
26	Gunaikurnai Land and Waters Aboriginal Corporation	Represent the Gunaikurnai people
27	Barengi Gadjin Land Council	Trustee for the Native Title rights and interest of the Wotjobaluk, Jaadwa, Jadawadjali, Wergai and Japagulk peoples
28	Gunditj Mirring Traditional Owners Aboriginals Corporation	Works to progress rights and interests in cultural identity, social justice, native title, cultural heritage, and land justice
29	Eastern Maar Aboriginal Corporation	Traditional Owners of South-Western Victoria
30	Federation of Victorian Traditional Owner Corporations	Advocates for the rights and interests of Traditional Owners
31	First Nations Legal & Research services	Work with groups who wish to pursue land justice outcomes in Victoria
33	Right People for Country program	Supporting Traditional Owners to make agreements between and within groups.
34	The Koling wada-ngal Aboriginal Corporation (Wyndham City)	Engage in an equal partnership with the Wyndham Aboriginal community and key stakeholders to work towards providing a culturally safe Aboriginal Community Centre.
35	Department of Justice & Community Safety Koori Justice Unit)	Native title is the recognition in Australian law that some Aboriginal and Torres Strait Islander people continue to hold rights and interests in land and water.
36	National Indigenous Australians Agency	Native title recognises the traditional rights and interests to land and waters of First Nations people.
143	Boon Wurrung Foundation	Represents the traditional people and custodians of the lands from the Werribee River to Wilson Promontory,
144	Bunurong Land Council Aboriginal Corporation	Registered Aboriginal Party for an on behalf of the Bunurong People, with lands and waters across greater Melbourne, Mornington Peninsula, and the Bass Coast.
145	Flinders Island Aboriginal Association Inc. (FIAAI)	An Aboriginal Community Controlled Organisation. Established in 1971 by a local Aboriginal group, FIAAI is governed by an Aboriginal Board of Management, elected by the local community.
146	Tasmania Aboriginal Centre	Represents the political and community development aspirations of the Tasmanian Aboriginal community
32	Victorian Aboriginal Heritage Council	Helping the community respect and understand Aboriginal Cultural Heritage and Traditional Owner responsibilities.
316	Southern Ocean Protection Embassy Collective	Southern Ocean Protection Embassy Collective in their fight to protect Southern Sea Country from seismic blasting

These organisations were contacted with an initial letter and supporting information, and phone calls were placed to confirm receipt. This initial letter described the activity, why they are being contacted, offering further information, and requesting co-design of the consultation process and activity. Non-respondents were followed up with periodically, restating the reason for contact, confirming if there is an alternative preferred contact, and were provided with project updates including measures put in place around Deen Maar, after consultation feedback and research that the island and area between the island and mainland is culturally significant (Event ID 1891 & Desktop Research: Org ID 316 & Person ID 1163 in Appendix C3), and the Sea Country Protection Plan. .

If contact continued to be unsuccessful, further attempts were made to find alternate contact details at the organisations, these included government (Org ID 32, Event ID's 2331, 2332, 3008), and online resources. It was understood that many of the land councils and traditional owners' corporations were under resourced for engagement with offshore proponents, so collaborative meetings with other titleholders were offered when appropriate (Event ID: 1891, 2608 & 2386). Where organizations had preferred booking processes, these were adhered to, for example via booking forms (Event ID 2791 & 3894).

Pursuing a co-design of consultation, organisations were offered and encouraged to request information specific to their group, for example, a map was produced to assist in understanding impacts (Event ID 2386) and a requested summary explaining the differences between our activity and that of another titleholder (Event ID 3887). This helped ease burden on the groups when determining potential impacts. During engagement, groups were also asked to provide input and feedback on best practice for information sharing, including use of appropriate language and method (e.g. Event ID 1891, 3678, 3674).

Giving Sufficient Information

Throughout the planning and execution of the consultation process for the Regia MSS EP, CGG has demonstrated a commitment to providing comprehensive and understandable information to all relevant persons. The processes and information in section 3.2 apply to First Nations Australians as much as they do all other relevant persons.

During consultations with First Nations organisations there were requests made for more information either in writing or during meetings. In each case listed below CGG gave the additional information to the relevant person.

1. The Eastern Maar Aboriginal Corporation (EMAC) requested information on the differences between the Regia MSS and the proposed TGS Otway MSS. This included a map request.
2. The GMTOAC requested a presentation on the activity, the assessment process, and the protection measures adopted for Sea Country values and sensitivities.
3. The GMTOAC requested a detailed assessment of how the Outstanding Universal Values of the Budj Bim World Heritage Area had been assessed.

Reasonable Period with Sufficient Information

To discharge the First Nations consultation obligation, CGG understood that they must demonstrate that First Nation groups have been afforded a reasonable opportunity to be consulted with. Further, all group members should be afforded a reasonable opportunity to participate in consultation with clear, simple, and directly expressed terms. The fulfillment of this duty is evidenced in the consultation records (Appendix C).

In determining whether CGG had provided a reasonable period for consultation with First Nations groups (Registered Aboriginal Parties, Prescribed Bodies Corporate, and Native Title groups) and peoples, we acknowledge the following benchmarks used in other relevant legislative processes, for example:

- Regulation 30 of the OPGGS(E)R, which sets out a public consultation period of 30 days
- While repealed, guidance taken from the Aboriginal Cultural Heritage Act 2021—Consultation Guidelines (Government of Western Australia, 2023) suggests that up to 12 weeks may be a reasonable period to allow identification, contact, and response, from First Nations peoples
- Recent DCCEEW consultation on offshore wind zone (Southern Ocean) in the same general offshore region as this project allowed for 2 months.

Drawing on these examples, a minimum period of 60 days was deemed appropriate to meet the obligations discussed above. However, it should be noted that whilst 60 days was a minimum, the actual period with sufficient information was well beyond this.

Relevant Person Feedback

Throughout the consultation process, CGG made a concerted effort to ensure that all feedback received was carefully considered and, where appropriate, integrated into the project planning and execution. This feedback significantly influenced several aspects of the project, including the mitigation strategies employed to protect culturally sensitive areas and the environmental

management plans developed to minimize impacts on natural resources important to First Nations communities.

CGG committed to ongoing engagement with the First Nations groups involved, ensuring that consultation did not end with the initial regulatory approval but continued throughout the lifecycle of the Regia MSS. This ongoing dialogue is aimed at maintaining trust and transparency and allows CGG to promptly address any new concerns or issues that arise as the project progresses.

Appropriate Measures Adopted

All interactions, feedback, and the measures adopted were meticulously documented, with CGG ensuring that each concern raised by GMTOAC was met with a detailed and considered response. This thorough documentation was critical in showcasing CGG's commitment to a transparent and responsive consultation process.

Through engagement and this research, the Sea Country Protection Plan was devised (Appendix B3). An outline of a possible program was provided to identified First Nations organisations and persons, and they were offered the opportunity to co-design, co-implement, and provide feedback on the program. The opportunity to make public comment or to join the consultation process at any time was also reiterated.

Culturally Appropriate Engagement and Tailored Consultation Strategies

Recognising the diverse needs and preferences within First Nations communities, CGG offered multiple engagement formats. These included traditional meetings, community gatherings on Country, and virtual meetings to accommodate remote participants. Each meeting was designed to facilitate open dialogue and ensure that community members could express their views and concerns in a culturally appropriate setting.

CGG recognised that in the vastly diverse culture of Indigenous Australians, there is often different cultural and consultation requirements that exist in the different jurisdictions, Indigenous communities, and representative bodies. These differences create potential challenges in processing and responding to information through traditional methods such as email or phone. In response to this, CGG sought input and feedback from the First Nations groups, on how they require consultation to be undertaken, including considerations to reduce burden and consultation fatigue. All available methods of communication were offered, including meetings on Country and in groups, and bespoke information was encouraged to be requested.

First Nations groups and organisations, such as land councils, traditional owners' corporations, local environmental groups, and individuals, may have a function, interest or activity that may be affected by the Regia MSS. Further, these groups may provide advice in relation to which other First Nations groups or individuals may need to be consulted with. This connection of traditional owners is represented in the Native Title Act 1993 (**NT Act**), that demonstrates consultation with First Nations people is workable through the communal interest they hold with their respective groups. Through this communal interest, the authorities require reasonable notice to group members but not an exhaustive communication with every person.

CGG provided opportunities for all relevant persons to co-design the consultation process. This approach ensured that the methods employed were not only respectful but also effective in capturing the full range of feedback from the communities. The consultation sessions were structured to be interactive, with CGG representatives providing information on the environmental planning process and listening to the concerns and suggestions from the community members.

CGG recognised through the consultation process that the consultation materials could be improved to use of First Nations language and as a result edits were made to support the preservation of language. In addition, CGG consistently invited further questions or requests for First Nations organisations to provide the opportunity to further tailor the consultation, or the information given.

Challenges in Consulting with First Nations Australians

The consultation process with First Nations Australians, while structured to be inclusive and respectful, presented several significant challenges, particularly when engaging with registered corporations. Despite CGG's commitment to a culturally appropriate consultation method, the response from many First Nations groups was less than optimal, impacting the overall timeline and effectiveness of the engagement efforts.

One of the primary challenges faced was the unresponsiveness of several registered First Nations corporations. Despite multiple attempts at contact through letters, emails, and phone calls, responses were infrequent and tardy. When responses were received, internal resource constraints were highlighted as a barrier to further consultation. Therefore, CGG assumed this lack of engagement was not due to a lack of interest but rather a reflection of the limited resources available to many First Nations corporations, which are often stretched thin across numerous obligations. CGG was willing to provide resourcing support to facilitate consultations provided there was a clear schedule of fees for such services. When such fees were required/requested they were paid by CGG.

Additionally, when First Nations groups did engage, there were some requests for CGG to "wait for instruction" before proceeding. While these requests were made to ensure that the engagement process was aligned with the cultural protocols and timelines of the communities, they introduced significant delays into the consultation timeline. The consultation period was extended on three separate occasions to attempt to accommodate First Nations Australians requests. CGG was prepared to accommodate these requests within reasonable limits, but these delays posed challenges, especially given the timelines associated with regulatory and environmental planning processes.

CGG is required to consult in a manner that is culturally appropriate and respectful of the traditions and practices of First Nations Australians. However, CGG experienced a complex set of circumstances when trying to balance the discharge of its legislative duties in a reasonable timeframe when First Nations groups were unresponsive or when we were requested to wait for consultation preferences. While CGG remained committed to respecting cultural protocols, the company also needs to adhere to regulatory timelines, its consultation principles, and project schedules.

In instances where prolonged unresponsiveness occurred, CGG had to make difficult decisions about how to proceed, always striving to keep open channels for late engagement and to document all efforts and communications thoroughly. In particular, the voluntary participation principle and the absence of universal participation principle were thoroughly considered during engagement with First Nations Australians.

Southern Ocean Protection Embassy Collective

CGG became aware of the Southern Ocean Protection Embassy Collective (Org ID 316), founded by Person ID 1163, through social media posts in opposition of the activity. A direct phone number or email could not be found, so social media was utilised to send a direct message (Event ID 2807), stating the purpose of contact and engagement, and confirming that participation on the engagement process would not be seen as consent and objections would be recorded. Information exchange was offered to be in the individuals preferred method, including the suggestion of a group meeting with their network. Public responses to social media posts concerning the activity and consultation process (Event ID's 2804, 3327) were also made, to reinforce the aim of engaging to protect and preserve Country and culture and reconfirming that consultation would not be seen as consent.

Contact networks were also requested to facilitate contact information exchange (Event ID's 2813, 2723, 2975, 3416, 3890, 4016). The project email was not removed from a reply all sent by person ID61, so received emails in error (Event ID 4057, 4058), but these included Person ID 1163 and confirmed receipt and no intention to respond (Event ID 4061). CGG responded to these by reinforcing how the individuals' concerns had been considered, what measures had been put in place, and restating how participation in the activity can be undertaken if they do wish to engage in future.

Whilst direct engagement was not undertaken by the organisation or individual, desktop research and learning was used to inform management and mitigation measures to minimise potential consequences of the activity on the persons' functions, interests, and activities. Relevant organisations and individuals' publicly published writing, websites, public social medias, and interviews, on First Nations matters, their functions, interests and activities, Sea Country and the reason for their objection to the activity, were valuable resources in both understanding appropriate consultation and activity design approaches (see Appendix C3, Desktop Research: Org ID 316 & Person ID 1163).

Gunditj Mirring Traditional Owners Aboriginal Corporation

CGG's consultation efforts with the Gunditji Mirring Traditional Owners Aboriginal Corporation (GMTOAC), organisation ID 28, highlighted several key interactions that underscored both the proactive outreach efforts and the engagement responses from GMTOAC. These consultations were fundamental in addressing specific concerns related to the impact of the project on sensitive ecological and cultural areas.

The consultation process was initiated with a structured approach, leveraging multiple communication platforms to ensure thorough engagement. Early interactions included emails (Event IDs 46, 672) and phone calls (Event ID s 439, 3031), setting a precedent for open and continuous dialogue. CGG's team was proactive, seeking to establish a foundational understanding of GMTOAC's perspectives and concerns from the outset.

An initial meeting was held (alongside ConocoPhillips Australia, who also have a proposal in the Otway, to ease burden) on 30 May 2023 (Event ID 1891) to discuss the activity and plan the consultation process for Gunditjmara people represented by GMTOAC. GMTOAC representatives provided information to CGG on the cultural values of Budj Bim (both onshore and offshore) and highlighted the significance of Deen Maar. When further inquiries about the characteristics of the cultural values were made, CGG were informed that it is not appropriate to ask for this information and only to recognise the significance of the island.

CGG were asked to wait for further instruction on a GMTOAC facilitated consultation day where all petroleum titleholders would be invited to consult with a broader audience of Gunditjmara people and GMTOAC staff. CGG respectfully awaited information about the consultation day. When no invitation was forthcoming CGG attempted to reestablish a communication channel through email, phone calls, and offering meetings whilst staff were on Country.

CGG received an invite to a consultation day on 7 December 2023, over 6 months after the initial meeting. CGG had progressed with its preparation of the EP, as described in project update emails received by GMTOAC, and discovered more information about the cultural values and sensitivities of Sea Country from other sources.

CGG attended the GMTOAC open day which we understand was a properly notified meeting under the Native Title Act. However, the GMTOAC did specify that the event was an information sharing meeting only and, in their view, did not represent consultation. CGG presented information previously provided to GMTOAC staff to attendees at the consultation day. This included information about the activity, the impact and risks of the activity, and detailed assessments of the predicted effects and management measures for totemic species and significant areas of Sea Country (such as the World Heritage Values of Budj Bim, the short-finned eel and the Southern Right Whale).

During the consultation day, GMTOAC representatives requested specific information, challenging CGG to demonstrate that there would be no measurable effects on the World Heritage values of Budj Bim. In response, CGG provided comprehensive documents and factsheets (Event ID 4794), ensuring that all data was transparent and accessible to GMTOAC representatives. This demonstrated CGG's commitment to not only meet regulatory requirements but also to respect the cultural and environmental concerns of the Traditional Owners.

Shortly after the consultation day, CGG received formal correspondence from Environmental Justice Australia, acting on behalf of GMTOAC. This communication was significant as it outlined specific consultation concerns that GMTOAC felt were not adequately addressed during the consultation. The intention to design a consultation plan was also stated. In response CGG offered its assistance in co-designing the plan, as well as reiterating their commitment to ongoing consultation and protection of Sea Country (Event ID 4797). This offer was also made in later correspondence (Event ID 4970), Following further correspondence, CGG wrote to GMTOAC addressing the assertions and concerns raised regarding the consultation process (Event ID 4973). These, as well as other assertions and concerns received throughout the process, are featured in the Assertions and Concerns table in GMTOAC's Relevant Person Summary, along with CGG's response. The summaries also contain an Information Received table that clearly describes the information exchange between the organisation and CGG, how it was addressed, and where relevant, how it informed the EP. Requests for Information, and how this was addressed, is also tabled in the summary.

On November 11th 2024, EJA provided CGG with the Gunditjmara Consultation & Negotiation Protocol – Final Version 11.11.24 (hereinafter referred to as the 'the protocol'), it should be noted that this was originally expected to be received by the end of August 2023.

The protocol describes the standards and expectations for consultation and negotiation concerning activities on Gunditjmara land (Mirring), including offshore and onshore energy projects, Gunditjmara Mirring (Country), cultural values, objectives and powers of GMTOAC and Native Title determinations, noting that the provided maps define certain areas of Gunditjmara Mirring and Nyamat Mirring, but do not fully capture the interconnected nature of the landscape. The GMTOAC Consultation and Negotiation Protocols apply to the entire Gunditjmara Mirring, including Nyamat Mirring, ensuring that all lands and waters under Gunditjmara stewardship are managed according to their traditions and legal rights. The document goes on to describe the principles by which consultation/negotiation must be conducted: Free, Prior, and Informed Consent (FPIC), mutual respect, equal relationship building, and accommodation of Gunditjmara Mirring and culture. And the protocols which include consultation/negotiation with Gunditjmara, early engagement and timing, decision-making, information requirements, confidentiality and IP, resourcing and a statement that Gunditjmara judge the completeness of the consultation/negotiation process. CGG thanked EJA for providing the protocol, acknowledging agreement with the sections concerning respect and cultural appropriateness (Event ID 6430), but expressed a lack of clarity concerning alignment between the protocol and the legislative requirements (section 2.1), and how the protocol can be adapted to be suitable specific projects, considering it covers a wide variety of activities. CGG provided feedback, summarised below, without prejudice, reinforcing that CGG encourages further dialogue however they were expecting a consultation, rather than a negotiation, plan and as such require further clarity.

Consultation or negotiation	Negotiation and consultation serve distinct purposes, follow different processes, and lead to different outcomes. Consultation is centered on gathering perspectives and providing information to inform decisions without requiring consensus. In contrast, negotiation seeks to establish a binding agreement through mutual concessions and collaboration. The protocol merges the distinct concepts of consultation and negotiation, creating significant ambiguity in how CGG should engage with GMTOAC. This lack of clarity makes it challenging to build respectful relationships based on aligned expectations while adhering to legislative requirements. For example, the protocol mandates the application of Free, Prior, and Informed Consent (FPIC) to both consultation and negotiation. However, seeking consent is inherent to negotiation and agreement-making, whereas it contradicts the fundamental purpose of consultation. If CGG approaches discussions as a consultation process while GMTOAC treats them as a negotiation, neither party's expectations will be met,

	making it difficult to foster mutual respect. CGG is concerned that there is not a clear or mutual understanding between consultation and negotiation within the Protocol. To avoid misunderstandings that could hinder future discussions clarity around this, and which parts of the protocol apply to each, is required. CGG typically reserves negotiation for contracts or dispute resolution and does not currently see the need for a negotiation process.
Decision-making	The protocol states that Gunditjmara determine when consultation/negotiation is meaningful and complete. CGG requests clarity regarding this, as consultation concludes at the discretion of the party seeking input, while negotiation should end when all parties reach an agreement. Additionally, the protocol calls for an early decision-making process between GMTOAC and the Proponent, which CGG contends is unnecessary in a consultation, where one party simply invites contributions to their decision-making.
Scope – Native Title and Protocol Map area	There is a lack of clarity in the protocol regarding how different areas, such as Native Title areas, joint Native Title areas, and non-Native Title areas, have been considered. Since CGG's proposed Regia MSS activity does not overlap with a Native Title area, nor with the map contained in the protocol that shows the areas to which the protocol applies, CGG seeks clarification on how GMTOAC has accounted for activities outside of the stated protocol areas, as they do not appear to be addressed in the current draft.
Scope – shared Sea Country	CGG seeks clarity on how Free, Prior, and Informed Consent (FPIC) applies in the context of shared Sea Country, where multiple Traditional Owner groups have overlapping cultural and legal interests. The protocol does not clearly outline how FPIC would function in such cases. Specifically, clarification is required on: • Scope of Consent – What matters would require consent? • Authority and Representation – Who grants consent, and do they represent all groups with shared cultural values? • Consent Process and Dispute Resolution – What procedures govern consent, how are disputes resolved, and under what authority? • Involvement of Other Marine Users – How would commercial fishers and other affected marine users be included in the process, particularly if their interests' conflict with GMTOAC's consent requirements? CGG seeks further information on how GMTOAC envisions managing these complexities in the consent process.
Scope – application to activities	The protocol appears to apply the same protocols to all projects, regardless of their scale or impact. This approach may not differentiate between long-term, high-impact projects, such as a 25-year onshore mining proposal, and shorter, lower-impact activities, such as a 90-day offshore seismic survey.

In response (Event ID 6340), GMTOAC confirmed that discussion on the protocol was included in the proposed agenda items for the February 2025 consultation day (Event ID 6880), but provided the following items as likely to involve negotiation: the Co-design Process and Consultation Framework, which covers agreed milestones and timeframes, CGG's proposed Consultation Framework with "agreed risk criteria," the proposed Sea Country Protection Plan, strategic regional environmental and cultural assessment, and any additional technical advice related to the EP.

CGG has continued to attend, and provide funding, for group meetings when invited by GMTOAC, provide information when and how requested, despite lack of clarity on the technical level of the individual stakeholder of some of the more detailed and specific information requests, and respond to feedback. CGG has diligently endeavoured to discharge its consultation duties with the GMTOAC by seeking to use culturally appropriate methods and adapting to the specific needs and protocols of the community. Recognizing the challenges of timely and constructive engagement due to various constraints on the part of GMTOAC, CGG proactively informed itself about the cultural values and sensitivities relevant to the affected environment. This was achieved through extensive desktop research, Cultural heritage desktop assessment report (Appendix B10) and public documentation to ensure a thorough understanding of the cultural landscape (Appendix F3, section 3.16). Additionally, CGG implemented measures to facilitate ongoing dialogue, offering multiple avenues for continued engagement and feedback. These efforts reflect CGG's commitment to respecting and integrating First Nations perspectives and concerns throughout the activity, reinforcing its dedication to fulfilling its ongoing consultation obligations responsibly and respectfully.

CGG recognise that the GMTOAC does not agree that consultation with them or their members is complete. CGG acknowledges GMTOAC's desire to progress with further consultation and affirms its desire to participate in any ongoing reasonable consultation process.

CGG acknowledges the role that GMTOAC play in preserving the communal interests of the Gunditjmara people. However, CGG has taken extensive further actions to reach all relevant persons (including First Nations individuals) and consult with them, reducing the reliance on GMTOAC facilitating access to individuals and knowledge (cognisant of the absence of a universal participation mandate). Further, the information likely to be revealed through the GMTOAC consultation process has already been found in sufficient detail to identify and protect cultural values of the existing environment. These were identified through considering the Biosis Cultural Heritage Report (Appendix B10), studying the Nyamat Mirring Plan 2023 – 2033, mining social media representations of First Nations individuals, reviewing information and documents available on First Nations groups websites, review of management plans which include Sea Country values (Twelve Apostles Marine National Park The Arches Marine Sanctuary), and in the meetings held with GMTOAC, government organisations and other First Nations organisations. Notwithstanding, CGG acknowledges the importance of providing ongoing engagement throughout the life cycle of the activity to allow GMTOAC and Gunditjmara people to continue to share information and make decisions about cultural heritage protection, as captured above in section 5. Ongoing Consultation and through the Sea Country Protection Plan, as per Appendix B3, section 5.4.5.

On 30 September 2025, GMTOAC, via counsel, provided CGG with a proposal for a Gunditjmara Nyamat Mirring Cultural Values Assessment (CVA) (Event ID EVT267). GMTOAC advised that a CVA was required for Gunditjmara to meaningfully continue participating in consultation for the Environment Plan (EP) and expressed the expectation that the EP should not be resubmitted until the CVA had been completed. GMTOAC further indicated that a CVA is likely to take an extended period to complete, estimating a period of around 12 months. The proposal described a comprehensive cultural assessment process that would involve a participatory model co-designed with GMTOAC, the engagement of an external consultant to undertake this work, cultural mapping, workshops with Gunditjmara knowledge-holders, and the documentation of both tangible and intangible cultural values associated with Nyamat Mirring and the broader Gunditjmara cultural landscape. GMTOAC indicated that the CVA would form the basis for consultation and would provide identification of, and information on, their cultural values and sensitivities.

CGG formally responded to this proposal (Event ID EVT337), reaffirming its respect for the cultural significance of Nyamat Mirring and welcoming the opportunity to continue dialogue with GMTOAC. CGG explained that, while it is open to undertaking cultural values work with GMTOAC, it did not consider it necessary to delay the resubmission of the EP, as CGG had already met the consultation requirements under the Regulations. CGG noted that the proposal provided by GMTOAC did not include sufficient detail to allow immediate progression and that, in its present form, the scope of the proposed CVA was limited to pre-survey activities and did not include the collaboration CGG

considered important during and after the survey. To support meaningful ongoing engagement, CGG developed and provided GMTOAC with an Alternative Scope of Work. This alternative proposal broadens the CVA concept into a partnership model that centres Gunditjmara people in the protection and management of cultural values throughout the period before, during and after the survey. The Alternative Scope of Work aligns with the Nyamat Mirring Plan 2023–2033 and offers a practical and adaptive management framework that strengthens cultural protection measures through a longer-term collaborative approach. It includes opportunities for full-group workshops, ongoing progress meetings, co-developed methodologies, cultural leadership in decision-making processes, and structured reporting designed to incorporate new cultural information throughout the lifecycle of the activity. CGG presented this alternative on a without-prejudice basis and invited GMTOAC to co-design the methodology to ensure it aligns with Gunditjmara governance and cultural frameworks.

On 7 November 2025 (Event ID EVT352), GMTOAC provided correspondence recording its objection to the resubmission of the EP. GMTOAC stated that it had not been provided with the opportunity to meaningfully participate in consultation and reiterated its position that a Nyamat Mirring Cultural Values Assessment (CVA) must be completed before further consultation can occur. GMTOAC asserted that consultation to date does not meet the standards required under the Environment Regulations and requested that NOPSEMA note its objections in considering the EP. Attachments accompanying the letter outlined GMTOAC's regulatory interpretation and detailed cultural matters it considers outstanding. As per CGG's documented process, these feedbacks have been assessed for merit and proposed responses compiled.

CGG provided a further response on 12 November 2025 (Event ID EVT367), reaffirming that CGG's position on the requirement of a CVA pre-submission remains that the Regulations do not require a CVA to be undertaken as part of the consultation process or as a prerequisite to preparing or resubmitting an EP. CGG outlined that the consultation obligations had been lawfully fulfilled and provided a detailed chronology demonstrating how this had been reached at each submission (see below).

CGG stated that its initial February 2023 correspondence met the legal standard in Tipakalippa and Regulation 25 by providing specific, sufficient information for GMTOAC to understand the Regia MSS and respond meaningfully. CGG notes that consultation began early, continued for many months, and allowed ample time for response before the EP's initial submission in January 2024. CGG rejects the claim that a Gunditjmara Nyamat Mirring Cultural Values Assessment (CVA) is required before submission, stating that no such obligation exists in the Regulations or guidelines and that cultural values had already been clearly conveyed through GMTOAC's meetings, correspondence, and published documents. CGG further noted that the relevant timeframe for ongoing consultation is the multi-year validity of the EP, not the 90-day activity window, and that its proposed Alternative Scope of Work and Sea Country Protection Plan provides a pathway for adaptive management and environmental protection.

CGG also noted that the cultural values central to the proposed CVA had already been articulated by GMTOAC and Gunditjmara through published materials, including the Nyamat Mirring Plan 2023–2033 and the Consultation and Negotiation Protocol, as well as through meetings, full-group sessions and written correspondence. These sources had informed CGG's description of the environment, impact and risk assessments, and cultural protection measures, including the Sea Country Protection Plan. CGG considered that this material provided sufficient information to assess the cultural values that may be affected and to integrate those values into the EP in accordance with the Regulations.

CGG confirmed that it would not delay the resubmission of the EP to undertake the CVA proposed by GMTOAC, as doing so would be inconsistent with the statutory consultation framework and disproportionate to the nature and scale of the survey. CGG reiterated its willingness to undertake cultural values work with GMTOAC as part of ongoing consultation embedded within the EP's Implementation Strategy and reaffirmed its commitment to collaboration through the Alternative Scope of Work. CGG acknowledged GMTOAC's position that it would not continue in-person

consultation until a CVA is completed, noting that this reflects a voluntary decision by GMTOAC and does not limit CGG's willingness to consult in good faith throughout the life of the EP.

Reasonable Period of Time and Sufficient Information

CGG's consultation process for both the initial and subsequent submissions of the Regia MSS EP accords with the First Nations methodology (Appendix C1, Annex 2), and the legal benchmarks for "sufficient information" and "reasonable period" as articulated in Regulation 11A, Regulation 10A(g), Regulation 34, NOPSEMA's Consultation in the course of preparing an Environment Plan Guideline (GL2086), and the Federal Court's decision in Santos v Tipakalippa. These instruments make clear that the duty to consult is discharged where the titleholder: (i) identifies relevant persons whose functions, interests or activities may be affected; (ii) provides each with enough information to make an informed assessment of the possible consequences of the activity; (iii) allows a reasonable period for them to respond; and (iv) demonstrates in the EP that the consultation process, and any measures adopted as a result, are appropriate and supported by an "evident and intelligible" justification. In this context, NOPSEMA's guideline stresses that "sufficient information" and "reasonable period" are assessed case by case, that information can properly be provided iteratively as more detail is developed, and that consultation must be appropriate and adapted to the nature of the interests affected, particularly where First Nations interests in Sea Country are held communally. CGG considers that consultation with GMTOAC commenced on 15 February 2023 and that GMTOAC was provided with sufficient information to make an informed assessment of the possible effects of the proposed Regia MSS on its functions, interests and activities for 242 days prior to the EP's initial submission, with ongoing consultation meeting this requirement at each subsequent submission.

CGG first contacted GMTOAC on 15 February 2023, providing an introductory letter that outlined the proposed Regia Marine Seismic Survey (Regia MSS), included an Activity Overview flyer and maps of the planning areas, and attached the Consultation Framework. This correspondence also described the purpose of the survey, potential consequences for GMTOAC's functions, interests and activities, and the environmental measures already adopted to reduce impacts, such as sound management, exclusion zones and protections for key species and habitats. CGG further included information on the regulatory framework and offered GMTOAC the opportunity to co-design the consultation process to suit their needs. On 23 March 2023, CGG confirmed by phone that the correspondence had been received, followed by additional emails on 20 April and 1 May 2023 resending the information and proposing an in-person meeting. During the period from 17 April to 16 June 2023, GMTOAC members also had the opportunity to attend 13 open community information sessions about the Regia MSS.

On 26 May 2023, CGG issued a newsletter drawing attention to the Regia MSS consultation hub, which at that time included a direct feedback submission tool, interactive map, the Community Consultation and Engagement Plan, a Preliminary Environmental Impact and Risk Assessment (PEIRA), information on the proposed environmental assessment process, decision-making criteria, and CGG's intention to place an exclusion zone around the culturally significant Deen Maar. CGG then met with GMTOAC on Country on 30 May 2023, reiterating information already provided, discussing consultation preferences, advising that most draft environmental assessments were available online, and explaining that any sensitive information supplied by GMTOAC could be kept confidential. On 3 July 2023, CGG issued another update outlining progress in activity design and confirming that exclusion zones were being carefully considered. Further information was distributed on 14 September 2023, when CGG provided detailed design updates, links to all published environmental assessments, and specialist reports including seismic sound studies, commercial fisheries analysis, vessel presence assessments, oil spill risk modelling, and impact assessments across a range of biological receptors. All communications, including letters and the consultation hub, invited and encouraged requests for information, providing multiple avenues in which these could be requested.

On 22 September 2023, CGG again provided GMTOAC with direct links to draft impact assessments. CGG followed this with a project update email, containing a webinar invitation and information about the upcoming public comment period, and when the EP was scheduled to be submitted to NOPSEMA.

After receiving feedback from First Nations organisations about consultation fatigue and resource limitations, CGG notified GMTOAC on 20 October 2023 that the EP submission would be postponed by three months. On 30 November 2023, CGG invited relevant persons to provide feedback on the consultation process and shared a link to a consultation survey and draft impact assessments. On 12 December 2023, CGG reiterated its view that sufficient information and reasonable opportunity for consultation had been provided and proposed a meeting to discuss the Sea Country Protection Program.

Following submission of the EP in January 2024, CGG notified the start of the public comment period on 26 January 2024, and on 31 January a webinar invitation to support participation. On 17 February 2024, CGG delivered a group presentation attended by GMTOAC and Gunditjmara providing further explanation of the activity, its potential impacts and risks, cultural features of environmental values and sensitivities, and key management measures. On 8 March 2024, CGG supplied additional information requested by GMTOAC members, including fact sheets on glass eels and Southern Right Whales, and a summary of the assessment of World Heritage Values for the Budj Bim Cultural Landscape. CGG also responded on 23 April 2024 to GMTOAC's notification of its consultation plan, seeking the opportunity to engage in co-designing the plan.

On 7 June 2024, CGG emailed in response to prior correspondence from GMTOAC's representatives, again emphasising that CGG sought involvement in the design of any future consultation plan and confirming its willingness to engage collaboratively. On 28 June 2024, CGG sent a detailed letter which set out CGG's position on the sufficiency of consultation already undertaken and explained how CGG had concluded that it had provided GMTOAC with sufficient information and a reasonable opportunity to comment during the preparation of the Regia MSS EP. The letter also summarised the history of consultation with GMTOAC, enclosing a table of all communications before and after the EP submission and attaching copies of correspondence, to provide transparency regarding the consultation process.

On 3 July 2024, CGG issued a campaign update advising relevant persons of the number of public comments received, providing a link to a summary information sheet, and sharing details of an upcoming webinar, sound reports (including a second commissioned report), and the titleholder report available on both the project and NOPSEMA websites. A further campaign email on 12 September 2024 directed GMTOAC to NOPSEMA's Request for Further Written Information (RFWI), explained refinements to the activity design that reduced the acquisition area, linked to a "Safeguarding Southern Right Whale" information sheet, and confirmed that CGG was addressing the matters raised in the RFWI and updating the EP accordingly. On 21 November 2024, CGG issued a project update confirming resubmission of the EP following the RFWI, providing a link to the revised EP, highlighting additional assessments for key values (including little penguins and plankton) and summarising these in Appendix F3, and inviting registration for a further webinar.

In December 2024, CGG responded to GMTOAC's correspondence on the Gunditjmara Consultation and Negotiation Protocol, acknowledging its significance but raising concerns about the blending of consultation and negotiation, as covered in this annex above. On the same day, CGG sent follow-up emails checking that GMTOAC had received the 21 November project update and providing links to requested project shapefiles while noting that marine park datasets were better sourced directly from the data owners; these were supplemented on 13 December 2024 with further shapefile links and a reminder that CGG did not own or maintain the marine park datasets. On 19 December 2024, CGG informed relevant persons that NOPSEMA had extended the EP assessment period to 7 February 2025 and that the survey was unlikely to commence in April 2025, with the next possible start date being September 2025. On 16 January 2025, compiled and shared requested materials for an upcoming group Gunditjmara meeting, reiterating its willingness to tailor communications.

On 6 February 2025, CGG provided information sheets to meet requests for simplified material. On 27 February 2025, CGG issued a campaign email confirming that NOPSEMA had issued an Opportunity to Modify and Resubmit (OMR), publishing the redacted decision letter on the project website and outlining next steps, including addressing the OMR and updating the EP. On 5 May 2025, CGG informed relevant persons that a modified EP had been resubmitted to NOPSEMA, summarising key

changes, including enhanced protection measures for little penguins and Southern Right Whales, reduced acquisition and active source areas, revised sound thresholds, use of updated fishing data, and expanded cultural heritage information. On 22 May 2025 consultation materials for the June group meeting were provided, including a presentation addressing agenda items, simplified information sheets, and a technical Q&A resource. On 11 June 2025, CGG shared a link to the consolidated EP, outlined key amendments since the last submission, and stated that a NOPSEMA decision was anticipated by 20 June. On 26 June 2025, CGG confirmed two next steps: CGG would fund a Cultural Values Assessment subject to an acceptable proposal by 25 July 2025 and would postpone the Regia MSS until at least 1 April 2026. On 27 June 2025, a campaign update advised that NOPSEMA had issued an OMR, that the decision letter had been published.

In the following months, CGG's outgoing information continued to focus on EP refinements and the proposed cultural values work. On 1 August 2025, CGG sent a consolidated update confirming that the EP had been revised to include clearer impact assessments for key marine species, confirming agreement in principle to fund a cultural values assessment and to postpone the survey until at least 1 April 2026, and recirculating key EP updates. Finally, on 28 October 2025, CGG responded to GMTOAC's CVA proposal of 30 September 2025, advising that the proposal lacked sufficient detail and appeared too limited in scope, and attaching an Alternative Scope of Work (Annex A) on a without-prejudice basis that proposed a broader partnership framework for Gunditjmara involvement before, during and after the survey. CGG confirmed that, while EP resubmission would not be delayed, the survey itself would not occur before September 2026.

Collectively, this chronology demonstrates CGG's continued provision of sufficient information, before first submission and before each resubmission, to GMTOAC, Gunditjmara peoples, and a reasonable period at each of these stages. This information was also provided to GMTOAC counsel once they became involved.

Annex 3 – Record of Engagements

Table C1-6 - Record of Engagements

Method	Summary	Total engagement
Community/Information sessions	Located in local towns along the activity area. Presented during these events: project description, engagement process, definition of Relevant Person, functions, interests and activities, the process and requirements for an EP. Discussion and information share with attendees. Attendees encouraged to register their details for updates and to self-identify as relevant persons.	176 attendees (please note not all attendees registered).
Project Outreach	Potentially relevant persons and organisations who appear to have functions, interests or activities that may be affected, found through desktop research and referral. Initial letters, sent via email or post, contained information on why recipient was being contacted, the applicable regulations, summary of the activity, link to the activity website, description of intent of an EP, invitation to co-design their consultation, commitment to provide sufficient information in appropriate manner, opt-out information, explaining sensitive information can be kept confidential on request, ongoing updates, request that they forward information to contacts that may have interested in the activity. Attachments to initial letter: • Activity Overview • Map of planning areas • Consultation Framework If no response phone calls and/or follow up emails were undertaken to attempt to confirm receipt. For organisations found through desktop research, or suggested referral, whose relevancy was uncertain, an email was sent with an activity description, link to the comprehensive website to determine if potentially affected. Follow up communications were sent to non-responders.	Over 260 individuals and organisations initially contacted through the project outreach.
Government agencies	Relevant government departments and agencies were identified under Section 25(1) using a combination of guidance documents and desktop research.	32 agencies identified and contacted.
Titleholder search	National Electronic Approvals Tracking System (NEATS) perused for other titleholders.	2 other titleholders found and contacted.
Conservation groups	Reached out to local community groups, such as those focused on environmental conservation or fishing, to identify members whose interests or activities could be affected by the activity.	40 conservation groups contacted.
First Nations groups	The activity may have an impact on the cultural or spiritual functions, interests and activities of First Nations groups. Therefore, it was considered important to conduct meaningful and effective consultation to establish genuine, ongoing, and effective relationships. The methods used for consultation are elaborated below.	14 First Nations groups contacted.

Method	Summary	Total engagement
Local (within EPA) newspaper and radio	The public was notified about the planned activity and asked to come forward if they had any specific functions, interests or activities that may be affected by the activity through advertisements in local newspapers and on local radio stations.	23 advertisements placed across social and traditional media. 272 radio spots over 6 stations. 4 radio and TV interviews/comments given (with direction to activity website).
Other marine users	These include petroleum titleholders, Ports, Coastguards, surf clubs, diving associations, subsea communications, and yacht clubs.	58 Other marine users.
Commercial fishing license holders	Through engagement with AFMA, in-community and Peak Associations found during the commercial fisheries review, fishers' details were obtained, and they were contacted via two points of contact.	377 commercial fishers contacted.
Fishing Industry Associations	Industry associations were contacted and engaged with, both on behalf of their members and as relevant organisations. Fee for service arrangements were undertaken where appropriate.	23 fishing industry associations.
Local Businesses & Tourism operators	We contacted local businesses and umbrella organisations, including Chambers of Commerce and tour operators, to engage members and customers through business networks whose interests or activities could be impacted by the activity.	25 businesses and operators contacted.
Educational Institutions & Research bodies	We reached out to local educational institutions, such as universities or research centres, to engage with researchers or students whose interests or activities could be affected by the activity.	8 educational institutes, researchers & Research bodies contacted.
Engagement Feedback Survey	Released in the November project update, the survey requested feedback on the engagement process, including timing and information received (ID:3811).	Sent to 413 individuals, 2 surveys completed.
Social media	An activity Instagram, Facebook (META), and LinkedIn were established, providing activity information, and updates, available to be shared. 13 posts were boosted as adverts to targeted local relevant audience, advertising community sessions and important updates. Social media was also used to privately message and comment to potentially relevant persons who were unable to be reached via traditional communication methods.	Estimated audience size of 270,300-318,000, with over 600 link clicks to the activity website.
Webinars	Live as well as recorded and uploaded onto the website and YouTube channel.	8 webinars.
Consultation Hub/project specific website	The project-specific Regia website allowed all members of the public and persons with interest to access every piece of information they would need to make informed decisions and objections. There are multiple industry-exceeding features of this website which are expanded on in section 1.4.1.	6361 visits, 2765 unique users, interacted on the website over 280 times, and over 860 document downloads.
Hosted industry-specific group meetings	Accommodating a co-design engagement process, when requested, commercial fishers group meetings were held in their locality and an online meeting for multiple NGO representatives.	5 group meetings.

Method	Summary	Total engagement
Presence in locality	The activity Environment Manager spent 44 days visiting the local areas to raise awareness and identify potentially relevant persons. Local businesses, such as those involved in recreational diving and commercial fishing, were visited. They also attended a locally held climate event, where they identified themselves, responded to an audience question regarding seismic and invited the member, who stated they were with a local conservation group, to meet at the events conclusion (Event ID 3778).	21 local in person meetings. 11 community information sessions. 4 wharf visits. 4 local in person group meetings. 2 door knocks/business visits. 1 attendance at relevant local event.

Annex 4 – Assertions or Concerns

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3000	4446	Stakeholder mentioned another company had open and respectful interaction and requested more of that approach from titleholder.	Responded in Event 4454, thanking the stakeholder for the meeting the previous week. Regia team member reassures the stakeholder that they are taking the claim seriously and that their Principal Research Scientist, who specialises in fish spawning and has 25 years of experience in the fishing and research industry, is currently reviewing the provided paper along with other related studies. This thorough approach aims to clearly establish potential impacts and identify any necessary mitigations. They appreciate the patience shown while awaiting a response, emphasising the importance of a careful and informed evaluation.
3001	872	Stakeholder refuted the need for the project as misdirected for a sustainable future.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3002	3413	Advised that simultaneous public comment periods for both Environmental Plans from ConocoPhillips Australia and CGG was not a good idea.	The Titleholder followed up confirming submission delayed until after Christmas (Event ID 3414)
3003	3152	Advocacy for more urgent climate action across all levels of government.	The titleholder noted the stakeholders position and requested further engagement to discuss (Event ID 606).
3004	2900	AMCS expresses concern about the meaningfulness of the consultation process without the requested map showing previous seismic in the area over the previous 15 years.	Provided these maps in Event ID 2802, explaining the delay was due to active source area only just been confirmed. Explained the latest email (Event ID 2900) had been overlooked as it was not sent to the project email, requested that project email is kept in copy for future correspondence.
3005	2901	AMCS is requesting another consultation meeting after receiving information that would enable them to give feedback on the seismic proposals and the contents of the Environmental Plan (EP) as Regia added to meeting at last minute.	Regia team attempted to arrange a meeting (Event 1056, 1356, 2802). Regia was included in the meeting (Event ID 2038) at AMCS's request (as clarified in Event ID 1025)
3006	2901	AMCS requested information about operational shutdowns related to marine life sightings. It was indicated that providing this information would require significant time and effort, and advised AMCS to consult the Australian Antarctic Division instead, which contradicts the goal of meaningful consultation, as directing AMCS to another agency for information on company practices is inadequate.	The Regia teams reflection on the meeting differs from AMCS's understanding. The Regia team member believes AMCS sought information on operational shutdowns across the entire industry, which CGG does not possess. While CGG could ask the other companies for this data, it would be more appropriate for AMCS to request it from the Australian Antarctic Division (AAD), which standardizes sighting data. This would ensure proper data collection without additional burden. Clarification on how AMCS's functions or interests might be impacted by the Regia MSS and the relevance of historical whale sightings in other parts of the country to environmental management in the survey, is requested. Event ID 1231

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3007	3415	Appreciates mitigations made regarding area and timing, but doesn't believe any mitigations would be enough.	We agree that refining the operating area and timing are not enough alone to mitigate impacts. This is why we have several other measures in place, to bring any impacts to an acceptable level (that being short-term, temporary, and recoverable). Examples being reducing sound source to the lowest settings, reducing the number of times the sound source is activated, and implementing exclusion zones around marine mammals.
3008	3021	Assertion about the narrowness of consultation requirements.	The stakeholder was concerned that they would not be able to be involved in consultation as there connection to the area was through familial connections and consideration of relocating. The Regia team responded, explain that the definition of functions, interests and activities can be read broadly, provided information on the consultation process, environmental processes, and inviting them to engage (Event ID 1384).
3009	2997	Assertion that offshore drilling in other locations is a better alternative.	The stakeholder responded to a project updates with a number of complaints regarding another Titleholders public comment period. When the Regia team informed the stakeholder of this, they rejected the explanation and continued to state petitions related to a different proposed activity. The Regia team previously assured the Stakeholder that all their comments would be received and provided to the industry regulator (Event ID 2630)
3010	5195	Asserts that throughout their communications with CGG, they have consistently advocated for the use of catch and effort data alongside spatial overlap data. The stakeholder expresses frustration over claim that the data provided was not in the correct format, labelling this suggestion as flippant.	This assertion has been raised multiple times, with the titleholder requesting the stakeholder explain how this data can assist where the currently supplied data can not. At the risk of damaging relationships further, this has not been responded to this time. Please refer to Appendix C1, where consultation with this stakeholder, including this assertion, is described in detail.
3011	5114	Burning more fossil fuels is criticised	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3012	3373	Categoric rejection of the proposal altogether.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3013	4075	CGG has the responsibility to facilitate community consultation.	CGG ran an extensive community consultation process, details of which may be found in EP Appendix C1. CGG had not at any time requested AMCS do any consultation on their behalf. The request was to encourage any potentially relevant persons who came forward to AMCS but had not yet identified themselves, to make contact with the Regia team in order for consultation to occur.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3014	3384	CGG have published significant amounts of information (draft EP chapters), which AMCS does not have in house capacity to fully review and assess. As such AMCS requests an extension of at least 4 weeks, before the EP is provided to NOPSEMA	As advised via email on Event ID 3331, consultation will not be paused, granting time extension well beyond the 4 weeks requested. We will submit the Regia MSS EP for public comment once we believe we have met the Reg 10A(g) acceptance criteria
3015	4788	Claims that without a comprehensive data report, it's impossible to accurately assess the materiality of the proposed actions.	CGG responded to this request many times, including Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would likely overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information. Event ID 4969 requested from the stakeholder the reasoning behind purchasing this report, and how it would help avoid interference, and provide information for mitigations.
3016	2274	Climate crisis being fuelled by new fossil fuel projects.	Objections to oil and gas activities are not about the adverse effects of the activity. These are not assessed further.
3017	2085	Comment highlights that the regulatory body lacks true independence and emphasises the need for credible, peer-reviewed scientific evidence before conducting activities with potentially severe environmental impacts.	We look forward to providing you our environmental assessments that are thoroughly referenced with peer reviewed literature and scientific evidence (Event ID 2085).
3018	2179	Community opposition to seismic testing and drilling for gas.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3019	3092	Concern about how the findings of the testing may impact the coastline and the town.	The titleholder requested further information (Event ID 869) on the coastline activities and confirmed contact with their sailing club (Event ID 960)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3020	4407	Concern about passing on the sea country protection program to others in the organisation due to lack of expertise in cultural values.	Titleholder expressed their appreciation if the stakeholder could provide any contacts that may be able to provide feedback on the Sea Country plan. (Event ID: 4456)
3021	3237	Concern about the need for the 83rd survey in a well-surveyed area.	The titleholder responded formally to submitted concerns in Event ID 3886, stating that new surveys allow for new technologies to better understand the geophysics of an area. Also there are areas where 3D seismic is yet to be acquired.
3022	2901	Concerns about a tick box approach to public consultation.	Prior to email Event ID 2901, AMCS was contacted via letter (Event ID 41) and phone (Event ID 433) at the start of the consultation process. The letter provides background information on the project, including an invitation to consultation and how to engage. Attached to the letter was an activity overview, with timing an map, a description of the consultation framework, illustrating how consultation can be co-designed, various methods of contact and direction to the Regia webpage with further information. AMCS then submitted an online survey with specific questions (Event ID 529), these were responded to via the supplied email (Event ID 633). AMCS was encouraged to continue engagement and request further clarification on their questions. Further engagement in a manner that best suited them was offered, including a webinar for their members. They were also notified of upcoming community sessions their members may be interested in.
3023	3373	Concerns about consultation process and fatigue	The titleholder holder acknowledged consultation fatigue as an issue for a range of stakeholders at the commencement of consultation and outlined how Regia MSS has attempted to reduce consultation fatigue. (Event ID: 916)
3024	722	Concerns about inadequate consultation with communities living on the coastline.	The assertion that consultation is inadequate has been based on the individuals interaction with the early stages of a much more thorough consultation process whereby they have taken an isolated community event and inferred inadequate consultation. The titleholder responded to the individual by providing information on the consultation process (Event ID: 2819)
3025	917	Concerns about the community's opposition to seismic testing and drilling for gas.	Titleholder met with stakeholder to discuss their concerns (Event ID 2011)
3026	164	Concerns about the consultation process providing sufficient information and a reasonable period for consultation were mentioned.	Titleholder has responded advising of their engagement with additional local council stakeholders (Event ID: 556).
3027	3152	Concerns about the economic profile of the region being reliant on a healthy natural environment and tourism.	The titleholder noted this concern and requested further engagement to discuss (Event ID 606)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3028	2766	Concerns about the ethical implications and role modelling of the seismic surveying business.	Titleholder responded acknowledging community views about the ongoing need for gas in Australia and provided CGG perspective based on AEMO modelled demand and Australian Energy Policy. (Event ID: 1862)
3029	2940	Concerns about the organization's dismissal of public submissions, social media, and other channels, indicating a lack of acknowledgment and transparency in the consultation process.	Titleholder responded querying if they had confused Regia MSS with a different project as the public comment period had not started. (Event ID: 2938)
3030	3917	Concerns about the registration process on the website due to unclear terms and conditions.	Titleholder responded confirming registration. (Event ID: 4464)
3031	2773	Concerns about the validity of the consultation process and submissions on the plan.	Titleholder responded outlining on of the purposes of consultation is to be able to receive and share information that improves the assessment of potential impacts and reiterated request for further information on previous assertions. (Event ID: 2414)
3032	3678	Concerns regarding the expansion of gas exploration activities, particularly in the context of climate change.	Outlined the ongoing need for gas identified by AEMO and the ongoing need beyond 2050 (Event ID 3678).
3033	579	Constituents voiced concerns about the wind farm, indicating they may also have concerns about the MSS.	During the phone call the Titleholder confirmed the project is not related to the wind farm proposal, provided background information on activity and seismic/multi-client. Discussed consultation formats available, offered to arrange workshop.
3034	3383	Consultation conducted through Tuna Australia can lead to better environmental outcomes.	Titleholder responded confirming fee-for-service arrangement to support consultation with Tuna Fishers (Event ID: 3796)
3035	3800	Consultation conducted through Tuna Australia can lead to better environmental outcomes.	Titleholder responded committing to fee-for-service arrangement. (Event ID: 3796)
3036	3746	Consultation services to be paid on a fee-for-service basis	Agreed to engage SETFIA/SSIA for fee-for-service consultation with members to raise awareness about the activity and encourage individual fishers participation in the consultation process. (Events 2930, 3350, 3856, 4039)
3037	2830	Consultation will demonstrate opposition to further oil or gas projects in the waters.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3038	886	Continued use, search, and retrieval of fossil fuels (gas) is outrageous due to the declared "Climate Emergency" by the local Warrnambool City Council.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3039	3152	Council's position opposing seismic testing and oil and gas development in the Otway Basin.	The titleholder responded with an aknowledgement of the correspondence and an offer to organise a meeting for further discussion (Event ID 606).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3040	2072	Criticises the lack of social license for offshore gas exploration and expansion in the Otway Basin. It emphasises that while attempts to assess impacts on commercial fish stocks are noted, the ongoing investment in fossil fuels will worsen climate change and increase ocean temperatures, leading to consequences for communities.	The titleholder responded to this interactive map comment: We understand your concern. There may not be commercially viable gas deposits in this area so we cannot assess the contribution of future developments to human made climate impacts. Further investment in gas development is needed in Australia to meet local gas demand and is a key part of the Labour governments energy transition plan.
3041	3237	Disappointment in the Federal Government for allowing the project to proceed.	Titleholder responded acknowledging information presented and that the team will review and respond. Offerred to meet with group (Event ID: 2754)
3042	4794	EJA, on behalf of GMTOAC, describes regulations for consultation; providing meaningful opportunity and resonable period to engage in consultations regarding activities affecting their Sea Country.	Responded in Event ID 4973, stating agreeance to provisions of regulations and providing the regulations.
3043	881	Emphasises that the issue extends beyond a single oil rig, pointing to a broader problem with Australia's reliance on oil and gas. It calls for retraining efforts and a shift toward renewable energy as a solution.	Objections to oil and gas activities are not about the advserse affects of the activity and were not assessed further.
3044	3674	Engagement with the Traditional Owner (TO) community has been challenging due to a severe lack of resources, with those available being stretched thin. Community members have expressed frustration over numerous requests for engagement with petroleum titleholders concerning events that are considered very unlikely.	Discussion in meeting was held around possible avenues to reduce consutlation fatigue on TO community. (Event ID: 3674.
3045	3654	Engagment should be formalised in an agreement.	Accepted and entered into engagement agreement.
3046	993	Expressed concerns regarding the absence of environmental and economic accounting, questioned what tangible benefits would accrue to the Eastern Maar Traditional Owners and EMAC from the data gathered, especially since CGG commercially profits from selling this information.	Described that without knowing what would be valuable to these groups it's hard for us to know. Noted that CGG suspect but don't know that there is anything of value in the data they'll gather. Benefits could include Traditional Owner's knowing what may be of value in Sea Country. Sharing of bathymetry data that might reveal culturally significant sites. CGG requesting EMAC support in translating information into appropriate language. CGG supporting EMAC in strengthening culture in other ways. Developing plans that align the objectives of EMAC and CGG through a Sea Country Protection Plan (working title). Agreed to share the draft Sea Country Protection Plan for discussion (Event ID 3678).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3047	2110	Expresses a clear stance against the proposed activity, indicating disapproval and concern regarding its impacts.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3048	1022	Expresses strong concern about the project's ability to conduct an environmental impact survey, emphasising that our limited knowledge of ocean ecosystems makes it impossible to predict the potential damage the activities may cause.	We have set decision making criteria that align with your comment in that we must not have long-lasting effects on ecological or cultural sensitivities. Our impact assessments will be thoroughly scrutinised by an independent regulator with the necessary expertise to hold us accountable if our work is not accurate. The Regia activity is a marine seismic survey. There has never been an oil spill from a seismic survey in Australia and we take every precaution to ensure this will remain the case. Even in the unlikely event of a spill the consequences would be undetectable 7 days after the event. The risk is lower than the 1000's of vessels that transit through the marine park every year without accident (Event ID 1022).
3049	880	Feedback states that ecosystems are collapsing and calls for a collective transition away from oil dependence.	Objections to oil and gas activities are not about the advserse affects of the activity and were not assessed further.
3050	2677	Further consultation and research are required.	The titleholder provided the NOPSEMA guidelines regarding environmental information and how research and data from applicable regions can be used to inform environment and impact assessments.
3051	4794	GMTOAC emphasises that effective consultation goes beyond sending emails or information sheets to staff without decision-making authority, as they view all offshore petroleum activities as potentially significant to their interests.	Responded in Event ID 4973, recognising that EJA only recently began acting on behalf of GMTOAC and as such provided the history of consultation carried out since 15 February 2023. Highlighted that EJA did not suggest any meaningful alternatives for engaging with GMTOAC, aside from stating that our efforts were insufficient. CGG would like to clarify that our efforts have been more extensive than the limited examples provided, as shown in our Community Consultation and Engagement Plan, which has been available on the Regia MSS Consultation Hub since February 2023.
3052	4794	GMTOAC emphasises the need for independent technical advice to assess the impacts of proposed offshore petroleum activities on Gunditjmara Sea Country, given the complexity of the EPs and states advice is crucial for understanding the potential effects of seismic surveying and to provide meaningful information to GMTOAC and its members.	Responded in Event ID 4973, stating GMTOAC had access to sufficient information and a resonable period, including an invitation to comment on each draft environmental assessment, which contained detailed information about how the activity may affect their functions, interests, or activities of relevant persons, 127 days before submission.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3053	4948	GMTOAC expresses concern that CGG's decision to submit the Regia MSS Environment Plan before receiving the Consultation Plan undermines the potential for meaningful dialogue and is frustrating.	On December 7, 2024, GMTOAC contacted CGG, inviting them to present for 45 minutes at an information day for GMTOAC members after 295 days without a response. Although CGG considered delaying the submission of the Regia MSS Environment Plan (EP) at that time, they ultimately decided to proceed with the submission for several reasons: the reasonable and accommodating consultation efforts already made, to which GMTOAC had previously been unresponsive; the extended consultation periods that had been provided; the absence of the promised consultation plan from GMTOAC; the fact that the information day invitation would not occur until February 17, 2024—an additional 73 days away; and the characterization of the meeting with the GMTOAC community as merely an information session, rather than part of the future and unspecified consultation plan that CGG had been awaiting since May 30, 2023, which was 197 days prior to receiving this invitation. (Event ID 4973)
3054	5228	GMTOAC requests that CGG commit to conducting proper, lawful, and respectful consultation, including withdrawing the current EP from submission to NOPSEMA and providing GMTOAC with the latest version of the proposed EP for effective participation in the consultation process.	CGG has clearly requested consultation with GMTOAC and its members on multiple occasions and explicitly invited co-design of the consultation process several times. They provided sufficient information both before and on May 30, 2023, and made additional information available after that date. CGG also offered to enter fee-for-service arrangements for consultation and waited months for any response. They attempted to identify relevant Gunditjmara persons and consult with the Gunditjmara community in various other ways. They supplied full copies of the environmental assessment to address uncertainties about sufficient information and shared their understanding of the cultural features relevant to environmental values and sensitivities. Furthermore, they communicated proposed protections for these cultural features and extended the consultation period multiple times to accommodate GMTOAC's needs. Despite these efforts, CGG had not received the consultation plan by the end of August, as promised in the May 30 meeting. Should no consultation plan be forthcoming by 30 June 2024, CGG will have been waiting 398 days for a consultation plan from GMTOAC. CGG remains committed to achieving mutually beneficial outcomes for GMTOAC members and CGG throughout this process, but that will not be possible without open two-way communication within a reasonable time frame The letter includes a summary table of correspondence and a copy of correspondence. (Event ID 4973). As of 1 November 2024, CGG has not received the consultation plan.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3055	4948 & 5228	GMTOAC restates their position that requirements for consultation have not been met, higlighting two-way dialogue, sufficient information and a resonable period.	CGG has clearly requested consultation with GMTOAC and its members on multiple occasions and explicitly invited co-design of the consultation process several times. They provided sufficient information both before and on May 30, 2023, and made additional information available after that date. CGG also offered to enter fee-for-service arrangements for consultation and waited months for any response. They attempted to identify relevant Gunditjmara persons and consult with the Gunditjmara community in various other ways. They supplied full copies of the environmental assessment to address uncertainties about sufficient information and shared their understanding of the cultural features relevant to environmental values and sensitivities. Furthermore, they communicated proposed protections for these cultural features and extended the consultation period multiple times to accommodate GMTOAC's needs. Despite these efforts, CGG had not received the consultation plan by the end of August, as promised in the May 30 meeting. Should no consultation plan be forthcoming by 30 June 2024, CGG will have been waiting 398 days for a consultation plan from GMTOAC. CGG remains committed to achieving mutually beneficial outcomes for GMTOAC members and CGG throughout this process, but that will not be possible without open two-way communication within a reasonable time frame The letter includes a summary table of correspondance and a copy of correspondance. (Event ID 4973). As of 1 November 2024, CGG has not receieved the consultation plan.
3056	4794	GMTOAC states the information session held on February 17, 2024, was deemed insufficient, serving only as a preliminary introduction rather than a comprehensive consultation.	Responded in Event ID 4973, stating the offer for a meeting with GMTOAC community was characterised as an information session and not part of the (future and unspecified) consultation plan that CGG had been waiting for since 30 May 2023, some 197 days at the time of receiving this invitation.
3057	1317	I have already stated my position to oppose seismic testing in the Otway Basin. Period.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3058	3373	Indivdual provided a general objection to oil and gas acitivities that including advising the titleholder that 11 local governments has opposed seismic activities and that the fishing and tourism industires also opposed it.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3059	4637	Inferred titleholder's ALARP assessments are the product of assumptions	Event ID 4635 explains that the methods of assessment, conclusions and assumptions have been outlined. The Regia MSS team have also shared impact assessments, citing over 120 references. Titleholder invites a detailed critique of their assumptions, encouraging the provision of validated sources to further inform their analysis.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3060	1389	It is clearly irresponsible to continue exploring for more fossil fuels as CO2 levels are high and continue to rise.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3061	4808	Lack of consultation with First Nations people on the cultural significance of Deen Maar.	Titleholder responded noting assertions and claims and outlining ongoing consultation approach with First Nations stakeholders (Event ID: 2630)
3062	2773	Lack of independent Australian University research before the seismic survey.	Titleholder responded clarifying scientific findings on mortality rates in lobsters and requesting further information on assertions regarding impacts to rock lobsters as a result of MSS in the Otway Basin. (Event ID: 2414)
3063	2901	Lack of information provided by Regia failed to meet AMCS expectations of consultation.	Prior to email Event ID 2901, AMCS was contacted via letter (Event ID 41) and phone (Event ID 433) at the start of the consultation process. The letter provides backgaround information on the project, including an invitation to consultation and how to engage. Attached to the letter was an activity overview, with timing an map, a description of the consultation framework, illustrating how consultation can be co-designed, various methods of contact and direction to the Regia webpage with further information. AMCS then submitted an online survey with specific questions (Event ID 529), these were responded to via the supplied email (Event ID 633). AMCS was encouraged to continue engagament and request further clarification on their questions. Further engagament in a manner that best suited them was offered, including a webinar for their members. They were also notified of upcoming community sessions their members may be interested in.
3064	4190	Lack of response to meeting request to understand the proposal better	Explained that unfortunately the email his colleague sent him, regiamss@cgg.com, does not exist. Stated the correct email was provided to his group in prior correspondance. Event ID 1739
3065	1022	Lack of trust in the environmental impact and risk assessments conducted. Claims if the assessments were done properly, the project would not proceed.	We have set decision making criteria that align with your comment in that we must not have long-lasting effects on ecological or cultural sensitivities. Our impact assessments will be thoroughly scrutinised by an independent regulator with the necessary expertise to hold us accountable if our work is not accurate. The Regia activity is a marine seismic survey. There has never been an oil spill from a seismic survey in Australia and we take every precaution to ensure this will remain the case. Even in the unlikely event of a spill the consequences would be undetectable 7 days after the event. The risk is lower than the 1000's of vessels that transit through the marine park every year without accident (Event ID 1022).
3066	4036	Late awareness of consultation period or contact with Blue Whale Study Organisation	Titleholder reponded to individual outline previous attempts to make contact and commence consultation. Provided NOPSEMA brochure and previously provided letter requesting consultation. (Event ID: 1933)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3067	4808	Local fishing and tourism industries passed motions against the project.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3068	1655	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3069	1659	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3070	1661	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3071	1662	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3072	1663	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3073	1665	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3074	1666	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3075	1668	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3076	1669	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3077	1670	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3078	1672	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3079	2586	Member lodging vote against the survey, seeks a receipt and asks for a transcript. States objection to proposed activity is on the grounds of unnecessary gas exploration and there is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan, although comments have been recorded and will be reported(Appendix C1). Provided consultation plans, NOPSEMA brochure and link to consultation hub. Requested more information on FIAs.
3080	3237	Mention of other ongoing projects and activities adding pressure to the marine environment.	The titleholder responded formally to submitted concerns in Event ID 3886, explaining that cumulative impacts are considered when assessments are made.
3081	4808	Moyne Shire and other local councils are unified against the project.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3082	3747	MSS Proponents are encouraged to complete a data project and then to use this to guide their consultation. (SETFIA's involvement is not critical but the Association can complete this work under contract and clients report finding it invaluable.)	A fisheries consultant was engaged to analyse the publicly available ABARES data and produced a comprehensive report which demonstrated the overlap of each fishery. See Appendix B6.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3083	4049	Need to know normal annual catch ($) in area to establish if co-existance is possible.	As detailed in Event ID's 4129 & 3989, knowing a value or tonnes of historical fishing averages in an area does not add to the solutions already in place for this proposed activity. Event ID 4805 notes that SETFIA, SSIA, and Atlantis stated they have previously submitted at least 11 reports to titleholders in the Otway, which are publicly available in other Environment Plans. In preparing the Regia MSS Environment Plan, CGG reviewed these reports and found that SETFIA/SSIA regularly indicated that Commonwealth Trawl Sector (CTS) fishing typically occurs between 400m and 1,000m, although some CTS fishers mentioned occasionally fishing down to 200m, a claim supported by ABARES data. Overall, CGG concluded that fishing effort in the area is relatively low, as evidenced by the ABARES data, past reports, and confidentiality limitations indicating fewer than five active fishers.
3084	1899	No seismic testing. Leave our amazing ocean alone.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3085	1668	Objection to proposed activity on the grounds of unnecessary gas exploration. There is no acceptable level of environmental impact or risk.	Confirmed no official vote and a vote is not part of community or relevant person engagement plan. Provided link to plan on website. Confirmed recorded in system and requested information on FIAs.
3086	2278	Opposition to seismic testing, exploratory drilling for gas, and future drilling for commercial quantities of gas due to potential climate damage.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3087	1669	Our oceans are already under extreme stress from drilling, plastic, shipping, pollution and global warming - they cannot bear this further, unnecessary pressure.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3088	4190	Poor communication and lack of serious handling of consultation	Explained that unfortunately the email his colleague sent him, regiamss@cgg.com, does not exist. Stated the correct email was provided to his group in prior correspondance. Event ID 1739
3089	3674	Preference for petroleum titleholders to collaborate in reducing the consultation burden. A proposal was made for quarterly meetings among all titleholders to engage with the TOs. This approach could provide mutual benefits, allowing titleholders to share updates on their activities and any changes, while TOs would have the opportunity to share cultural stories, strengthen their community ties, and contribute to the management of environmental impacts associated with the petroleum activities.	Discussion in meeting was held around possible avenues to reduce consutlation fatigue on TO community. (Event ID: 3674.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3090	2024	Raised an objection by questioning the overall necessity of the survey, focusing on whether it should be conducted at all, rather than just discussing the "how" and "when".	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3091	2940	Reference to the overwhelming public opinion against the plans to proceed with the project.	Titleholder responded quering if they had confused Regia MSS with a different project as the public comment period had not started. (Event ID: 2938)
3092	5121	Relevant Persons have not been informed of content of letter from NOPSEMA to CGG	As publishing private correspondance is not a usual part of the process, but a choice made by CGG to demonstrate transparency and build trust, CGG requested permission from NOPSEMA to publish the letter. Once this approval was given the letter was uploaded to the consultation hub, and notice sent to relevant persons (Event ID 5134). AMCS was informed of this process in Event ID 5124.
3093	886	Request for a real contact person's name to deal with.	Titleholder advised the individual that the project email was a shared inbox and provided an overview of the administrative function and use for consultation and advised with whom they were corresponding in this instance. (Event ID 3187)
3094	4481	Request for the company to abandon exploration and seek more sustainable energy sources.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3095	2003	Request that the issue of compensation be dealt with through the associations only.	Discussion and input with associations only - rejected, fishers have requested this doesn't occur. Discussion and input with fishers only - rejected, excludes fishers who are happy to be represented by their asssociations. Discussion and input through a CGG process - adopted, noting the benefits of a collaborative approach. Discussion and input through a collaborative process (similar to the one NERA ran) - adopted.
3096	3746	Request to engage their data consultant to review and present data on shark and trawl fishery catches and values over the past 20 years in the proposed survey area, anticipating similar requests from other fisheries	A fisheries consultant was engaged to analyse the publicly available ABARES data and produced a comprehensive report which demonstrated the overlap of each fishery. See Appendix B6
3097	3705	Restatement that the consultation should consider IF the survey should go ahead, not just how and when the survey should be undertaken.	Acknowleged restatement of previous feedback (Feedback ID 275) and repeated response (Event ID 4280)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3098	5231	SETFIA indicates that there is likely little more they can contribute moving forward, stating their willingness to share information about compensation with members. However, they express reluctance to engage in separating vessels from the survey due to CGG's perceived failure to act in good faith to minimise impacts.	This assertion has been raised multiple times, with the titleholder requesting the stakeholder explain how this data can assist where the currently supplied data can not. At the risk of damaging relationships further, this has not been responded to this time. Please refer to Apendix C1, where consultation with this stakeholder, including this assertion, is described in detail.
3099	2003	SSIA and SETFIA request a review of 20 years of AFMA data, reporting back on the extent of average annual overlap with each fishery. This can be done under contract with SETFIA or by an alternative company.	A fisheries consultant was engaged to analyse the publicly available ABARES data and produced a comprehensive report which demonstrated the overlap of each fishery. See Appendix B6
3100	4554	Stakeholder accused titleholder of showing a lack of integrity and stated they would blockade boats if titleholder attempted activity. Requested to know where a BACI designed study is and asked 'what happened at lakes entrance'.	Responded in Event 4555, stating that they are consulting with the stakeholder in good faith and adhering to legal requirements. They invite credible sources of information and relevant studies for review, committing to implement measures to avoid impacts or provide compensation if warranted. However, they currently conclude that the Regia MSS will not measurably affect King George Whiting populations, and thus no compensation is necessary. They reject the idea of negotiations being contingent on threats to block legal operations as unacceptable. Regarding the request for a Before-After-Control-Impact (BACI) study, they state there is no basis for further research on seismic effects on King George Whiting from the Regia MSS, asserting there are no significant evidence gaps. They also clarify that while the FRDC study they assume is referenced is ongoing, they cannot draw conclusions until a peer-reviewed report is available.
3101	2963	Stakeholder advocated for declaring coastlines off-limits to drilling and other destructive practices.	The titleholder has noted, recorded and reported the objection to oil and gas activities.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3102	3209	Stakeholder asserted that consultation was token.	We can confirm that our correspondence with you is recorded in our consultation records. The classification of relevant person and public comment are not defined by us, but rather the authorising body NOPSEMA, in order to simplify engagement for all parties. This does not mean that if you are not in the category of relevant person that you are unable to be informed or make comment. Rather there is a distinction in how we engage. For example, if someone has a general objection to all oil and gas activities, whilst we will record this and it can be presented during public comment, we are working within the bounds of current legalisation that allows oil and gas activities to occur (once the specific permits are in place). However, if an individual or group raise a specific concern that they may be affected by our activities, then we are required to evaluate it and place mitigations in place as required. An example with this project would be considerations around Deen Maar. Through engagement we learnt that there is a spiritual significance to the area, so we impended an exclusion zone around the island and put a measure in place to ensure the vessel does not pass between the coast and Deen Maar. I have attached a brochure from NOPSEMA that explains the process in further detail.
3103	3209	Stakeholder asserted that despite consultation, views were not valued.	We take engagement very seriously and stand firmly behind our environmental scientists' work. Through the "engagement process we have been able to identify potential impacts and put measures in place, and so respectfully engagement process we have been able to identify potential impacts and put measures in place, and so respectfully disagree with your final statement that we aren't truly listening. Thank you for your time in sharing your concerns and engaging with us, it is an important part of the process and much appreciated. If you would like any clarification of the above, or to request further information and engagement, please don't hesitate to contact us."

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3104	3209	Stakeholder asserted the need to stop new gas/oil projects and reduce fossil fuel reliance.	The 'no new oil or gas' statement comes from the International Energy Association (IEA) World Energy Outlook (WEO) 2021, Net Zero Scenario which is a global analysis predicated on a demand driven decrease in fossil fuel use. It does not consider that at an Australia level, the AEMO predicts shortfalls of gas as early as 2027 in its Victorian Gas Planning We understand community views about the ongoing need for gas in Australia (or lack thereof) as the country navigates the energy transition. The current government policy is that more gas is needed, and petroleum exploration titles continue to authorise the exploration process, including seismic surveys. Matters of national energy policy are not within the purview of CGG or the Regia MSS. We will register claims related to the ongoing need for gas and provide those to NOPSEMA. We also advise that these concerns are better directed to your State or Federal members of parliament and/or the State or Federal Resources Ministers.
3105	2632	Stakeholder asserts a range of general objections and opposition to oil and gas acitivites and the Regia MSS including: Labeling the sender as the last bastion of outdated fossil technology, sharing his preference for receiving gas from existing suppliers over new supply and a proliferation of frontier gas exploration in the southern ocean, and advocating for the use of renewable energy sources once exisiting gas supply is exhausted.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3106	5236	Stakeholder emailed another organisation with the Regia project team cc'd into correspondence. Stakeholder states that in a recent SETFIA general meeting, CGG expressed their stance regarding the BACI study they co-funded in eastern Bass Strait, asserting that without publication, they do not acknowledge impact on catch rates from marine seismic surveys. They raised several concerns: the report's significant delay, issues with the FRDC board's acceptance of the report, and CGG's ongoing requests to the FRDC for the report over the past few years. Stakeholder followed up in the email.	The titleholder responded to all, correcteing the content of stakeholder's email to FRDC regarding BACI data. (Event ID: 5239).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3107	3148	Stakeholder enquired why there is no community session in their region and made an official request for this to occur.	The titleholder responded offering a meeting and provided additional survey information that may interest the club members. (Event ID: 4567)
3108	549	Stakeholder expressed concerns that NOPTA was the sole government body overseeing the award of SPA's, without needing joint authority approval, and argued that this process was undemocratic.	Titleholder advised that objections and claims needed to be about the advserse affects of the activity and explained that this concern was a matter for NOPTA, the Minister for Resources or the local member for parliament (Event ID: 549).
3109	3386	Stakeholder expresses concern that CGG has not recognised them as a relevant person, despite their representation of AMCS, a recognized entity.	Regia team contacted the individual (Event ID 3143) two days after they had completed an online survey. They had sent an email a day later with a number of information requests. Event ID 3143 confirmed they were recorded, but also requested information regarding if they were also seeking to be a relevant person as an individual, in addition to as a representative of AMCS, or both. This was requested as previous consultation with AMCS had been with another individual, and also due to the multiple correspondance methods stakeholder (Person ID 1203) had used in a two day period. The individual was informed that a person may hold multiple FIA's, including as an individual and as part of an organisation (Event ID 3368)
3110	5192	Stakeholder listed statements they said were made by the Regia MSS team member asking if they were being withdrawn, which would align the views of CGG and SETFIA goals.	Titleholder responded clarifying statements and views including the preference to use final results, the importance of the peer review process in BACI results and methodology (Event ID: 5239).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3111	5195	Stakeholder outlines their understanding of responsibilities under the Act. Stating that the proponent must identify relevant stakeholders (such as SETFIA) and provide them with necessary information, specifically requesting data on catch and effort rather than just gross spatial overlap. Additionally, the stakeholder emphasises that the proponent should present the impacts of their project, recognising that while fishing grounds are important, the primary concerns for fishing businesses are catch and revenue. The feedback asserts that the proponent must also take reasonable steps to reduce impacts to an acceptable level, referencing the ALARP (As Low As Reasonably Practicable) principle, and notes that SETFIA believes CGG has not adequately mitigated impacts, relying instead on compensation offers.	This assertion has been raised multiple times, with the titleholder requesting the stakeholder explain how this data can assist where the currently supplied data can not. At the risk of damaging relationships further, this has not been responded to this time. Please refer to Apendix C1, where consultation with this stakeholder, including this assertion, is described in detail.
3112	4057	Stakeholder questioned the validity and genuine nature of Regia MSS' efforts to include the stakeholder in the environmental assessment process.	The titleholder responded by offering to discuss the points made further with the stakeholder, and highlighted the stakeholders option to inform NOPSEMA of any dissatisfaction they may have relating to the consultation process (Event ID 4063).
3113	4032	Stakeholder questioned why the Regia MSS would not respect the past history, honour their present moment in time and protect their future.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3114	4057	Stakeholder refused to communicate with Regia MSS further and called for an outright ban on all seismic blasting for fossil fuel projects.	The titleholder responded by offering to discuss the points made further with the stakeholder, and highlighted the stakeholders option to inform NOPSEMA of any dissatisfaction they may have relating to the consultation process (Event ID 4063).
3115	2586	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3116	1653	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3117	1655	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3118	1659	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3119	1661	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3120	1662	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3121	1663	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3122	1665	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3123	1668	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3124	1667	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3125	1670	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3126	1672	Stakeholder strongly objected to the proposal for seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3127	2254	Standing in solidarity with first nations custodians of the Gunditjmara land who say no to this!	Objections to oil and gas activities are not about the adverse effects of the activity. These are not assessed further.
3128	842	Stated that the oceans are incredibly important to the safety and health of our futures and noted that a project like this is absolutely not in line with moving towards safer futures.	Titleholder responded providing information on marine mitgation plans, confirming individual as an interested community member and inviting further engagement, noting connection with First Nations community (Event ID: 843)
3129	3382	States CGG needs to undertake the financial overlap report to ensure it has sufficient funds	In CGGs past experience such information provided no basis for protection measure or a reasonable estimation of the compensation that was actually due. Event ID 2894 explains that this is a concern for CGG and is not relevant to the purpose of consultation with SETFIA/SSIA. However, CGG remains open to any other reasons that we might need to generate and share this information. However, at present CGG cannot see any improvement to the predictive accuracy of our impact assessment work from obtaining or sharing this information.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3130	4236	States financial catch information is needed by CGG to prepare their funds. The data project spoken about early on in the consultation process is from ABARES reports and doesn't provide the information CGG would need for this.	In CGGs past experience such information provided no basis for protection measure or a reasonable estimation of the compensation that was actually due. Event ID 2894 explains that this is a concern for CGG and is not relevant to the purpose of consultation with SETFIA/SSIA. However, CGG remains open to any other reasons that we might need to generate and share this information. However, at present CGG cannot see any improvement to the predictive accuracy of our impact assessment work from obtaining or sharing this information. As detailed in Event ID's 4129 & 3989, knowing a value or tonnes of historical fishing averages in an area does not add to the solutions already in place for this proposed activity. Event ID 4805 notes that SETFIA, SSIA, and Atlantis stated they have previously submitted at least 11 reports to titleholders in the Otway, which are publicly available in other Environment Plans. In preparing the Regia MSS Environment Plan, CGG reviewed these reports and found that SETFIA/SSIA regularly indicated that Commonwealth Trawl Sector (CTS) fishing typically occurs between 400m and 1,000m, although some CTS fishers mentioned occasionally fishing down to 200m, a claim supported by ABARES data. Overall, CGG concluded that fishing effort in the area is relatively low, as evidenced by the ABARES data, past reports, and confidentiality limitations indicating fewer than five active fishers. Event ID 4969 requested from the stakeholder the reasoning behind purchasing this report, and how it would help avoid interference, and provide information for mitigations.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3131	4948	States GMTOAC and its members are concerned about the potential impacts of CGG's proposed seismic survey activities on Gunditjmara Sea Country and its environmental and cultural features. They feel that CGG has not sufficiently addressed the cultural, marine, and cumulative impacts related to the various activities proposed in the Otway Basin. CGG expressed interest in collaborating with GMTOAC on the co-design of its Consultation Plan and engaging further on its Sea Country Protection Program. However, GMTOAC has instructed that they will only meet with CGG regarding the Regia MSS Environment Plan (EP) after the Consultation Plan is finalised. GMTOAC emphasises that, given CGG's submission of the EP without prior consultation, it is inappropriate to discuss other matters, including the Sea Country Protection Program. They also assert that any such program must be entirely designed and led by Gunditjmara Traditional Owners, as mere consultation is not acceptable to them.	Despite the challenges faced in consultation, CGG remains committed to ongoing engagement with GMTOAC and its members. On February 17, 2024, CGG discussed the proposed activity, its impacts, risks, and protective measures for cultural features with the Gunditjmara community. This information refined earlier communications from before and on May 30, 2023, reflecting feedback from relevant persons. On March 8, 2024, CGG provided fact sheets addressing impacts on glass eels and Southern Right Whales, as well as clarifications about the absence of impacts to the Outstanding Universal Values of the Budj Bim Cultural Landscape, in response to GMTOAC community requests. While delays in the consultation plan have been frustrating, CGG emphasises that these challenges do not equate to a failure of consultation, engagement which will continue throughout the project's lifecycle. CGG believes the best path forward involves input from GMTOAC into their Sea Country Protection Program and other ongoing consultation protocols, including a future GMTOAC consultation plan, ensuring that cultural features and environmental sensitivities are adequately considered and managed for mutually beneficial outcomes. (Event ID 4973)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3132	4788	States SETFIA cannot provide assistance without further information, so they will wait to see the outcomes, stating the activity is now potentially dangerous, commenting that the operator may 'be lucky' or may encounter a critical interaction with a trawl vessel.	Responded in Event ID 4804, explaining CGG's experience with the Gippsland survey has enabled them to identify the necessary information to minimize vessel overlap. They obtained and validated data from ABARES, and through discussions with trawl fishers, established measures to reduce disruption in shared areas. Their analysis and maps are conservative, as the operational area has been reduced and will continue to be updated. CGG reiterated they would like to engage in a fee-for-service arrangement to provide information to SETFIA's members, including on-water communications, noting that overlap reports may not effectively account for changing fishing areas Event ID 4788 challenges the comment regarding the survey now being dangerous and impactful, and the chance of a negative interaction at sea, stating that given there has only been a reduction in the nature and scale of the survey over the last 12 months the statement is mischievous, incendiary and not in accordance with the Commonwealth Government guidance framework. The stakeholder is asked to refrain from making such statements as that outcome would only be true with a complete lack of cooperation leading to fishers acting illegally.
3133	2274	STOP the destruction NOW	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3134	1669	Strong objection to the proposal by Regia to 3D seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3135	1673	Strongly object to the proposal being made by Regia to 3D seismic blast in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3136	1021	That has not been funded by the fossil fuels industry.	Objections to oil and gas activities are not about the advserse affects of the activity and were not assessed further.
3137	2038	The Australian Marine Conservation Society (AMCS) expressed serious concerns about the impacts of certain processes on the community and marine life. They advocate for the cessation of these processes, viewing the industry as polluting and incompatible with Paris climate targets. AMCS strongly advocates for the protection of oceans and marine life and the end of offshore oil and gas operations.	The titleholder has noted, recorded and reported the objection to oil and gas activities. Regarding concerns on marine life and the community, the consultation process has been followed, with subsequent engagment with the relevant organisation.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3138	2082	The commenter questions the true independence of NOPSEMA, the supposed independent regulator, citing its sole funding from the petroleum industry as a conflict of interest.	A Productivity Commission study into Resources Sector Regulation (Nov 2020) stated that other regulators should "investigate opportunities for enhancing regulators' cost recovery processes (like those adopted by NOPSEMA)". Our claim of NOPSEMA's independence is repeating the claim they themselves make. It is regulatory best practice to cost recover from proponents and typical in many sectors (Event ID 2082).
3139	2997	The community and elected officials have spoken against the project.	The stakeholder responded to a project updates with a number of complaints regarding another Titleholders public comment period. When the Regia team informed the stakeholder of this, they rejected the explanation and continued to state petitions related to a different proposed activity. The Regia teampreviously assured the Stakeholder that all their comments would be received and provided to the industry regulator (Event ID 2630)
3140	2632	The community, local governments, and signatories are against seismic blasting in the southern ocean.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3141	2901	The consultation process was not clear, transparent, or accessible.	Prior to email Event ID 2901, AMCS was contacted via letter (Event ID 41) and phone (Event ID 433) at the start of the consultation process. The letter provides background information on the project, including an invitation to consultation and how to engage. Attached to the letter was an activity overview, with timing an map, a description of the consultation framework, illustrating how consultation can be co-designed, various methods of contact and direction to the Regia webpage with further information. AMCS then submitted an online survey with specific questions (Event ID 529), these were responded to via the supplied email (Event ID 633). AMCS was encouraged to continue engagament and request further clarification on their questions. Further engagament in a manner that best suited them was offered, including a webinar for their members. They were also notified of upcoming community sessions their members may be interested in.
3142	4942	The Council's request to NOPSEMA, the Victorian State Government, and the Commonwealth Government for the moratorium.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3143	653	The DNP should be made aware of oil/gas pollution incidences which occur within a marine park or are likely to impact on a marine park as soon as possible.	The titleholder responded with a link to the Implementation Strategy document that details the procedure relevent to the claim. (Event ID: 1751)
3144	3373	The entire community, including First Nations and non-Indigenous people, will not back down against seismic activities.	The titleholder has noted, recorded and reported the objection to oil and gas activities.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3145	880	The feedback expresses strong concern about the environmental risks associated with potential spills, emphasising the need to prioritise ecosystem protection.	We understand this is a risk people are concerned about. Seismic surveying has occurred in Australia extensively for 60 years and there has never been an oil spill from a seismic activity, this is due to the prevention measures we implement to protect the environment. Further, in case the worst happens, we have plans in place to response quickly and effectively. These will be published shortly. Our oil spill risk is far less than the thousands of ships that pass through these waterways every year, without incident, delivering essential goods and services to local communities. The fuel we use is similar to diesel you'd put in your car. Our vessels are designed to the highest standard and have redundancies in place if unforeseen circumstances arise (Event ID 880).
3146	880	The feedback expresses that oil spills are inevitable and argues that protecting waterways is more important than pursuing profit.	We understand this is a risk people are concerned about. Seismic surveying has occurred in Australia extensively for 60 years and there has never been an oil spill from a seismic activity, this is due to the prevention measures we implement to protect the environment. Further, in case the worst happens, we have plans in place to response quickly and effectively. These will be published shortly. Our oil spill risk is far less than the thousands of ships that pass through these waterways every year, without incident, delivering essential goods and services to local communities. The fuel we use is similar to the diesel you'd put in your car. Our vessels are designed to the highest standard and have redundancies in place if unforeseen circumstances arise (Event ID 880).
3147	881	The feedback highlights concern over the cumulative damage to reefs caused by diesel-powered ships and oil industries. It stresses that diesel is harmful and not to be taken lightly, noting its long-term impact on the environment.	We understand your concern which is why we'll publish our risk prevention measures as well as our emergency plans for you to comment on (Event ID 881).
3148	2080	The feedback questions why corporate interests, under the guise of human necessity, are allowed to continue practices that may irreparably harm marine ecosystems.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3149	878	The feedback stresses the importance of transparency regarding the seismic blasting license being sought and calls for a clear explanation of the Seismic Program Application (SPA) to ensure the community is well-informed.	Titleholder responded to online feedback outlining process required prior to applying for the SPA and/or an AA and acknowledged inidividuals calls for transparency about titles. (Event ID: 878)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3150	2080	The feedback urges a shift in investment from gas to alternative energy sources, suggesting that funds should support innovative, sustainable energy solutions instead of further gas development.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3151	2074	The latest AEMO report indicates that Australia's gas demand for electricity generation is expected to decrease by a third by 2030. However, gas companies are forecasted to maintain their current export levels, suggesting that the focus is more on profit than on addressing supply needs.	Electricity generation is only one source of gas usage. The latest AEMO Victorian Gas Planning Report stated "Unless new Victorian supply is developed, Victoria is forecast to become a net importer of gas from winter 2027, as Victorian annual consumption exceeds Victorian production (Event ID 2074).
3152	4049	The list of fishers provided by AFMA includes holders of SESSF vessel permits, many of whom do not actively fish and lease their rights elsewhere. Most permit holders do not operate in the Otway region. It's noted that the primary value of rights in the SESSF comes from quotas rather than vessel permits. While NOPSEMA is urging this process, it is viewed as misdirected and potentially irritating to rights holders who are not impacted.	Event ID 3879 explains that commonwealth fishers have been contacted via the AFMA details we have obtained, to ensure we have reached everyone and to establish if the fishers have functions, interests, or activities outside of commercial fishing.
3153	2073	The March 2023 IPCC report emphasises the need to halt new fossil fuel exploration to keep global warming below 1.5 to 2 degrees Celsius. It calls for an immediate stop to licensing and funding new oil and gas projects, halting the expansion of existing reserves, and achieving net-zero electricity generation by 2035 for developed nations and 2040 for others. Ignoring these recommendations is deemed grossly irresponsible, highlighting the critical nature of addressing climate change.	In most world energy outlooks gas still has a role to play in a net-zero world, particularly in hard to abate sectors. The most recent IRENA report suggested that even if we can scale up renewables three times faster than current projections, renewables will only meet 90% of the world's energy demand. Gas, particularly with carbon capture technologies, is necessary for a net-zero emissions world (Event ID 2073).
3154	4091	The possible risks of the proposed activity far outweigh any value that may be derived from hydrocarbon exploitation.	The titleholder responded: The legislation allows NOPSEMA to permission environmental impacts provided we comply with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations (Event ID 4092).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3155	3746	The Regia consultation process has thus far failed to meet NOPSEMA's principles of effective consultation, including communication, transparency, collaboration, inclusiveness, and integrity.	In Event ID's 4597 & 4805, CGG reiterated that they have addressed all matters raised in previous correspondence with SETFIA, SSIA, and Atlantis. They note the absence of some correspondence from SETFIA's records and attach their full communication history with these parties for transparency. CGG has also confirmed their discussions with AFMA regarding the accuracy of ABARES data. They remain committed to finding ways to minimize impacts on individual commercial fishers and will communicate updates to the associations. Additionally, CGG has provided a purchase order for invoicing, requesting that SETFIA include the PO number on their invoice when convenient.
3156	4942	The resolution adopted by the Glenelg Shire Council to support the moratorium on seismic testing in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3157	806	The sender mentions confusion among community members after a joint presentation with Conoco Phillips Australia, and and seeks consultation in Apollo Bay.	Explained joint sessions were held in an attempt to mitigate consultation fatigue, offered and held standalone Regia session in Apollo Bay. Requested preferred dates and times. Event ID's 817, 813.
3158	3384	The staged approach of release of draft EP chapters means relevant persons were not able to initially review as a whole.	As advised via email on Event ID 3331, consulation will not be paused, granting time extension well beyond the 4 weeks requested. We will submit the Regia MSS EP for public comment once we believe we have met the Reg 10A(g) acceptance criteria
3159	2014	The stakeholder advised against petroleum development and seismic surveys.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3160	1891	The stakeholder advised that they were organising an offshore wind symposium aimed at fostering collaboration among wind proponents. Asserted that a new appraoch was necessary.	Titleholder requested an invitation to the offshore wind symposium so that we can listen and learn (no response was provided) (Event ID 1891). Titleholder also asked if there was a preferred way we should consult. If there were preferred consultants that we could use. Stakeholder advised nobody preferred. And that we need to be aware about the Sea Country IPA that they are working on and will publish shortly.
3161	2109	The stakeholder argues that the urgent need to transition away from fossil fuels limits the profitability of any gas found before a ban. They emphasise that the risks to marine life from seismic exploration and gas extraction are significant, advocating for prioritising ecological health over economic gain.	We are working hard to design our survey so that we limit our impacts to acceptable levels. Our activity is no more than 90 days so we'll find an appropriate window to operate in. We will not destroy any wildlife habitat as a result of our activity (Event ID 2109).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3162	1891	The stakeholder asserted that effective consultation hinges on recognising the sovereign rights of Traditional Owners and ensuring collaboration on an equal footing. They sought a partnership model, as any superficial, tick-box appraoch is quickly identified and not trusted. Stakeholder mentioned that it is crucial to align on goals and the methods to achieve them.	Agreed that we are aligned on protecting cultural heritage and respecting the sovereign rights of TO's in everything we do.
3163	2103	The stakeholder asserts that the IPCC has called for no new fossil fuel development, emphasising that greenhouse gas emissions from existing fossil fuel infrastructure are already sufficient to exceed the 1.5°C global temperature increase. They argue that any additional fossil fuel projects would contradict climate goals and commitments.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3164	2097	The stakeholder asserts that the project will significantly exacerbate the climate crisis, emphasising the belief that this impact is undeniable.	CGG acknowledges claims regarding global warming and has reviewed Environment Plan (EP) Appendix B4 (Regia MSS Preliminary Environmental Impact and Risk Assessment (PEIRA)), which provided preliminary information on the potential impacts and risks to support consultations with relevant persons and provided the context to the subsequent impact and risk assessments. An assessment of atmospheric emissions was conducted as part of the PEIRA which concluded that, while emissions from the use of fuel to power vessel engines, generators and mobile and fixed plant add to the GHG load in the atmosphere which adds to global warming potential, they are relatively small on a state, national and global scale, representing an insignificant contribution to overall GHG emissions. Emissions will be small in quantity and short-term. The emissions from up to three vessels for 90 days will not significantly contribute to climate change. Therefore, impacts to ecological components of the environment from atmospheric emissions from the Regia MSS are not predicted and have not been evaluated further. CGG acknowledges claims regarding the concerns about the future potential for natural gas extraction; however, CGG is not proposing the commercial extraction of natural gas as part of the Regia MSS. The activity presented in the Environment Plan is for a short-term, temporary marine seismic survey. Consequently, this claim is not relevant to the adverse effects of the proposed Regia MSS to which the EP relates and is beyond the scope of this assessment.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3165	2757	The Stakeholder claimed it disturbed greatly that this could go ahead without consent from people in this area despite consultation.	As per the previously provided NOPSEMA document (reattached for convenience), whilst the law doesn't require agreement or consent, it does require us to demonstrate in our EP (Environment Plan) that we have considered and addressed concerns, objections, or claims. This helps ensure that any associated impacts are as low as reasonably practicable and are acceptable. An example of this with Regia would be mitigations around Deen Maar. Through engagement we learnt that there is a spiritual significance to the area, so we implemented an exclusion zone around the island and put a measure in place to ensure the vessel does not pass between the coast and Deen Maar.
3166	3450	The stakeholder considered the consultation update to be inaccurate and failed to respond to many issues.	Titleholder responded outlinging thepurpose of project updates and response on previous questions. (Event ID: 3455)
3167	879	The stakeholder emphasised the need for honesty in the consultation process regarding the seismic project. They stated that the area in question is not a designated title released by the Australian Government but rather a frontier exploration zone.	Titleholder responded publically to this interactive map comment: The title/titles we end up applying for has no bearing on how we protect the beautiful and important creatures in your photo. The title you reference expires after 183 days so it is quite normal to apply for these when we submit our Environment Plan and not before. Questions about the purpose and use of titles are best answered by the National Offshore Petroleum Titles Administrator (NOPTA).
3168	1891	The stakeholder explained that they function solely as the administrative body, and would need to present a position to the Traditional Owners at the next meeting to determine the next steps after the initial letter. Advised that once they receive guidance from the Traditional Owners, they can develop an effective consultation process.	Titleholder responded providing information on the assesments completed to-date and the SCPP, inviting further involvement in the co-design and co-implementation of the program (Event ID: 256) and requested in-person meeting when team were next in the region after draft environmental impact assessments were made available (Event ID: 2669, 3031)
3169	1891	The stakeholder expressed diappointment over the lack of communication from NOPSEMA regarding the regulations.	TItleholder offered to relay that message to NOPSEMA (Event ID 1891).
3170	4048	The stakeholder expressed disatisfaction with activity design changes being made via direct consultation with relevant persons (Trawl Fishers), who the Regia team did not name and as such may be state or unlicenced.	The consultation process allows relevant persons to co-design the consultation process. This means some fishers may choose to engage directly with the Titleholder, whilst others may nominate an organisation to consult on their behalf.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3171	2708	The stakeholder expressed dissatisfaction with the lack of information provided during the online consultation	The titleholder responded by thanking the stakeholder for their engagement, offered to arrange a meeting once relevant documents had been finalised, and offered to arrange a webinar tailored to the stakeholder groups needs. The titleholder also provided information on the topics covered in a recent webinar hosted by the titleholder (Event 1889).
3172	2105	The stakeholder expresses agreement with previous comments from the online Interactive Map, urging that the area should remain untouched to preserve it for future generations. They emphasise the desire for their descendants to enjoy the environment as their father did, voicing a preference for leaving the area natural and undisturbed.	The titleholder responded publically to the interactive map commment: We respect your views and encourage you to consult with us through the relevant persons process so that your views can be documented and shared with the independent regulatory decision makers at NOPSEMA. We understand your opinion and encourage you to consult with us through the prescribed regulatory process. However, our there is overwhelming evidence that the area is not untouched and is impacted daily by transient shipping, defence activities, port activities, commercial and recreational fishing and the natural fluctuations of a functioning ecosystem. It would be unacceptable to have long-term or perminent/unrecoverable impacts that threaten the environmental enjoyment future generations. Fortunately, impacts from marine seismic surveys are short-term, temporary, and recoverable. We acknowledge your opinion and encourage you to engage in the prescribed regulatory process so that NOPSEMA can take this into account. There is evidence that the Otway area is a highly productive industrialised waterway with defence, shipping, fishing, and petroleum activities coexisting within the environment in the region for many years.
3173	2107	The stakeholder expresses strong disapproval of profit-driven activities that harm the planet and marine life, advocating for a shift toward sustainable energy investments. They emphasise the responsibility to protect the environment for future generations.	The legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan (Event ID 2107).
3174	2255	The stakeholder expresses the need for a move away from fossil fuels.	The titleholder responded, noting the concerns, providing information and offering further enagagement (Event ID 674)
3175	3697	The stakeholder has a standing objection to seismic surveys and will continue to campaign for an end to these activities.	Acknowledged objection to seismic surveys. (Event ID: 3701)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3176	2708	The stakeholder highlighted the importance of having a consultation meeting that allows for sufficient time to consider all project plans.	The titleholder responded by thanking the stakeholder for their engagement, offered to arrange a meeting once relevant documents had been finalised, and offered to arrange a webinar tailored to the stakeholder groups needs. The titleholder also provided information on the topics covered in a recent webinar hosted by the titleholder (Event 1889).
3177	579	The stakeholder mentioned of an organisation opposing offshore activities, suggesting potential objections to the project.	Titleholder acknowledged assertion and provided date Team memeber would be in the region for a workshop with council. (Event ID: 579,)
3178	5192	The stakeholder mentioned that it would be left to the FRDC (Fisheries Research and Development Corporation) to decide on a response, highlighting that a group of 15 contributors to FRDC funding had heard the same remarks.	Titleholder responded acknowledging preliminary report and outling that they were unwilling to rely on them in isolation as the currently didn't mee standards of other studies taken into account in the EP. (Event ID: 5239)
3179	3697	The stakeholder noted that the titleholder's commitment to transparency and consultation had been industry leading.	Noted in meeting minutes (Event ID 3697).
3180	2389	The stakeholder objected to the activity on the basis that it is opposed to Australian Government Senate Enquiry.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3181	4189	the stakeholder objects to the gas exploration proposal in the Otway Basin.	The titleholder has noted, recorded and reported the objection to oil and gas activities.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3182	2034	The stakeholder raised concerns about climate change increasing sea water temperatures.	CGG acknowledges claims regarding global warming and has reviewed Environment Plan (EP) Appendix B4 (Regia MSS Preliminary Environmental Impact and Risk Assessment (PEIRA)), which provided preliminary information on the potential impacts and risks to support consultations with relevant persons and provided the context to the subsequent impact and risk assessments. An assessment of atmospheric emissions was conducted as part of the PEIRA which concluded that, while emissions from the use of fuel to power vessel engines, generators and mobile and fixed plant add to the GHG load in the atmosphere which adds to global warming potential, they are relatively small on a state, national and global scale, representing an insignificant contribution to overall GHG emissions. Emissions will be small in quantity and short-term. The emissions from up to three vessels for 90 days will not significantly contribute to climate change. Therefore, impacts to ecological components of the environment from atmospheric emissions from the Regia MSS are not predicted and have not been evaluated further. CGG acknowledges claims regarding the concerns about the future potential for natural gas extraction; however, CGG is not proposing the commercial extraction of natural gas as part of the Regia MSS. The activity presented in the Environment Plan is for a short-term, temporary marine seismic survey. Consequently, this claim is not relevant to the adverse effects of the proposed Regia MSS to which the EP relates and is beyond the scope of this assessment.
3183	3697	The stakeholder raised concerns about titleholders surveying at the same time.	Outlined that a minimum buffer of 40km would be applied between the two activities in the unlikely event they were acquired simultaneously. (Event ID 3697)
3184	1891	The stakeholder requested that the industry come back to the stakeholder with an improved consultation approach.	Titleholder responded providing information on the assesments completed to-date and the SCPP, inviting further involvement in the co-design and co-implementation of the program (Event ID: 256) and requested in-person meeting when team were next in the region after draft environmental impact assessments were made available (Event ID: 2669, 3031)
3185	2831	The stakeholder stated that although the Regia team is working to reduce environmental impacts, and is listening to the community, it is not enough.	The titleholder responded in Event ID 2382, responding to concerns raised and offering ongoing engagement.
3186	1890	The stakeholder stated that there were no benefits of the seismic activity to the community.	This was discussed during the online meeting with the stakeholder, noted, recorded and reported.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3187	1890	The stakeholder stated that they were concerned about climate change and that there is no longer a need for gas.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3188	3697	The stakeholder stated they oppose seismic surveys and will continue to campaign against them.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3189	4234	The stakeholder suggests if CGG and TGS have X overlap in the west, then there will be entire quotas that can't be caught and will need to be compensated for. The stakeholder states the data provided by the titleholder does not provide adequate information for this.	CGG responded in Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would likely overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information.
3190	2255	The stakeholder supports moving away from fossil fuels and expresses concerns about seismic blasting leading to drilling for oil and gas.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3191	2074	The statement asserts that transitioning to net zero does not necessitate new fossil fuel infrastructure or investments, as there is already sufficient gas supply in Australia. It emphasises that the issue lies not in the availability of gas but in the fact that most of it is exported rather than used domestically.	Electricity generation is only one source of gas usage. The latest AEMO Victorian Gas Planning Report stated "Unless new Victorian supply is developed, Victoria is forecast to become a net importer of gas from winter 2027, as Victorian annual consumption exceeds Victorian production (Event ID 2074).
3192	1389	The sufficiency of Australia's gas reserves for the gas as transition phase.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3193	5195	The use of fine-scale fishing data can aid in minimising mutual risks and impacts on fishing activities when shared marine spaces are proposed. It emphasises that the effectiveness of this approach hinges on CGG's willingness to make reasonable efforts to act.	This assertion has been raised multiple times, with the titleholder requesting the stakeholder explain how this data can assist where the currently supplied data can not. At the risk of damaging relationships further, this has not been responded to this time. Please refer to Apendix C1, where consultation with this stakeholder, including this assertion, is described in detail.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3194	2886	There is no "gas shortage," just a shortage of ethics and integrity from the gas cartel offering data in declining gas usage and querying the AEMO conclusion that more supply is needed for domestic demand. LINK provided.	Titleholder acknowledged individual and communities views on the ongoing need for gas in Australia and provided CGG perspective based on current AEMO expected demand and Australian Government Policy drivers. Titleholder advised that matters of national energy policy were not within the purview of the Regia MSS and suggested the individual direct their concerns to their State or Federal members of parliament and the State and Federal Resources minister. (Event ID: 2634)
3195	1673	There is no acceptable level of environmental impact or risk	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.
3196	3386	They have not received feedback on their submission or any indication of intended consultation. After CGG's request for clarification on October 12, the writer confirmed their representation of AMCS in a response on October 13, summarising their concerns. However, they have not received any further communication from CGG about a consultation meeting	Response Event ID 3368 explains that we carefully consider and review each submission, calling on specialists where required, to ensure each point has been understood thoroughly, researched, and any action or measure required put in place. This can be a longer process, and to avoid consultation fatigue, we endeavour to respond when we have all the requested information in place to provide to you.
3197	4794	They state that law mandates that these consultations should be appropriate to their communal interests	Responded in Event ID 4973: CGG's approach to consultation during the preparation of an Environment Plan is fundamentally rooted in legislation, case law and previously accepted approaches by other titleholders. We agree with paragraph 7 of your letter dated 13 June 2024, which addresses s25(2) of the Regulations quoting Santos NA Barossa Pty Ltd v Tipakalippa (Santos) and stating that consultation needs to be "appropriate and adapted to the nature of the interests.
3198	2094	This feedback asserts that the timeline for project approval is 183 days from the date of approval, not from the registration of the project with NOPTA, indicating a potential misunderstanding or miscommunication about the regulatory process.	It appears you may be conflating the roles of our two petroleum regulators, NOPTA and NOPSEMA. Once again, the title instruments required have no bearing on how we manage environmental impacts and risks. Therefore, questions about titles are best directed to NOPTA (Event ID 124).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3199	2100	This statement argues against the proposed drilling by highlighting the shift away from fossil fuels. It emphasises the destruction of the environment and local ecosystems, asserting that this stance is self-evident and does not require further justification.	Gas has successfully been developed in the Otway for 25 years, including the successful co-existence of seismic surveying with the fishing, shipping, port infrastructure, and other marine users. If. you have particular places you'd like to see protected please let us know on this map so that we can acknowledge them and consider how best to protect them (Event ID 2100).
3200	2101	This statement expresses solidarity with Cetaceans (such as whales), emphasising a personal connection and a sense of kinship with these marine animals. It reflects a commitment to their protection, underscoring a belief in the intrinsic value of these species and concern over potential harm to their wellbeing.	Thank you for your comment. We will not carry out our survey whilst Southern Right Whales are present in their reproductive biologically important area. We have meetings with the local traditional owners soon and look forward to hearing their stories, learning about their culture, and protecting sea country (Event ID 2101).
3201	4808	Thousands of signatories against the project.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3202	2275	Total opposition to seismic blasting and oil and gas exploration	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3203	1265	We don't need more oil and gas exploration.	The titleholder has noted, recorded and reported the objection to oil and gas activities.
3204	3746	Will only engage with the titleholder if commercially engaged to do so.	Agreed to engage SETFIA/SSIA for fee-for-service consultation with members to raise awareness about the activity and encourage individual fishers participation in the consultation process. (Events 2930, 3350, 3856, 4039)
3205	4191	You couldn't care less about the environment, global warming or anything else.	The titleholder has noted, recorded and reported the objection to oil and gas activities.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
4377	6412	Stakeholder claims that the lack of consultation with local experts and scientists could lead to adverse effects on the Fairy Penguin colonies and other species.	Event ID 6882 (Doc ID 9096) - CGG consulted with Parks Victoria (PV) during the planning of the proposed survey, meeting on 11/08/2023. The consultation records are available in the EP (Appendix C2). PV raised concerns about the survey's proximity to the Twelve Apostles Marine Park, leading to a refinement of the survey area. Fairy Penguins were not mentioned in this meeting. CGG also consulted with the Warrnambool Coastcare Landcare Network and their Middle Island Penguin Project. A referenced expert in scientific literature was consulted about penguin foraging ecology and at-sea movements. They advised against relying on outdated population estimates for penguins due to rapid ecosystem changes and predation pressures. CGG has sent the F3 assessment from the Regia EP to the Professor for feedback and is awaiting a response. CGG also reached out to DECCA but has not received any information. Regarding the other individuals mentioned, they were consulted, with records available on the public website. The Regia MSS EP includes extensive references to studies by blue whale (EP E7 and F3) and Southern Right Whale experts. Additionally, a professor's work on Fairy Penguins is referenced, along with the Middle Island Penguin Project. CGG based its impact assessment on peer-reviewed literature, including studies by the scientists mentioned, and disagrees with any suggestion that knowledge was bypassed or cherry-picked. The process has been fully transparent, and CGG has actively sought additional relevant literature. CGG also met with Warrnambool City Council to discuss the Middle Island Penguin Project and is looking to support efforts to gather data on penguin populations.
3206	6313	Request for all future correspondence from CGG to be sent to EJA on behalf of GMTOAC.	Responded in Event ID 6429 stating that the project update had been sent to EJA, requesting stakeholder advise the Regia team if this hadn't been received. Explained that relevant persons and individuals who receive the update may have interest in the project separate to their role in an organisation, and in this case it is appropriate for individuals to follow the advice in the project updates and unsubscribe if they so wished.
3207	6315	Concerned about the timing of the decision-making process due to the holiday period and has requested an extension for the decision-making period to a date after 15 January 2025	This assertion was made to NOPSEMA
3208	6324	Concerns that points in submission from relevant person have been misunderstood or being obscured	In Event ID 6318, Regia team provided credentials of experts who made the assessment and asked the stakeholder to specificy the points they feel have not been understood.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3209	6325	Relevant person asserts that the Regia team do not care for their business	This assertion is rejected by the Titleholder. As shown in the consultation records and the EP a large amount of additional research and assessment has been undertaken on the stakeholders request.
3210	6326	The relevant person was concerned that they had not been notified of status updates of the EP re submission.	Event ID 6314 - The Regia team responded that the Regia MSS EP remains under assessment and that CGG would issue an update to all relevant persons on the status of the submission in due course.
3211	6327	Stakeholder was not satisfied with some aspects of the recipient's response to her Fairy Penguin report.	Event ID 6320 - The Regia team encouraged them to provide feedback.
3212	6341	The relevant organisation asserted that consultation has not occurred according to the standard required and therefore is not complete.	Event ID 6430 - The Regia team member clarified their duty under Section 25 of the Regulations, and restated CGG's position on historicial consultation efforts, including CGG's initial contact and request to co-design a consultation process, 660 days previous to the date of the letter.
3213	6341	Acknowledges it has taken time to develop an appropriate protocol for consultation and that they are open to suggestions on how consultation may best occur.	Event ID 6430 - The Regia team member provides feedback on the consultation and negociation protocol, highlighting lack of clarity with how the protocol can be applied to CGG's legislative requirements, the negotiation process, the activity area not being included in the scope, and questions how the protocol can be adapted to the activity (short duration), and how FPIC can be applied in a situation where other traditional owner groups have shared interests. It is stated that the feedback is made without prejudice and should not be taken as an unwillingness for dialogue and understanding of the need for a negotiation process, but rather that a consultation plan was expected.
3214	6341	Claims that the meeting held on 17 February 2024 could not properly and meaningfully progress consultations due to various reasons, including the limited time for each session, the complexity of the information presented, and the lack of specific tailoring to the risks of the proponents' activities in respect of GMTOAC and Gunditjmara functions, interests, and activities.	Event ID 6430 - The Regia team member responds stating that CGG has previously put forward their position regarding previous consultation effects as they relate to Section 25 of the regulations and so repeating them would be redundant. However the dates of initial communication (15 Feb 2023) and passage of time before receiving the promised consultation plan, (532 days) are described.
3215	6341	Objects to the fact that a single 45-minute meeting with only some members of a Traditional Owner group is not sufficient for representative decision-making or to be informed about technical petroleum activities that may have decades of implications for the environment.	Event ID 6430 - The Regia team member responds stating that CGG has previously put forward their position regarding previous consultation effects as they relate to Section 25 of the regulations and so repeating them would be redundant. However the dates of initial communication (15 Feb 2023) and passage of time before receiving the promised consultation plan, (532 days) are described.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3216	6341	Objects to the fact that the recipient has not provided updated versions of the EPs despite previous requests.	Event ID 6430 - CGG refute this claim. Each updated document of the EP has been updated on the Regia consultation hub, despite this not being mandated, and notification of this sent to all relevant persons. CGG have records that show GMTOAC and EJA staff both received and opended these notifications.
3217	6341	Requested information on whether the CGG agree to fund the costs of consultation, obtaining independent technical advice, and a strategic regional environmental and cultural assessment.	Event ID 6430 - The Regia team responded that CGG had no objection to payment of sitting fees, requested to be made aware of any fees the organisation, or any other party, sought to charge before any engagement. CGG requested that discussions about the cost of ongoing consultation should be tabled.CGG was open to discussion about what information the organisation may need to comission, but could not agree to the clause of their consultation and negotiation protocol that was tantamount to providing a blank cheque.The Regia team also stated that CGG was open to discussion about relevant strategic regional environmental and cultural assessment but that it was premature to offer a view on their agreeement to such a scope of work without initiating the co-design of the consultation process.
3218	6341	The relevant organisation requested CGG's views and comments on their Consultation Plan by 6 December 2024, including whether CGG was open to negotiation in respect of agreement-making with the organisation to discuss its activities in the Otway Basin.	Event ID 6430 - Titleholder responded clarifying between Negotiation and Consultation and outlined their believe that the provided Consultation and Negotiation Protocol blends the differences between consultation and negotiation creating a lack of clarity in how CGG is best to progress engagement whilst building respectful relationships. The titleholder stated that the feedback was made without prejudice and should not been seen as unwillingness to continue dialogue and understand the need for a negotiation process.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3219	6410	The sender asserts that the information provided by CGG is inconsistent and confusing and does not provide comprehensive or comprehensible information to relevant persons and the community.	In Event 6529, Regia team member states that the claims of inconsistency, between the EP and the consultation hub, are evidence of genuine consultation, with effective consultation and management processes, undertaken over an extended period of time. The comment that the stakeholder pointed to, was made when the previous Southern Right Whale (SRW) Conservation Management Plan was in effect, with survey timing scheduled for January, February, and March. Since then, the SRW National Recovery Plan was updated, changing the area listed as critical to the species' survival, particularly regarding the proposed Regia MSS area. As a result, the survey design was modified to increase separation from the reproductive BIA and the timing adjusted to align with transition periods between SRW and Blue Whale usage in the Otway region. To ensure transparency, CGG has published each version of the Environment Plan and consultation materials over the past 20 months.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3220	6412	Asserts that the consultation process for the Regia MSS project has not included scientific experts with local knowledge on Fairy Penguins	Event ID 6882 (Doc ID 9096) - CGG consulted with Parks Victoria (PV) (Event ID 2282)during the planning of the proposed survey, meeting on 11/08/2023. The consultation records are available in the EP (Appendix C2). PV raised concerns about the survey's proximity to the Twelve Apostles Marine Park, leading to a refinement of the survey area. Fairy Penguins were not mentioned in this meeting. CGG also consulted with the Warrnambool Coastcare Landcare Network and their Middle Island Penguin Project. A referenced expert in scientific literature was consulted about penguin foraging ecology and at-sea movements. They advised against relying on outdated population estimates for penguins due to rapid ecosystem changes and predation pressures. CGG has sent the F3 assessment from the Regia EP to the Professor for feedback and is awaiting a response. CGG also reached out to DECCA but has not received any information. Regarding the other individuals mentioned, they were consulted, with records available on the public website. The Regia MSS EP includes extensive references to studies by blue whale (EP E7 and F3) and Southern Right Whale experts. Additionally, a Professor's work on Fairy Penguins is referenced, along with the Middle Island Penguin Project. CGG based its impact assessment on peer-reviewed literature, including studies by the scientists mentioned, and disagrees with any suggestion that knowledge was bypassed or cherry-picked. The process has been fully transparent, and CGG has actively sought additional relevant literature. CGG also met with Warrnambool City Council to discuss the Middle Island Penguin Project and is looking to support efforts to gather data on penguin populations.
3221	6412	Asserts that the decision-making process regarding the project should not be left solely to CGG and needs to be closely overseen by NOPSEMA.	Throughout the consultation process, including Event ID's 1481, 1731 and 1499, the relevant person has been informed of the consultation and assessment process, including NOPSEMA's role as regulator.
3222	6420	Stakeholder suggested they may need information explained to them, regarding their concern around potential regional population impacts of seismically induced krill mortality within the ASA.	In Event ID 6414, Regia Team member agreed with stakeholder to hold meeting with the Regia marine science team to discuss matters further. This meeting is Event ID 6890
3223	6432	Asserts that CGG was never intending to blast the initial, larger ASA and always intended to reduce it based on public feedback.	In Event ID 6815, The Regia team stated the reductions made during consultation, planning, and environmental assessment processes, are significant and pertain to areas that might be surveyed in the future. These reductions clearly contribute to minimizing impacts and risks, which is a requirement of the activity design.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3224	6432	Asserts that CGG has been insincere, minimising accountability rather than engaging in meaningful environmental stewardship.	Regia has dedicated over 3,000 pages to understanding and developing a comprehensive environmental management program for the area where the Regia MSS will take place. The program includes an extensive and detailed discussion of the ecosystem, with a particular emphasis on the "complexity of population and ecosystem dynamics in the region." This work is supported by hundreds of citations. Additionally, Regia has conducted two years of community consultation, which is still ongoing. (Event ID 6815)
3225	6505	The sender questions the recipient's understanding of the agreed action items from their meeting.	The Regia team noted in Event ID 6518 that they did not agree that the stakeholders action item (as per Event ID 6513) was the one agreed upon, however still committed to providing the full review of the submission (Event ID 6815)
3226	6507	The sender questions how the NOPSEMA assessment process integrates public submissions and maintains transparency at this stage	Ongoing consultation processes was discussed with the relevant person via phone call (Event ID 6874). In addition, the following is included in project updates: Ongoing consultation will continue with relevant persons, organisations and authorities, and updates provided of any changes or new information as it becomes available. Relevant Persons are invited to contact us at any time with any new information they have concerning the project.
3227	6512	The relevant person expressed concern about the lack of interest in his model and its supporting material.	Event ID 6517 - The Regia team responded that they would like discuss the relevant person's calculations, which occurred in the online meeting (Event ID 6890) later that day.

3228	6512	The relevant person asserted that the Regia team's explanation of the precautionary principle needs clarification as there were many uncertainties.	Event ID 6517 - The Regia team discussed the precautionary principle. They responded that the quote the relevant person had pulled is from the NOPSEMA Safety Case Guidance and has not come from Environment Plan guidance. It also encourages a precautionary approach and does not apply the precautionary principle as defined in Section 391(2) of the EPBC Act. To be clear, taking precaution in impact/risk management and legally complying with the EPBC Act are two related and different things. The Regia team stated that they had routinely applied the former and assessed the latter in the EP, which I will provide you some reading on below. NOPSEMA Environment Plan Guidance focuses on implementing the legal definition. s391(2): The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage. The Regia team provided a link to an article which the relevant person may find helpful in understanding this and the two conditions precedent for its application: Federal Court confirms interpretation of the precautionary principle | Lindsay Taylor Lawyers Federal Court confirms interpretation of the precautionary principle Posted on October 28, 2022 by Liam Mulligan 11. Federal Court confirms interpretation of the precautionary principle. The Federal Court of Australia in Bob Brown Foundation Inc v Minister for the Environment (No 2) [2022] FCA 873 has confirmed how the precautionary principle is to be interpreted and applied under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) ('EPBC ... www.lindsaytaylorlawyers.com.au They also stated that there is a distinction drawn between "uncertainty" and "scientific uncertainty" that is relevant to consider here. The word "uncertainty" itself has slightly different meanings when used in everyday speech versus a scientific context. In scientific discourse, it conveys the degree to which something is known. In the vernacular, the word conveys rather the sense of not knowing. The difference is subtle, but important. Regardless, there are two preconditions to satisfy when considering whether 'to postpone a measure to prevent degradation' and the case we have put forward in the Regia EP is that, with the measures put in place, there is no threat of serious or irreversible environmental

Feedback ID	Event ID	Feedback Summary	Titleholder Response
			damage from the Regia MSS. This renders any discussion about the scale of uncertainty moot in relation to application of the legally defined precautionary principle.
3229	6513	The relevant person asserted that CGG's logic around regional scale impacts of Regia MSS on larval krill within the CGG EP has some critical flaws, where their model did not attempt to quantify such effects and indicted the multiplier effect of currents (between 0 and 1 knot) on krill larvae mortality through the ASA is about 5x.	Event ID 6518 - The Regia team responded that they did not agree with the relevant person's written conclusion. They stated that they had considered the relevant person's paper and model and committed to providing them with more detailed feedback to understand its utility in an impact assessment. The Regia team requested more information on the model, all the references and underlying data used in the model including the code and calculations, and the numbers used for what appared to be mortality and reproduction estimates with references.
3230	6520	The relevant organisation asserted they did not have enough time to discuss the requested material from the Regia team prior to the meeting on 15 February 2025.	Event ID 6521 - The Regia team provided the material requested by the relevant organisation and stated that most of the information had been previously given to them or had been available online since September 2023. They stated that any changes are as result of: - The passage of time. - Incorporating new science and literature (such as the Gunditjmara Nyamat Mirring Plan). - Activity design reductions and/or improvements to management measures. - Responses to public comment and ongoing consultation. - Feedback from NOPSEMA's assessment.
3231	6520	The relevant organisation asserted that 'appropriate and adapted' consultation for them included consultation at duly convened meetings, with information in the format requested being received in advance of such meetings.	Event ID 6521 - The Regia team responded to the assertion made concerning the presentation and accessibility of information with a reiteration that throughout the consultation process, CGG had repeatedly offered tailored and bespoke communications, including numerous requests to meet with the relevant organisation to discuss their needs. In the absence of requests or feedback being received, CGG had endeavoured to provide information in multiple formats, including summarised information sheets and recorded webinars, and also made these publicly available, along with multiple forms of contact to request alternative communications. They provided an example of their compliance to the provision of information when a request was made: CGG was asked at the meeting in February 2024 to supply their assessment of impacts to the OUV of the Budj Bim Cultural Landscape, and fact sheets on Glass Eel and Southern Right Whale, which was promptly produced and given.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3232	6520	The relevant organisation asserted that the information requested is necessary to be reasonably informed about the proposed activities under the EP and its potential consequences on organisations functions, activities, and interests. They also assert that it is the duty of the titleholder to present this information to relevant persons in an appropriate, adapted, and meaningful way to give effect to the objects of consultation.	Event ID 6521 - The Regia team responded to the assertion made concerning the presentation and accessibility of information with a reiteration that throughout the consultation process, CGG had repeatedly offered tailored and bespoke communications, including numerous requests to meet with the relevant organisation to discuss their needs. In the absence of requests or feedback being received, CGG had endeavoured to provide information in multiple formats, including summarised information sheets and recorded webinars, and also made these publicly available, along with multiple forms of contact to request alternative communications. They provided an example of their compliance to the provision of information when a request was made: CGG was asked at the meeting in February 2024 to supply their assessment of impacts to the OUV of the Budj Bim Cultural Landscape, and fact sheets on Glass Eel and Southern Right Whale, which was promptly produced and given.
3233	6526	Concerns about the consultation process, including milestones and timeframes, consultation costs, confidentiality and intellectual property requirements	Event 6528 - The Regia team responded to the relevant person's request for information regarding the Regia Marine Seismic Survey (Regia MSS) consultation. They acknowledged the additions to the meeting agenda for 15 February 2025 and reiterated the need for written feedback on specific points from previous correspondence to prepare adequately.
3234	6526	Need for further technical advice in respect of the EP	Event 6288 - Titleholder recognised relevant persons perception of inequity in consultation process and outline regulatory requirements of the titleholder in the consultation process.
3235	6526	Expressed concerns about the ability of their client to navigate the volume of material without support.	Event 6528 - Titleholder responsed querying relevant persons intent around large request for information whilst raising concern about the requirement to navigate large volumes of information.
3236	6526	The sender raises concerns about whether the consultation process has provided sufficient information and a reasonable period for consultation.	Event 6528 - Titleholder responded advising that both sufficient information and a reasonable period for consultation had been provided, as evidenced in the consultation records.
3237	6880	The relevant person did not consider what had happened prior to their meeting with the Regia team on 14/02/25 consultation.	Event ID 6880 - The Regia team responded in-meeting and discussed co-design for the ongoing consultation process and stated they were happy to be guided on the relevant person's preferred method of consultation.
3238	6880	The relevant person was concerned that the Regia team were trivialising what was happening on Country.	Event 6880 - The Regia team responded in-meeting and provided overview of what CGG had undertaken to reduce impacts and risks of activity, specifically impacts to whales.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3239	6880	The relevant person was concerned that the EP only focused on 'big-ticket' items like whales and ignored the effects of seismic on other species.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act.
3240	6880	The relevant person said there was a genocidal hierarchy in picking and choosing which species live and dies.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act. The hierarchy is something in place by the Australian government. In terms of the effects of seismic, they stated that there are no mortal effects predicted to these species. A large majority are affected in a behavioural sense or not affected at all.
3241	6880	The relevant person wanted to ensure that the Gunditjmara people were protected environmentally.	Event ID 6880 - The Regia team responded in-meeting and discussed risk pathways on Sea Country. Discussed accidental oil spills, release of waste, invasive marine species and fauna interactions. Discussed impact pathways i.e. atmospheric emissions, light emissions, physical presence. Discussed planned discharges. In relation to underwater sound, there are 2 categories – continuous noise and impulsive sound. Explained data can take 12-18 months to process before they could get an image of rock layers.
3242	6880	The relevant person asserted that the finances of the project need to be spoken about in true context.	Event ID 6880 - The Regia team responded in-meeting and discussed confidentiality and intellectual property requirements. Explained sensitive information requirement and our obligation to make it private. Explained we have to submit it to regulator but it will fall under the SIR. We do not know what is sensitive until we are told. Explained the EP is published and made publicly available. If the information is reasonably publicly known, that information would be made public.
3243	6880	The relevant person asserted that the Otway region and Sea Country was unhealthy.	Event ID 6880 - The Regia team responded in-meeting with an overview of the Otway region and explained that it is a productive and dynamic environment holding a variety of species.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3244	6880	The relevant person was concerned that, in relation to the SCPP, their contribution would be part of the design rather than having it be something brought to the table to trigger consultation.	Event ID 6880 - The Regia team responded that they had put forward their case with the regulator and are continuing to engage with the organisation as there was a particular process they had to follow. Explained that they had engaged with Traditional Owners across the Otway Region and that the Regia team respect the relevant person's values and that it would be beneficial to exchange information on those values. Explained the SCPP could be a vehicle to discuss shared values.
3245	6880	The relevant person was concerned that an email sent to them was regarded as consultation.	Event ID 6880 - The Regia team responded in-meeting with an explanation of consultation efforts made with the organisation since 15th February 2023 and that they had an obligation to provide copy correspondence to NOSPEMA.
3246	6880	The relevant person was concerned that CGG would profit from the information they provide through consultation.	Event ID 6880 - The Regia team explained in-meeting that if the relevant person tells them the information they provide is sensitive, CGG and NOPSEMA are not allowed to publish it. The Regia team stated that the data licensed by CGG is only sub-surface data/scientific data from the survey.
3247	6880	The relevant person was concerned about impact of mother nature on the 90 day activity limit.	Event ID 6880 - The Regia team responded in-meeting that there may be times when operation would cease due to conditions.
3248	6880	The relevant person asserted that information provided by the Regia team needs to be simple, easy to understand and brought to the broader group so that everyone in the organisation has the same information.	Event ID 6880 - The Regia team responded in-meeting that some questions that have been previously raised by the organisation are difficult to respond to without providing a scientific response and using technical language. Provided the example of decibel thresholds. The Regia team explained that if someone had a scientific question, they would respond to that person and discuss the easiest way to share the information with the organisation. The Regia team also stated that every document had been made publicly available and they want to ensure everyone has access to the information. Offered a workshop to provide information on how to work the EP and locate information.
3249	6880	The relevant person asserted that future meetings with their organisation should be held on a weekend.	Event ID 6880 - The Regia team responded in-meeting that meeting over a weekend would be suitable with prior notice.
3250	6880	The relevant person asserted that they have a preference for face-to-face meetings/hybrid meetings.	Event ID 6880 - The Regia team responded in-meeting that during the next meeting they would allow more time to go into a deep Q&A regarding the organisation's concerns.
3251	6623	Asserted that they had not been able to identify answers to questions raised in the consultation materials provided by CGG.	Event ID 6859 - The Regia team responded by providing responses to questions raised with a letter annexure. Noted unease in attempting to answer detailed technical and scientific questions in the requested “plain non-technical language”, but stated that had done their best to ensure that answers are in a form that is appropriate and adapted to the audience.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3252	6702	Asserted that the Sea Country Protection program must be co-designed and led by Gunditjmara and/or with Traditional Owners of another adjacent Country.	Event 6880 - Regia team responded by acknowledging past consultation and advised that the Regia team have engaged with TO's across the Otway region as a whole. Titleholder shared that they acknowledge and respect your values and therefore need to exchange information on those values. Titleholder suggested that if relevant person did not think the SCPP was not the best vehicle to protect Sea Country they were invited to make alternative suggestions
3253	6690	Asserted that it would be beneficial for all parties to be fully informed on the proposed activity and its progress.	Event ID 6794 - The Regia team responded that at the start of consultation on the Regia MSS, CGG recognised the need for transparency in order to build trust with relevant persons. One aspect of this has been to publish the NOPSEMA assessment letters, which they had done on the web site and notified relevant persons via a project update. They stated that as this is not something that other titleholders do, and as the letter is essentially private correspondence meant for the addressee (CGG) only, there is a process that has to be undertaken before we publish the correspondence.Once the correspondence was ready to be published, the Regia team would notify relevant persons via a project update, as they had done previously.
3254	6879	Asserted general opposition to seismic activities.	Event ID 6879 - The Regia team responded in-meeting and provided project updates by way of information.
3255	6878	Asserted that the organisation is saturated by consultation requests and that engagement with the Regia team was about listening and understanding.	Event ID 6878 - The Regia team responded in-meeting with an overview of the SCPP and initiatives that could be run through the SCPP.
3256	6878	Asserted that their organisation requires a lot of lead time and need to be involved at the beginning of the process.	Event ID 6878 - The Regia team responded in-meeting and discussed the consultation position put forward to the regulator. Stated that they hoped the Eastern Maar people would understand the process and stated that they would be kept informed.
3279	6748	Relevant person stated that they had followed up seeking a response to questions made on compensation a number of times and were seeking a response	Event 6722 - Responded to relevant person clarifying the commitment to investigate the matter and advised the work on this was still ongoing a nd requested patience. Provided brief update on search for additional research that supports the FRDC findings and requested if the relevant person was able to access/ provide any other peer reviewed literature to support the claim

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3281	6749	If OMICC is correct and there are no impacts, providing compensation after the survey has no cost and should be agreed to in the scheme.	Event 6724 - OMICC announces that the latest version of the OMICC Otway Adjustment Protocol has been published, along with a video briefing for fishers, which can be accessed through a provided link. In the briefing, OMICC confirms that, following the relevant persons feedback, a "claim period" and a "lodgment period" have been incorporated into the definitions of the protocol. The claim period is set to 30 days after the end of any activity, while the lodgment period extends up to 6 months after the end date of any activity. OMICC further informs the relevant person that the OMICC Founders reviewed the request for claims up to 6 months after an activity. However, the decision was made to adopt a 30-day claim period, as this duration resulted in a positive compensation outcome for fishers affected by the Gippsland survey in 2019.
3282	6749	Small coastal towns rely on the fishing industry.	Noted, compensation protocol put in place.
3283	6759	The relevant person requests a response, emphasizing the need for an in-person meeting at the offices in Brighton. They also note that this is the third request for a meeting.	Event 6704 - OMICC acknowledges receipt of an email, which appears to be the first message received from the relevant person in the OMICC project inbox. They are seeking confirmation about whether the email was intended for the Otway Marine Industries Co-Existence Cooperative (OMICC) or one of the founding titleholders, CGG (Regia MSS) or ConocoPhillips Australia (Otway Exploration Drilling Program). If the email was meant for a specific titleholder or project, OMICC requests clarification so they can forward the message to the appropriate team.
3285	6594	Relevant person criticised VFA management of fishery and consultation	Event - 6595 Titleholder responded to relevant person outlining approach to assessment of fisheries and SRL, including assessment of mitigiations in place and advised the would not comment on VFA matters.
3286	6592	Relevant person replied to campaign sms - noted that seismic companies had not been honest with rock lobster fishermen.	Event ID 6595 - The titleholder responded that they could not comment on VFA matters and that they had undertaken a thorough assessment of potential impacts on SRL, including a further assessment on the effectiveness of the mitigations in place.
3287	6875	Asserted that they had experienced a fishing decline and suspected that seismic blasting was the reason.	Event ID 6875 - The Regia team responded in-meeting. Discussed that they had completed some analysis and presented data on long-term catchability and went through the analysis with the stakeholder.
3288	6875	Asserted that a lot of commercial fishers have had to 'sell-out' as a result of historic activities.	Event ID 6875 - The Regia team responded in-meeting. Explained that the Regia survey area had been reduced and provided an update on timeframes and duration.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3289	6875	Concerned about loss of fishing quota and questioned why it is commercial fishers that are wearing the impact.	Event ID 6875 - The Regia team responded in-meeting and explained that there is an impact of the seismic activity on lobster associated with their righting reflex. Discussed that they needed to look at what the resource tolerates. Discussed research boat in Tasmania and directed relevant person to recent research paper "Boom, Shake the Room."
3290	6876	Relevant person was concerned about how the protocol had been amended without fisher consultation.	Event ID 6876 - The Regia team responded in-meeting and explained that the protocol was open for comment to commercial fishers. Outlined the feedback received and the amendments made to the adjustment protocol as a result of consultation.
3291	6876	Raised concern about quota reduction.	Event ID 6876 - The Regia team responded in-meeting with discussion regarding egg rate production in the western fishery.
3292	6876	Asserted that they were dissatisfied the Regia team were not acknowledging their request for retirement of quota.	Event ID 6786 - The Regia team responded in-meeting and stated they had spoken with SIV and explained why retirement of quota is not the right way to pay compensation. Explained that the quota holder is not always the fisher and that it was the Regia team's position that the person on the water should be compensated. The Regia team also discussed anti-rivalry laws.
3293	6876	Concerned that tests showing effects on puerulus and soft shell requested by the relevant person had not been completed.	Event ID 6786 - The Regia team responded in-meeting and discussed UTAS study which looked into effects of seismic during different stages of juvenile development. Explained that the sample size was very small. Study showed that there is a repairing period.
3294	6988	Asserted the test claim button on the online form was not working.	Event ID 6990- Titleholder responded with a copy adjustment protocol which had hard copy claim forms attached. The Titleholder also provided the stakeholder with login details to access the online test claim form and supplied a step-by-step screenshot guide for how to log in.
3295	6966	Asserted that they remained committed to consulting with CGG about the proposed activity in line with their consultation and negotiation protocol.	In Event ID 7022, CGG responded acknowledging this and confirming that they also remained committed to consultation, as per Section 25 of the Regulations.
3296	6966	Asserted that the SCPP and strategic regional environmental cultural assessment, including any funding required to pursue these initiatives in a culturally competent way, would be the subjects of substantive consultation moving forward.	In Event ID 7022, CGG confirms it will seek to follow the Gunditjmara Consultation and Negotiation Protocol, while also meeting its legal obligations under Section 25 of the Regulations.
3297	6966	Asserted that CGG had previously represented that it would not commence certain activities without its SCPP in place.	In Event ID 7022 CGG encouraged GMTOAC and Gunditjmara to take part in the Sea Country Protection Program, which supports the identification and management of new, activity-relevant information through collaboration with participating First Nations people.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3298	6966	Asserted that though all information prepared by CGG was provided to Gunditjmara ahead of time using their Cultural Information Management System, there was not enough time to discuss the information sheets and other requested materials prior to the 14 February 2025 meeting.	Noted
3299	6966	Asserted they were grateful for the efforts made by CGG to prepare consultation materials.	Noted
3300	6966	Asserted that receiving the finalised PowerPoint presentation one week before the native title meeting did not allow the relevant person enough time to consider materials and the structure of the 14 February 2025 session did not afford the time to discuss agenda items in full.	In Event ID 7022, the titleholder expresses their support for in-person, full group meetings with Gunditjmara, which include open-ended Q&A sessions.
3301	6966	Concern that if the documents provided by CGG remain unchanged, it will pose challenges for the relevant person to effectively participate in consultation.	CGG reaffirmed their willingness to make changes to the documents but requested further clarity regarding the format and expectations for future documents, particularly when technical questions are involved. CGG also noted its efforts to balance brevity and substance in the information sheets, aiming to be respectful while avoiding oversimplification that could appear dismissive (Event ID 7022)
3302	6966	Asserted that consultation be conducted via dedicated, Gunditjmara-specific, full group meetings.	In Event ID 7022, the titleholder expresses their support for in-person, full group meetings with Gunditjmara, which include open-ended Q&A sessions.
3303	6966	Asserted that their client was disappointed by the tone and insinuations made by CGG and would write to CGG separately.	Titleholder recieved separate correspondance from GMTOAC (Event ID 7004) and responded in Event ID 7023.
3304	7004	Asserted that they felt the meeting with CGG on 14 February 2025 had gone well and was a positive first step towards meaningful consultation with Gunditjmara.	In Event ID 7023, Titleholder extended their gratitude for the meeting.
3305	7004	Asserted that they were disappointed with CGG's letter of 4th March 2025 as they felt it questioned their right to be consulted in the manner that is appropriate and adapted to their interests and their right to independent advice.	CGG expressed regret that its correspondence was perceived as questioning the approach to receiving independent advice, clarifying that this was not its intention and reaffirming a commitment to respectful and collaborative engagement. CGG also reiterated the need for clarity regarding correspondence involving EJA as an intermediary, emphasising that its request for transparency aligns with legal obligations to report consultation details to NOPSEMA (Event ID 7023)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3306	7004	Asserted that CGG's questioning of their right to ask detailed questions is not appropriate and not appreciated in the light of efforts to build a relationship through consultation.	CGG emphasised that their request for clarification should not be seen as a refusal to provide the requested information, but rather a need to ensure they meet GMTOAC's expectations. CGG reiterated their previous offer to provide information through various formats such as webinars, videos, or one-on-one meetings. CGG also highlighted their commitment to transparency by publishing all iterations of their Environment Plan, including external assessments and correspondence with NOPSEMA, in order to build trust, and expressed disappointment at being assumed to withhold independent advice. CGG expressed disappointment that GMTOAC has chosen not to share the preliminary technical advice referenced in the EJA letter of 6 February 2025, which is now considered confidential. CGG noted that sharing this advice would support mutual understanding and help achieve better environmental outcomes, particularly given the alignment with GMTOAC's own Consultation and Negotiation Protocol. CGG also highlighted a disconnect between written requests from representatives and the questions raised during direct engagement, with some Gunditjmara attendees appearing unfamiliar with the proposed activity (Event ID 7023).
3307	7004	Concern that if the documents provided by CGG remain unchanged, it will pose challenges for the relevant person to effectively participate in consultation.	CGG clarified that they had not changed their position on consultation with GMTOAC and Gunditjmara and were not making the insinuations claimed. However, they emphasised their legal obligation to provide NOPSEMA with a consultation report detailing the consultations undertaken, and therefore, it was reasonable for them to request transparency and clarity about the specific individuals they had consulted with (Event ID 7023).
3308	7007	Relevant person asserted there had been misunderstandings with information and communication between CGG and another stakeholder which led to unfortunate assumptions by CGG.	CGG clarified that while they cannot discuss specific private correspondence, they wanted to provide insights into their consultation process and scientific practices. They explained that during consultation, all stakeholders are invited to share information, but any received information must be validated for relevance and accuracy, similar to the peer review process in scientific research. Peer review ensures quality, credibility, and error detection. CGG acknowledged that feedback can be challenging to receive but is crucial for transparency and improving future work. They concluded by expressing appreciation for the stakeholder's participation and emphasized their commitment to protecting the environment while managing the proposed activity (Event ID 7024)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
3309	7007	Asserted that there were a number of concerns about Fairy Penguins that require attention, and they will write to us with these in due time.	In Event ID 7024, CGG responded to comments about Fairy Penguins by encouraging the provision of new relevant information for their marine science team's assessment.

Annex 5 – Information Received

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1000	168	Stakeholder noted attached information doesn't provide details of survey effort, locations or proximity to Australian Marine Parks.	Appendix E1 Section 4 and 8.	The titleholder responded with the relevant documents and shape files for both the proposed activity and environmental planning. The titleholder confirmed that they were refining the project they engaged with stakeholders therefore changes/refinements to the areas or plans may occur. (Event ID: 559, Document ID: 333)
1001	405	Provided secondary email contact. Advised email to resend initial letter. Could not confirm receipt of initial letter, advised the original email is a business and email could have been deleted.		Correspondence was sent to the revised email address provided; receipt confirmed via phone call (Event ID 3914).
1002	428	Highlights the ecological importance of the area as a significant birthing and migration site for endangered southern right whales, which visit annually.	E7 Section 4.3.6, F3 Section 4.1	We are about to start our environmental assessments and will include details about how we plan to protect southern right whales and minimise our interference with local fishers. Keep informed of updates by registering for our newsletter and our webinars (Event ID 428).
1003	529	FIA's are marine conservation, advocacy and community support in subject areas, including being residents in affected communities.		Information used to inform consultation process
1004	537	Highlights that numerous scientific studies have investigated the impacts of seismic surveys, specifically noting that several studies have been conducted in the region of Tasmania and King Island.		The information was noted. No further action required.
1005	560	Recommendation to continue to engage with relevant councils as key stakeholders		Advised that we have engaged with local councils adjacent to the proposed activity area. No further action required.
1006	626	Regia MSS's brief flyer only mentions the presence of Pygmy Blue Whales	E7 Section 4.3.5, F3 Section 4.2	The titleholder informed the stakeholder that a full environmental assessment utilising information sources provided by the stakeholder was being conducted, and provided a link to the project website where the documents could be found (Event ID 724).
1007	626	In 2019 and 2023 at least this region was a birthing and nursery area for Pygmy Blues and Sperm Whales (the data is not formally published in journals at this stage, but is on the biological database of the Department of Environment).	Appendix E7 Section 4 and 8, F3 Section 4.2	Advised that no validated scientific data exists to confirm presence of sperm whale birthing and nursery areas in the area where the Regia MSS will occur. All relevant data on Pygmy Blues has however been assessed.
1008	648	Advised of email address for staff member that could be contacted in their place.		The information was noted. No further action required.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1009	653	The stakeholder requests , the EP must: identify and manage all impacts and risks on Australian marine park values (including ecosystem values) to an acceptable level and has considered all options to avoid or reduce them to as low as reasonably practicable.	D4, E1	CGG has assessed risks and impacts to Marine Parks in Appendices D4 and E1 of the EP. The closest marine protected area is the 12 Apostles State Marine Park. CGG will implement anactivity limitation with no operational activity within 5 km of this Park
1010	653	The proposed operational area intersects the West Tasmania Canyons and the Bonney Coast Upwelling. Both features are areas of high productivity and aggregations of marine life	A2, F3 Section 4.13	The active source area does not overlap with the West Tasmania Canyons and the Regia MSS will not be operating during the summer months of high productivity in the Bonney Upwelling.
1011	653	The operational area is adjacent to, and appears to overlap, recent seismic activities undertaken by ConocoPhillips and is near another proposed seismic activity.	A2, F1	CGG undertook a cumulative impact assessment to ensure other projects in the Otway (see Appendix F1). There will be no overlap with drilling activities and the Regia MSS. The overall cumulative impact is considered low.
1012	653	The operational area is adjacent to and overlaps the following biologically important areas:Presence of Southern Rock Lobster and Giant Crab within the proposed acquisition area, including previously excised areas in the recent ConocoPhillips acquisition.	E1, E4 Sections 4 & 8, F3 Sections 4.5 & 4.6	CGG has acknowledged the presence and assessed the impacts of seismic sound to Southern Rock Lobster, and Giant Crab in relation to the acquisition area across the EP including Appendices to E1, E4, and F3.
1013	653	The operational area is adjacent to and overlaps the following biologically important areas: Pygmy Blue Whales' seasonal feeding aggregations are supported by upwelling systems located at the Bonney Upwelling system and adjacent waters off South Australia and Victoria. Whales predominantly occur in these regions from November to May. Research to date has found that Pygmy blue whales occupy the western are of the Bonney Upwelling system in the Eastern Great Australia Bight and adjacent to the Kangaroo Island canyons from November to December – with high variability of abundance between and within seasons – 'Conservation Management Plan for the Blue Whale'.	E7 Section 4.3.5, F3 Section 4.2	CGG has acknowledged the presence and assessed the impacts of seismic sound to Pygmy Blue Whales in relation to the acquisition area across the EP including Appendices E7 and F3.
1014	653	The operational area is adjacent to and overlaps the following biologically important areas: Foraging areas for numerous protected seabirds.	E5 Section 8	CGG carried out a full impact assessment on seabirds (see Appendix E5) that may be undertaking biologically important areas in the vicinity of the operational area, and the predicted levels of impact were below acceptable levels of impact.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1015	653	The operational area is adjacent to and overlaps the following biologically important areas: Core use and range area for the Southern Right Whale ('Draft National Recovery Plan for the Southern Right Whale'). Impacts within the species' range is an identified risk in the plan emphasising the need to ensure injury and, or, disturbance is minimised, including from the impacts from anthropogenic underwater noise – particularly as whales demonstrate site fidelity.	E7 Section 4.3.6, F3 Section 4.1	CGG has acknowledged the presence and assessed the impacts of seismic sound to Southern Right Whales, in relation to the acquisition area across the EP including Appendices E7 and F3.
1016	653	The EP must clearly demonstrate that the activity will not be inconsistent with the South-east Commonwealth Marine Reserves Network Management Plan 2013-2023	B2	CGG as part of its obligations ensures that its EP complies with all relevant legislation that applies to offshore activities. These are designed to ensure the protection and preservation of the marine environment and the sustainability of its resources. This is consistent with the SECMRN management plan which was proclaimed for the purpose of protecting and maintaining marine biodiversity, while allowing for the sustainable use of natural resources in some areas, and contributing to the NRSMPA.
1017	653	Spatial avoidance of fishing grounds or temporal avoidance of fishing seasons is recommended.	A2	The titleholder responded with an explanation that the Regia MSS team are consulting with fishers to identify appropriate controls to manage impacts to fishers and stock. Based on feedback to date, the following exclusion zone will be implemented: No acquisition in water depths of less than 50m as this is protective for abalone divers, abalone, and other recreational marine users. (Event ID: 1751)
1018	653	Noted the acquisition area is 37 km from Nelson Marine Park and 33 km from Zeehan Marine Park which form part of the South-east Marine Parks Network. If activity is not effectively managed, it could affect the parks' natural, social and economic values.	A2, E1	There is no overlap with the acquisition area and Nelson Marine Park and Zeehan Park
1019	653	Noted planned activity does not overlap an Australian Marine Park. As such, there are no licencing requirements from the Director of National Parks.		The information was noted. No further action required.
1020	653	Information on the values for the marine parks can be located on the Australian Marine Parks Science Atlas.	E1 Section 8	CGG has considered this information in its Physical Presence Impact Assessment in E1.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1021	653	Further information for Zeehan and Apollo Marine parks can be found in the South-east Commonwealth Marine Reserves Network Management Plan 2013-2023.		The information was noted. No further action required.
1022	653	Asked Regia MSS to take note of the guidance note created by the stakeholder and NOPSEMA outlining what titleholders need to consider and evaluate.	E1	CGG has consulted with the Director of National Parks.
1023	781	Stakeholder provided details of their functions, interests and activities: swim and/or surf and/or dive and/or fish and/or kayak and/or sail and/or watch wildlife in the local area.	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1024	788	***Redacted***	E8	***Redacted***
1025	792	Stakeholder is now retired so provided contact details for the person acting in the role.		The information was noted. No further action required.
1026	820	***Redacted***	E8	***Redacted***
1027	823	Stakeholder provided details of their functions, interests and activities: swim and/or surf and/or dive and/or fish and/or kayak and/or sail and/or watch wildlife in the local area.	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1028	823	Stakeholder provided details of functions, interests and activities: family run a local business that relies on tourism.	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1029	832	The stakeholder informed the titleholder of their role which is the collection of Marine Debris (plastics) along our ocean beaches. They want to be assured that the activities out at sea will not result in increased rubbish washing up.	D1	CGG has considered this information and has included a risk assessment in the EP (Appendix D1) to ensure the accidental release of materials from the vessel is minimised. CGG will have a Garbage Management Plan, Streamer Recovery Units, Garbage Record Books, and OVID style inspections to ensure compliance and to ensure no waste from the activity washes up on any local beaches.
1030	835	As a member of Portland Field Naturalists Club, the stakeholder watches whales and seals and also pelagic and shorebirds along the southwest coast of Victoria	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1031	840	Stakeholder provided details of their functions, interests and activities: swim and/or surf and/or dive and/or fish and/or kayak and/or sail and/or watch wildlife in the local area.	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1032	852	***Redacted***	E8	***Redacted***
1033	886	Stakeholder mentioned the Southern Right Whales that migrate to Warrnambool every year to give birth.	E7 Sections 4.3.6 and 8, F3 Section 4.1	CGG acknowledges this information and has condsidered impacts to SRW's that migrate to the waters off the coast of Victoria in EP Appendices E7 and F3.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1034	918	The Regia MSS is proposed within Eastern Maar unceded territory	A2	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS. There is a buffer of 17km around Deen Maar.
1035	918	Confirming Eastern Maar Aboriginal Corporation (EMAC) represents the rights of the Eastern Maar.		Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1036	948	The stakeholder stated that abalone typically do not inhabit depths greater than 30 meters.	A2 Section 4	CGG has adopted a minimum survey depth of 50m.
1037	948	The stakeholder recognised the disease outbreak that affected the abalone in Portland in 2019, and highlighted the importance of giving areas time to recover.	A2	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS. CGG has adopted a minimum survey depth of 50m.
1038	948	The stakeholder recognised other fishers who may be impacted and consented to share their details.		The information was noted. No further action required.
1039	948	Fishers explained that abalone divers have a high degree of self-regulation, attributed to the smaller number of divers, which enables easier consensus on areas to leave fallow.		The information was noted. No further action required.
1040	956	Given the location, the the stakeholder believed there weren't any risk of interaction with the Saturday races since they don't venture that far offshore. However, he mentioned a large yacht race from Queenscliff to Port Fairy, where participants take the fastest route but may need to tack out depending on wind conditions, sometimes reaching 3 to 4 nautical miles offshore.		The information was noted. No further action required.
1041	989	The stakeholder suggested that the recipient should advertise the event in the AB community news sheet	C2	I can confirm that we have contacted the editor to request placing an advert in the newsletter.
1042	1040	Stakeholder took part in an online survey and advised they would like to be deemed a relevant person for the purpose of consultation and has requested a meeting.		Undertook consultation process with Relevant Person. No further action required.
1043	1180	The proposed activity area is important for Eastern Tuna and Billfish Fishery concession holders.	E1 Section 4.1	Information was noted but fishery activity in the Operational Area was assessed as low with less than 5 fishers during 2010 to 2020. See Table E1-5 1: Fishery effort is typically concentrated along the NSW coast and southern Queensland coast

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1044	1181	Tuna Australia represents members of the Eastern and Western Tuna and Billfish fisheries of Australia which includes the operational area of Regia MSS. Members target tuna and associated baitfish stocks such as Yellowfin Tuna (Thunnus albacares), Bigeye Tuna (T. obesus), Albacore Tuna (T. alalunga), Broadbill Swordfish (Xiphias gladius) and Striped Marlin (Tetrapturus audax) and some target Southern Bluefin Tuna (T. maccoyii). Target fish species are from internationally shared highly migratory fish stocks. Fishing effort is variable, and is related to but not entirely, ocean pelagic habitat. Due to climate change and increased fish abundance, we have observed significant changes to fishing grounds, with some fishing effort moving 1500kms.	E1 Section 4.1	Information was noted but fishery activity in the Operational Area was assessed as low with less than 5 fishers during 2010 to 2020. See Table E1-5 1: Fishery effort is typically concentrated along the NSW coast and southern Queensland coast
1045	1244	***Redacted***	E1, E8	***Redacted***
1046	1251	Stakeholder provided details of their functions, interests and activities: swim and/or surf and/or dive and/or fish and/or kayak and/or sail and/or watch wildlife in the local area.	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1047	1317	Stakeholders ancestry includes connections with the ocean through livelihoods.		Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1048	1317	Stakeholder is the curator of Portland Bay Beacon, facilitating community discussions.	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1049	1325	Stakeholder provided details of their functions, interests and activities: swim and/or surf and/or dive and/or fish and/or kayak and/or sail and/or watch wildlife in the local area.	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1050	1333	Stakeholder provided details of their functions, interests and activities: swim and/or surf and/or dive and/or fish and/or kayak and/or sail and/or watch wildlife in the local area.	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1051	1335	The stakeholder mentions being a regular visitor to the coastline for recreational purposes, indicating potential knowledge of fishing locations.	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1052	1389	The stakeholder identified themselves as a relevant person because they are passionate about climate change and conservation.		Regia MSS Environment Team responded to each assertion and provided thorough feedback and information, including providing links to research on seismic studies, humpback whale studies, impact surveys on marine life.
1053	1432	Commenter mentions that they dive along the coastline from Port Campbell to Portland throughout the year.	E8 Section 8.2	We understand that divers may be affected by the activity which is why we'd like to know where and when you're diving so that we can implement a SIMOPS plan in accordance with DMAC guidelines. One of the team will be in touch with you to discuss your activities (Event ID 1432).
1054	1432	A scuba diving instructor, notes witnessing significant changes in the local ocean environment over the past 40 years.		The information was noted. No further action required.
1055	1438	The maximum area fished applies the five boat rule and expands reporting to 1-degree squares, shading the entire square to indicate any fishing activity. This means there could be just one fishing event within a shaded 1-degree square.		Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1056	1438	The effort/intensity data (red/pink) indicates catch intensity at a square kilometre scale, excluding areas where data is reported by fewer than five boats.		Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1057	1438	ABARES maps reflect the catch and effort restraint of AFMA's information disclosure policy		Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1058	1529	There is a strong objection to the idea of peak bodies receiving compensation, suggesting that such payments should not be directed to these organisations but rather to individual fishers or affected parties.	Refer to Otway Adjustment Protocol	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1059	1529	There is a clear objection to compensation being directed solely to license holders, emphasising that payments should instead be made to boat owners and those actively engaged in fishing.	Refer to Otway Adjustment Protocol	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1060	1529	Shark/ gillnet and trawl fishers provided information about the potential displacement from northern fishing areas within Victoria/P79 due to seismic activities. They highlighted that fishing plans can be affected by weather conditions.	Refer to Otway Adjustment Protocol	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1061	1529	Participants referenced a historic protocol by Origin Energy, where the seasonal quota for SRL was retired as a compensation measure.	Refer to Otway Adjustment Protocol	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1062	1529	Fishers indicated that SETFIA (South East Trawl Fishing Industry Association) represents members of the trawl sector in Portland and emphasised the importance of ongoing consultation with this organisation.		Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1063	1529	Discussion around the fishing areas/ targeted areas and Regia MSS current exclusions commitments. Information received confirmed zones as Trawl fishing from 200m out, Sharknet and some Trawl within 200m, SRL targeted in 20-70m depths.	Refer to Otway Adjustment Protocol	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1064	1529	Discussion around critical lifecycle stages, feedback that February to April better time for SRL, and that Shark flagged that Gummies are spawning during May.	B8 Sections 4 & 9, E3 Section 4, E4 Sections 4 & 8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1065	1649	Individual identified as running two relevant not-for-profit fishing associations		CGG identified and contacted the stakeholders associations in February 2023, at the start of the consultation process, requesting engagement (Event IDs 4202, 4203 & 3210)
1066	1655	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process
1067	1659	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process
1068	1661	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process
1069	1662	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process
1070	1663	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process
1071	1665	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process
1072	1666	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process
1073	1668	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process
1074	1669	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process
1075	1669	Registered their vote AGAINST Regia's proposal.		Information noted but no further action required.
1076	1670	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process
1077	1672	Stating they are a member of OCEAN, Org ID 190		Information used to inform consultation process

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1078	1686	Stakeholder sent a brief email to advise they were the CEO for SETFIA and SSIA, explaining Atlantis Fisheries Consulting Group is a company engaged by the aforementioned associations.		Information used to inform consultation process
1079	1737	A map was provided of the Tasmanian jurisdiction for rock lobster and giant crab	A2	There is no overlap of the active source area with the Tasmanian fishing sector.
1080	1738	Stakeholder emailed detailed documents of dive sites as attachments and advised other divers use these and other sites up to 2 km out from shore.	E8	Multiple measures undertaken to manage interaction with divers
1081	1740	Recreational fishing activities		Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1082	1740	Involvement in fishing charters		Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1083	1742	The stakeholder stated the environmental planning area extends into Tasmanian jurisdiction for rock lobster and giant crab, and in addition, abalone and octopus fishing.	A2, E4	There is no overlap of the active source area with the Tasmanian fishing sector. No impacts predicted within Tasmanian jurisdictions.
1084	1760	Provided information on previous scientific work undertaken in area: Investigator p190 - modelling and possibly measurements done, Crowes Foot - modelling for impact on lobster and suggested mitgations, no measurements and unsure if mitigations were accepted and undertaken, Enterprise - modelling for biological impacts and safe diving distance, no measurements. Other measurements of seismic in area: west coast Tassie T48P, Aargon west side King Island, Essential and Kerr McGee Robe.		Information noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1085	1780	Stakeholder informed us that 'The Arches" is a popular dive site and located inside a Marine Park and therefore protected.	E1	The information was noted. No further action required as Regia MSS is 25km away and does not impinge on any marine parks.
1086	1783	Research findings on the effects of seismic testing on penguins, showed avoidance of preferred foraging areas during seismic testing.	B8 Section 7, E5 Section 8, F3 Section 4.4	CGG has considered this research and it has been included in the EP-Appendix B8 Seismic Studies and Appendix E 5 Section 8

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1087	1783	Middle Island is home to seabirds such as the Short-tailed Shearwater, the Black-faced Cormorant, and the Little Penguin.	E5, F3 Section 4.4	The Regia EP has conducted a thorough assessment of the literature and found there will be minimal seismic impacts to birds on Middle Island. The MSS will not pose any threat to the long-term health and sustainability of the bird populations on Middle Island. Foxes remain the greatest threat to long term survival of resident birds. See E5, F3
1088	1783	Background on the Middle Island Penguin Project and the use of Maremma Guardian Dogs to protect Little Penguins from foxes.		The information was noted. No further action required.
1089	1784	Research findings on the effects of seismic testing on penguins, showed avoidance of preferred foraging areas during seismic testing.	B8 Section 7, E5 Section 8, F3 Section 4.4	CGG has included this research in the EP- Appendix B8 Seismic Studies and Appendix E 5 Section 8
1090	1784	Potential decrease in the penguin population due to the adverse effects on foraging behaviour.	B8 Section 7, E5 Section 8, F3 Section 4.4	CGG acknowledges this information and has addressed poytential impacts to penguin foraging behaviour in EP Appendices E5- Section 8 and F3 Section 4.4.
1091	1784	Penguins began foraging significantly further from the seismic survey vessel when in operation.	B8 Section 7, E5 Section 8, F3 Section 4.4	CGG acknowledges this information and has addressed the impacts of seismic on penguin foraging in EP Appendices E5- Section 8 and F3 Section 4.4.
1092	1784	Increased stress and fatigue on birds due to having to travel further for food.	B8 Section 7, E5 Section 8, F3 Section 4.4	CGG acknowledges this information and has addressed the impacts of seismic seabirds in EP Appendix E5- Section 8
1093	1784	Decreased chances of penguins returning to their chicks and survival.	B8 Section 7, E5 Section 8, F3 Section 4.4	CGG acknowledges this information and has addressed potential decreases in penguins and chick survival in EP Appendices E5- Section 8 and F3 Section 4.4.
1094	1785	***Redacted***		***Redacted***
1095	1815	The stakeholder stated that they would not be in a position to address objections and claims raised by members and that their scope of work would need to be clear.		Stakeholder interests were noted. No further action required.
1096	1815	The stakeholder stated an expectation to receive a fee for service arrangement.		Stakeholder interests were noted. No further action required.
1097	1815	The stakeholder provided information that their policy position and fee for service arrangement would be available in a month and would be for the provision of information only.		Stakeholder interests were noted. No further action required.
1098	1890	The stakeholder provided the locations of surf priority sites both along the coast and 1km from the coast.	A2	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS. CGG has implemented a minimum depth threshold of 50m.

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1099	1890	Provided details of their functions, interests and activities as a surf group representing over 100 members from Apollo Bay to Warrnambool/Port Fairy with a function to preserve and protect the marine environment.		Stakeholder interests were noted. No further action required.
1100	1891	The stakeholder stated that they function solely as the administrative body and do not act as representatives until they have received direction from Traditional Owners.		Information was noted and used to inform consultation.
1101	1891	The stakeholder recommended that titleholder's review the process used for listing Budi Bim as a UNESCO World Heritage site, and emphasised the cultural significance of the areas surrounding and connected to Budi Bim.	F3 Section 4.15	Advised that we're here to learn about country and what was significant in the region. Mentioned that we'd heard that Deen Maar was culturally significant (Event ID 1891).
1102	1891	The stakeholder mentioned that creating a sea country plan was on the agenda to help raise community awareness about the culturally significant sites in the region.		Information was noted. No further action required.
1103	1891	The stakeholder confirmed that Dean Maar holds cultural significance and recommended leaving it alone.	A2	Confirmed that a buffer of 17km has been put in place around Deen Maar (Event ID 1891).
1104	1891	The stakeholder advised they needed to speak to someone at the organisation who might be able to assist. Stakeholder provided contact name.		Information was noted and contact given.
1105	1891	The stakeholder advised not a native title holder, and that should consult with specific groups as well as well as Gunditjmirring and Eastern Maar.		Information was noted and used to inform consultation process
1106	1891	Stakeholder expressed that they prefer a collective request for information on (cultural values and sensitivities). Example of eight offshore wind proponents all wanting the same thing.		Information was noted and used to inform consultation process
1107	1891	Provided information that recent studies have revealed ancient cave dwellings and culturally significant sites located on the seafloor and within geological formations in other areas and hence should be aware of this during this process.		Information was noted and used to inform consultation process

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1108	1891	Advised that the Iluka silica/sand mine underwent a thorough assessment process lasting between 12 to 24 months, encountering some challenges but ultimately experiencing fewer consultation issues compared to other similar projects.		Information noted but no further action required.
1109	1892	There was a discussion regarding lighter-coloured lobster found along the 100m contour, which has not been fished due to current market dynamics.	Refer to compensation protocol	Intention to fish there if the market changes could be accounted for in a compensation approach (Event ID 1892).
1110	1892	The Victorian SRL is actively working towards achieving MSC qualifications.		Information was noted. No further action required.
1111	1892	Participants requested that the engagement and consultation process be transparent and consistent.		Information was noted and used to inform consultation process
1112	1892	Fishers reported that the Victorian Fisheries Authority (VFA) has revised its models for calculating fishing quotas. They noted that the community decided not to increase the quota this year, opting instead to maintain the current quota levels despite having the option to raise them.		Information was noted. No further action required.
1113	1892	Fishers expressed concerns about port facilities in Warrnambool, particularly noting previous damage that industry support vessels have caused.		Information was noted. No further action required.
1114	1892	Fishers discussed the current state of Giant Crab fishing, noting that the fishery is small and characterised by low quota levels.	E4 Section 4.2 & 8, F3 Section 4.6	Information was noted. No further action required.
1115	1893	Recommendation to consult with the Victorian Department of Energy Environment and Climate Action (DEECA) and the Victorian Fisheries Authority (VFA) for the consultation process.		Consultation was undertaken with these organisations, Org ID 330 and 13 respectively
1116	1924	Provided the fisheries present in the area		Information was noted. No further action required.
1117	1924	Provided information on process to obtain individual fishers contact details		Information used for identification of relevant persons
1118	1924	Provided contact details for additional associations AFMA suggest are contacted		Information used for identification of relevant persons
1119	2003	Use the Atlantis email address for communications with SETFIA and SSIA		Information used to inform consultation process
1120	2003	The trawl fishery is now 85% closed.		Information was noted. No further action required.

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1121	2003	The hourly charges for contact with proponent and costs for SMS's sent to members.		Agreed to engage SETFIA/SSIA for fee-for-service consultation with members to raise awareness about the activity and encourage individual fishers participation in the consultation process. (Events 2930, 3350, 3856, 4039)
1122	2003	SSIA is concerned about the impacts on the shark fishery (displacement). The shark fishery is 90% closed.	E3 Section 4.2	Stakeholder concerns were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1123	2003	SETFIA is concerned about the impacts on the fishery (displacement) and on the exploratory roughy fishery.	C2	Information used to inform consultation process
1124	2003	SETFIA (trawl) and SSIA (shark) are relevant association for which Atlantis holds the management contract	C2	Information used to inform consultation process
1125	2003	Members names and details are not released, however all members are potentially impacted as fishers in the west may be displaced to the east.	C2	Information used to inform consultation process
1126	2003	This exploratory roughy fishery is run by SETFIA, not SSIA.	C2	Information used to inform consultation process
1127	2006	Light pollution poses a challenge for shearwaters during their northern migration, as the birds are often attracted to artificial lights in towns. In response, a program has been initiated in Warrnambool to turn off lights when the shearwaters depart for their migration to Alaska at the end of summer.	Appendix E9 Section 4 and 8.	Information is noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1128	2006	Advised there are currently three cameras installed on Middle Island to monitor bird activity.		Information was noted. No further action required.
1129	2006	Advised shearwater breeding, which also occurs on Griffith Island, and black-faced cormorants are both present on Middle island.		Information is noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1130	2006	Advised penguins in the area are equipped with microchips but do not have GPS tags or trackers.		Information was noted. No further action required.
1131	2006	Advised penguins are observed year-round, with breeding activity typically beginning in August and September when they lay eggs. Population counts are generally conducted in September to monitor breeding trends and numbers.	Appendix E5 Section 4 and 8, F3 Section 4.	Information is noted and used to inform the analysis and assessment of impacts arising from the Regia MSS

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1132	2006	Advised in 1999, the penguin population on the island was approximately 90 birds, but recent counts have dwindled to just 6, primarily due to the threat posed by foxes. The project's objective is to protect the remaining penguins and increase their numbers.	Appendix E5 Section 4 and 8, F3 Section 4.	Information is noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1133	2007	The Southern Right Whale Study off GAB is a long-term research program designed to monitor the recovery of the Southern Right whale population.		Information was noted. No further action required.
1134	2007	The most recent population estimate for the species is derived from the acoustic monitoring conducted by McCauley as part of the Integrated Marine Observing System (IMOS) project.		Information was noted. No further action required.
1135	2007	Options for monitoring blue whales in the Otway region were discussed, highlighting the importance of both acoustic monitoring and aerial surveillance. Acoustic methods, such as those implemented by IMOS or fixed loggers positioned off the Thylacine platform, can effectively track the location and timing of whale presence. However, to gain a comprehensive understanding of the whales' behaviors and activities, aerial surveillance is also necessary to provide contextual information about their movements and interactions within the area.	Appendix E7 Section 4 and 8, F3 Section 4, G1 and G2	Information is noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1136	2007	The Blue Whale Study is not currently collaborating with any oil and gas companies in its research efforts.		Information noted but no further action required.
1137	2009	The stakeholder confirmed the accuracy of ABARES data.		Information was noted. No further action required.
1138	2026	The fisher confirmed specific fishing areas he operates in, detailing that he regularly fishes in blocks G12, G13, and H14, with occasional activity in block H13.		Information was noted. No further action required.
1139	2028	Stakeholder offered to assist with communications with recreational divers through their network, indicating a willingness to facilitate dialogue and information sharing between stakeholders.	Appendix E8 Section 4 and 8, and C2	Welcomed this and confirmed that we'd like to take up this offer near to the survey timing, once the final dates were known (Event ID 2028).

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1140	2028	Shared details about diving experience, noting they regularly use several dive sites and complete over 300 dives each year, both during the day and at night.	Appendix E8 Section 4 and 8	Acknowledge that it might be easier to coordinate SIMOPS if a commitment to only survey close to the coast at night was made. The other alternative was to distance the survey away from those sites. Noted that CGG would be completing more modelling in the future once the activity has been further refined. Committed to share this modelling with stakeholder when received (Event ID 2028).
1141	2029	The stakeholder confirmed availability to provide data for aggregated areas over previous surveys.		Information was noted. No further action required.
1142	2032	the stakeholder stated the effects on individual rock lobsters were well established but population level effects were not so well understood.	Appendix E1 Section 4 and 8, E5 Section 4 and 8, and F3 Section 4.	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1143	2032	The stakeholder confirmed that there were no research activities planning that may be affected by the activity but were open to undertaking research if needed with vessel time.		Information was noted. No further action required.
1144	2037	Stakeholder requested to be included on project updates.		Request was noted and actioned.
1145	2038	Stakeholder stated that the impacts of seismic blasts, which can travel hundreds of kilometers, especially on cetaceans, need to be better studied.	C2	At a joint briefing by Regia MSS and ConocoPhillips Australia, the representative of Regia MSS attempted to answer the question that followed this statement of information about seismic blasts but was cut off. (13/6/2023; Event ID 1655). There is no seismic testing scheduled for this project and that point has been reiterated in project information materials as it is clearly a matter of community interest.
1146	2038	Stakeholder questioned about the measures being taken to avoid operations during migration times of federally listed species, including endangered ones, in areas with high migratory species traffic like the Otway Basin.	A2	The Regia Mss team responded to information shared and a subsequent question about measures to ensure the project would not be operational during migration times for Federally listed species. The response affirmed that there would be both activity limitations and control measures.
1147	2073	Logans Beach is the only established nursery for southern right whales in south-eastern Australia, serving as a vital habitat for mothers and calves during the calving season.	Appendix E7 Section 4 and 8 and F3 Section 4.	We agree, it would be unacceptable to acquire seismic in a known Southern Right Whale calving area while they are present. So CGG commits to not undertaking seismic activities while Southern Right Whales are in the critical habitat defined in their conservation management plan. That plan identifies that the Southern Right Whales are likely to be present between May and November (Event ID 2073).

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1148	2097	The Bonney Upwelling is identified as essential for the survival of local marine species, underscoring its ecological importance.	E2 Section 4.3, F3 Section 4.13	Information was noted. A thorough analysis of the upwelling has been conducted and used to inform the analysis and assessment of impacts arising from the Regia MSS.
1149	2113	Stakeholder provided details of their functions, interests and activities: swim and/or surf and/or dive and/or fish and/or kayak and/or sail and/or watch wildlife in the local area.	Appendix E8 Section 8.	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1150	2117	Stakeholder provided details of their functions, interests and activities: swim and/or surf and/or dive and/or fish and/or kayak and/or sail and/or watch wildlife in the local area.	Appendix E8 Section 8.	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1151	2120	Stakeholder emailed as an attachment a paper published in 2023 regarding leatherback turtle foraging grounds in the Southern Ocean.	E6 Section 4, E7 Sections 4.3.6 and 8, F3 Section 4.1	CGG acknowledges this information and added the source into the EP Appendix E6 Section 4.
1152	2135	Stakeholder provided information regarding the potential effect to blue whale reproduction from displacement.	E7 Section 4 and 8, F3 Section 4.2	CGG acknowledges this information and it was considered as part of all material assessed for the EP.
1153	2135	Stakeholder provided information regarding sightings of skinny blue whales in the Bonney Upwelling and Otway suggesting they may be nutritionally stressed.	E7 Sections 4.3.5 and 8, F3 Section 4.2	CGG acknowledges this information and it was considered as part of all material assessed for the EP.
1154	2135	Stakeholder provided information regarding La Nina and climate pattern appears reducing prey availability for blue whales in Indonesia and sightings of skinny blue whales off NW Australia.	E7 Section 4 and 8, F3 Section 4.2	CGG acknowledges this information and it was considered as part of all material assessed for the EP.
1155	2135	Stakeholder provided information regarding energy trade offs in blue whale foraging techniques	E7 Section 4 and 8, F3 Section 4.2	CGG acknowledges this information and it was considered as part of all material assessed for the EP.
1156	2135	Stakeholder provided information on the differences between energy storage techniques in blue whales, southern right whales and humpback whales	E7 Section 4 and 8, F3 Section 4.2	CGG acknowledges this information and it was considered as part of all material assessed for the EP.
1157	2135	Challenges and feasibility of tagging studies regarding Blue Whales in the Otway region.		Information noted but no further action required.
1158	2135	Blue whales' feeding habits and reliance on prey-rich areas such as GAB, and the WA coast.	E7 Section 4 and 8, F3 Section 4.2	CGG acknowledges this information and it was considered as part of all material assessed for the EP.
1159	2255	The stakeholder emphasizes their role as a local member of the community and the planet, indicating a broader perspective beyond personal interests.		

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1160	2255	The stakeholder mentions their appreciation of the environment and awareness of the detrimental effects of the blasting activity on marine ecosystems.	Appendices E1 to E9 and F3	Information noted but no further action required.
1161	2255	The stakeholder highlights their activities in the southern ocean, indicating a personal connection to the marine environment.	E8	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1162	2256	***Redacted***	Appendices E1 to E9 and F3	***Redacted***
1163	2275	Reference to accurate information obtained from the Australian Marine Conservation Society		Information noted but no further action required.
1164	2275	Mention of suitably qualified scientists from the Australian Marine Conservation Society		Information noted but no further action required.
1165	2275	Circulation of social communications and videos related to the topic		Information noted but no further action required.
1166	2278	***Redacted***	Appendix E7 Section 4 and 8 and F3 Section 4.1.	***Redacted***
1167	2278	***Redacted***	Appendix E1 Section 4 and 8, E4 Section 4 and 8, and F3 Section 4	***Redacted***
1168	2282	The stakeholder outlined several dive sites that they used and that they completed >300 divers per year, both a day and night.	C2	Information was noted and used to inform the consultation process.
1169	2282	The stakeholder offered to assist with communications with recreational divers through her network.	C2	Welcomed this and confirmed that we'd like to take up this offer near to the survey timing, once the final dates were known. (Event ID 2282)
1170	2371	Mention of the high cultural significance of the Mornington Peninsula and Point Nepean to Bunurong People.	C2	The titleholder requested stakeholder availability for a meeting (Event ID 2917).
1171	2383	Vulnerable Plant and Animal Life: Reference to the need to protect marine life and the whale birthing nursery in Warrnambool.	E7 Section 4 and 8, F3 Section 4.1	Information noted but no further action required.
1172	2383	Indigenous Relationship with Land and Sea: Mention of the importance of indigenous culture and the significance of the Otway Basin Sea Country.	E1 Section 4.6 and F3 Section 4.16	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1173	2389	The stakeholder provided an information link to a protest in Port Fairy and to websites of other opposition groups.		Information noted but no further action required.
1174	2586	Stating they are a member of OCEAN, Org ID 190	C2	Information used to inform consultation process

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1175	2629	SRL key findings and implications from report (Document ID 1875) were as follows: There was no increased mortality in either lobster group, righting reflex was significantly impaired immediately after exposure for those in E0 and E500 treatments, recovery was observed after the first moult in juvenile E500 lobsters, while E0 juveniles showed persistent impairment after the second moult, ntermoult periods were significantly longer for E0 juveniles, suggesting potential slowed development and growth. Implications: Seismic exposure levels matched previous studies, validating the experimental approach, righting impairment extended to at least 500 m from the seismic source, persistent impairment in lobsters exposed at close range suggests a threshold beyond which recovery occurs, highlighting the need for careful management of seismic activities to minimize impacts on fisheries.	Appendix E1 Section 4 and 8, E4 Section 4 and 8, and F3 Section 4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS. Reports are in database.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1176	2629	Adult pale octopus key findings and implications from report (Document ID 1875): Key Findings: The BACI analysis showed no impact on octopus CPUE at the fishing block level, though localized short-term declines were noted independently. No mortality occurred in either sex due to seismic exposure, but behavioural changes were observed: Males exhibited reduced adventurousness and feeding rates, females showed decreased maternal care as eggs approached hatching. Egg counts in exposed females suggested potential issues, though not conclusively linked to exposure. Physiological assessments indicated lower initial pH levels in males, with significant changes following exposure, elevated immune responses (phagocytosis) in exposed octopuses, alongside variable results for oxidative stress indicators, some evidence of neurotransmitter activity changes, potentially linked to behavioural impacts, no significant DNA damage or long-term impairments were detected. Implications: The study concluded no evidence of mortality or severe long-term effects from seismic exposure. Behavioural changes raised concerns about neuromuscular coordination and environmental interactions. Overall, the impacts were negligible at 500 m and almost non-existent at 1000 m, establishing a threshold for minimizing seismic survey impacts.	Appendix E1 Section 4 and 8, E4 Section 4 and 8, and F3 Section 4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS. Reports are in database.
1177	2631	Stakeholder was thankful for being kept updated and advised weather had prevented a lot of diving activity recently and advised that from then on they would be highly active in the region.		Information noted but no further action required.
1178	2640	Stakeholder was thankful for being kept updated and advised weather had prevented a lot of diving activity recently and advised that from then on they would be highly active in the region.		Information noted but no further action required.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1179	2687	Proposed activity is in close proximity to 2 fisher communities, the King Island and north-west communities.	A2	Responded with information about how Regia EP identifies impacts and risks and subsequent mitigation plans. Acquisition area is ~100km away.
1180	2745	Provided information, contact details and links to 5 Registered Aboriginal Parties, for further engagement, and has extended help in engaging if no response is received.		Information noted but no further action required.
1181	2766	Species presence: Mention of the Southern Right Whale choosing the area for birthing their calves.	E7 Section 4 and 8, F3 Section 4.1	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1182	2766	Local environmental knowledge: Insights into the cultural heritage and significance of the Otway Basin Sea Country.	B3, E1 Section 4.6,F3 Section 4.1	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1183	2766	Fishing locations: Reference to the significance of the Otway Basin Sea Country and the importance of local elders in protecting the whale birthing nursery.	E1 Section 4.6, E7 Section 4 and 8 and F3 Section 4.1	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1184	2886	Stakeholder provided information as part of the objections and claims in the form of links to articles supporting the objection.		Information noted but no further action required.

1185	2886	Stakeholder cited a study showing reduced cetacean sightings (baleen and toothed whales) across large spatial scales across effects in seismic testing and control sites, with evidence of multi-species impacts from seismic survey noise on cetaceans. The stakeholder also cited studies to show that airguns can damage whales' hearing if they're fired within a kilometre or so of an animal, and can also be disturbingly loud at great distances. because they are both loud and ow-frequency creating a range of behavioural impacts dozens of kilometres away from airgun arrays. LINK provided.		CCG is committed to ensuring that marine mammals can continue to undertake biologically important behaviours within the Otway Basin. Several species of marine mammals (whales, dolphins, and seals) are typically found within the area where the Regia survey is proposed. Where underwater noise has the potential to affect marine mammals, mitigation and management measures will need to be in place. We are currently reviewing all mitigations to identify those that will be effective in managing impacts to whales, particularly southern right whale and blue whale which have been identified as undertaking biologically important behaviour within or close to the Regia survey area. As southern right whales have been identified as calving and resting within coastal areas adjacent to the survey area, we have committed to no acquisition to be undertaken when they are in these coastal areas. To determine when southern right whales are present or absent from these coastal areas, we will work with southern right whale researchers to develop appropriate survey methods. We have also altered our timing, following relevant person consultation, from a 6- month window (November – May), to two separate 3-month windows of April – June, or September – November. The activity will occur once in these windows between 2024 and 2028. The decision to alter timing reflects an additional priority for protection and the implementation of an additional impact management buffer for Southern Right Whales (SRW). SRW's remain our priority for protection, and we are now increasing the level of protection afforded to the biodiversity associated with the summer upwelling events. Finding ways to reduce impacts to these sensitivities has led to the implementation of: - an additional impact management area for SRW's (which extends 11.3km beyond the proposed reproductive biologically important area), and - the change in timing to avoid the expected increase in blue whales associated with the summer upwelling. In addition, we will not be acquiring in water shallower than 50m,

				increasing the survey's distance from shore and offering additional biodiversity protection. For other whale species, industry standard controls for seismic surveys that will be implemented as per EPBC Act Policy Statement 2.1: Interaction between Offshore Seismic Exploration and Whales are: - Two marine mammal observers will be present on the survey vessel with a minimum of one on watch at all times during day light hours to implement controls including shut down zones. - The acoustic source is ramped up over a period of 30 minutes with acoustic source components gradually added in sequence until operating level is achieved. - The seismic source ramp up (called a soft start) can only commence if no whales have been observed (minimum observation zone will be 3 km) in the previous 30 minutes. - If a whale is sighted during the soft start the acoustic source should is to be powered down to the lowest possible setting and the soft start cannot commence until the whale is no longer observed or 30 minutes has passed since the whale has been observed. - Shutdown and low power zones implemented for whales. - For line turns acoustic source will be at low power to deter whales form entering the survey area. When observations cannot be undertaken (night-time and low visibility) start-up may commence after a soft start: - Provided that there have not been 3 or more whale instigated power-down or shutdown events during the preceding 24-hour period; or If operations were not previously underway during the preceding 24 hours, the vessel (and/or a spotter vessel or aircraft) has been in the vicinity (approximately 10km) of the proposed start up position for at least 2 hours (under good visibility conditions) within the preceding 24-hour period, and no whales have been sighted. Operations may proceed provided that there have not been 3 or more whale instigated power-down or shut-down situations during the preceding 24-hour period. When observations cannot be undertaken (night-time and low visibility) operations may proceed provided that there have not been 3 or more whale instigated power-down or shut-down situations

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				during the preceding 24-hour period. Other controls being evaluated with expert opinion from acoustic specialists and whale researchers: - Use of acoustic monitoring for detection of whales. - Use of vessel and aerial surveys and shoreline observations to detect presence/absence of southern right whales in coastal areas and presence/absence of blue and other whales in offshore areas. Our full draft impact assessment is available here.
1186	2886	Stakeholder quoted seafood industry calls for more research on seismic testing under 'real-world conditions' in response to research into seismic impacts on demersal fish species which have shown profound negative impacts to the fish stocks. Including a Fisheries Research and Development Corporation report which showed a 80-99 per cent decline in the catch rates of flathead and school whiting following seismic testing in the Danish seine commercial fishery off Lakes Entrance. Stakeholder also referred to a study showing that seismic surveying reduces whiting catch rate by 99.5 per cent. The research found catch rates for whiting were down by 99.5 per cent during a six-month-long survey at Lakes Entrance in eastern Victoria, compared to before the survey. Flathead catch was also reduced by 71 per cent, according to the research. LINK provided.		The paper you cite here is yet to be finalised and released, therefore assessment is undertaken. on current scientifically accepted research. The survey has the potential to temporarily displace fish and other marine life from the survey area, which may temporarily impact the local fishing industry. However, measures will be taken to minimize the impact, such as conducting surveys during the time of year when fish are less likely to be in the area and implementing exclusion zones around fishing grounds. If exclusions zones cannot be accommodated, we will work with individual fishers to ensure they are no worse off because of the survey.
1187	2901	VP-79 has 43 referenced migratory species known to use this area for foraging and habitat including blue whale, pygmy blue whale and northern royal albatross.	Appendix E7 Section 4 and 8, E5 Section 4 and 8 and Appendix F3 Section 4	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1188	2901	Lease V79 lease abounds with the Apollo marine protected areas of which AMCS has long running Marine Park and Threatened Species campaign activity in.	Appendix E1 Section 4 and 8.	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1189	2924	Requested to be removed from email correspondence list.		Information noted but no further action required.
1190	2926	Mention of phasing the activity to consider Southern Right Whales and Blue Whales at different times of the year.	B3, E7 Section 4 and Section 8, F3 Sections 4.1 and 4.2	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1191	2926	Interest in studying the cumulative impacts of 2D and 3D seismic surveying.	F1	
1192	2970	Stakeholder provided fishing locations in Portland.		Information noted but no further action required.
1193	2997	Mention of the area being a blue whale migratory location and southern right whale breeding ground.	Appendix E7 Section 4 and F3 Section 4.1 and 4.2	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1194	3021	Mention of the rich sea life in the ocean off Portland.		Information noted but no further action required.
1195	3068	The AHO will promulgate the appropriate Notice to Mariners (NTM), which will ensure other vessels receive information of activities.		Information noted but no further action required.
1196	3068	Advised to provide updates to both the Australian Hydrographic Office and the JRCC on progress and, importantly, any changes to the intended operations.	C2	Information used to inform consultation process
1197	3068	Advised to notify AMSA's Joint Rescue Coordination Centre (JRCC) by email or phone for promulgation of radio-navigation warnings at least 24-48 hours before operations commence. AMSA's JRCC will require the vessel details (including name, callsign and Maritime Mobile Service Identity (MMSI)), satellite communications details (including INMARSAT-C and satellite telephone numbers), area of operation, requested clearance from other vessels and any other information that may contribute to safety at sea. JRCC will also need to be advised when operations start and end.	C2	Information used to inform consultation process
1198	3068	Advised to exhibit appropriate lights and shapes to reflect the nature of operations.	B2	All vessels engaged in the Regia MSS will be compliant with the International Rules for Preventing Collisions at Sea
1199	3068	Advised to contact the Australian Hydrographic Office no less than four weeks before operations, with details relevant to the operations.	C2	Information used to inform consultation process
1200	3068	Advised how to obtain a vessel traffic plot showing Automatic Identification System (AIS) traffic data for area of interest through AMSA's spatial data gateway and Spatial@AMSA portal to download digital data sets and maps.	C2	Information used to inform consultation process

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1201	3080	Stakeholder responded to a meeting offer accepting and discussing method of meeting. Advised that 2 colleagues have been added to email and would be happy to all meet at the same time.		Information noted but no further action required.
1202	3092	Mention of a yacht race each Saturday off the coastline of Port Fairy.		Information noted but no further action required.
1203	3182	The paper "McCauley et al. 'Widely used marine seismic survey air gun operations negatively impact zooplankton' 2017" raises concerns about the negative impact of marine seismic survey air gun operations on zooplankton.	Appendix E 2 Section 8 and F3 Section 4.13 and 4.14.	The titleholder provided a response in the form of an attached document. This response included information around why the paper in question is considered an outlier in evidence, and explained that NOPSEMA has accepted the petroleum industry's position on the paper in multiple other seismic survey EP's. The titleholder also explains the absence of a "no impact" requirement in Australia and the relevance of defined acceptable levels (Event ID 2356).
1204	3209	Stakeholder referred to the Precautionary Principle; the IPCC Report on Climate Change; and the Sonic Sea movie.		Information noted but no further action required.
1205	3212	Stakeholder stating they are CEO for two associations.	C2	Information used to inform consultation process
1206	3215	Contact details for SETFIA and SSIA are the Atlantis contact details.	C2	Information used to inform consultation process
1207	3217	Provided SETFIA SSIA Policy on MSS Proponent Engagement 2_0 20 June 2023	C2	Information used to inform consultation process
1208	3224	Provided information regarding consulting with the Commonwealth Fishing industry	C2	Information used to inform consultation process
1209	3228	This feedback provides information about the fishing practices for RL, indicating that most activities occurred in shallower waters closer to ports.	A1	Confirmed that the data agreed with this and why the 50 m activity limitation was adopted (Event IDs 3228 and 4107).
1210	3228	One participant expressed a preference for compensation payments to be directed to quota owners, indicating that this approach would be more beneficial for him as a quota owner.	Adjustment protocol	Stakeholder interests were noted. Refer to compensation protocol document.
1211	3228	No agreement was reached from stakeholders that compensation should be paid on a boat-by-boat basis.	C2	The Regia MSS team pointed out feedback from Portland fishers who preferred that each fisher should be the claimant. Agreed that all evidence-based claims would be put through the NERA adjustment protocol (Event ID 3228).

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1212	3228	Expression of interest from the fishers about putting their boats forward for a spotter vessel if required.		Information noted but no further action required.
1213	3229	Identification of any seabed anomalies that may be potential heritage sites (shipwrecks, crashed aircraft, etc), Regis MSS must notify Heritage Victoria in accordance with the requirements of s 80 of the Heritage Act 2017 (Vic) and/or s 40 of the Underwater Cultural Heritage Act 2018 (Cth). The stakeholder also noted 40 of the UCH Act also requires notification to the Minister.		Information noted but no further action required.
1214	3237	Impacts on whales and dolphins due to seismic air-gun surveys.	B8 Section 8, E7, F3 Section 4	Regia EP has conducted a thorough assessment of the literature and found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan
1215	3237	Impact on seals from seismic testing.	B8 Section 8, E7, F3 Section 4.3	Regia EP has conducted a thorough assessment of the literature and found potential seismic impacts to seals do not pose any threat to the long-term health and sustainability of any populations of these taxa found within the operational area. Any interactions with seismic are mitigated and managed through spatial boundaries and a comprehensive fauna management plan.
1216	3237	Impact on Molluscs and Crustaceans from seismic testing.	B8 Section 4, E4, F3 Sections 4.5, 4.6, 4.8, 4.9, 4.10	Regia EP has conducted a thorough assessment of the literature and found seismic impacts to fish, molluscs and crustaceans do not pose any threat to the long-term health and sustainability of any populations of these taxa found within the operational area.
1217	3237	Impact on Fish from seismic testing.	B8 Section 5, E3, F3 Sections 4.11, 4.12, 4.14	Regia EP has conducted a thorough assessment of the literature and found seismic impacts to fish, molluscs and crustaceans do not pose any threat to the long-term health and sustainability of any populations of these taxa found within the operational area.
1218	3237	Impact on zooplankton from seismic testing.	B8 Section 8, E7, F3 Section 4.13	Regia EP has conducted a thorough assessment of the literature and found potential seismic impacts to zooplankton do not pose any threat to the long-term health and sustainability of any populations of these taxa found within the operational area.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1219	3328	The stakeholder stated fishers will look to them for advice and that they would support their members.	C2	Information used to inform consultation process
1220	3350	The stakeholder stated that Gillnet fishers don't go deeper than 100f, 183m.	Appendix E1 Section 4 and 8	Stakeholder information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1221	3350	The stakeholder stated that trawlers operate mostly in deeper waters and only go as shallow as 150m.	Appendix E1 Section 4 and 8	Stakeholder information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1222	3350	The stakeholder provided information regarding their consultation services and stated they could provide on-water comms including SMS, Facebook posts and emails by fishing zone.		Information noted but no further action required.
1223	3355	SETFIA clarifies that it undertakes work specifically for marine seismic survey (MSS) proponents and not Atlantis. As a not-for-profit organization, SETFIA, along with the SSIA, engages Atlantis to manage their associations, but Atlantis does not receive payment from either association for MSS project work.	C2	Information used to inform consultation process
1224	3356	Stakeholder shared concern about the start time for meeting in Portland.		
1225	3373	Mention of the protest rally in Warrnambool		
1226	3383	Tuna concession owners wish for all environmental plan consultation to be directed through Tuna Australia.	C2	Information used to inform consultation process
1227	3383	Mention of Tuna Australia's internal database being up to date, accurate, actively managed, and reviewed after each consultation.	C2	Information used to inform consultation process
1228	3383	Advice from the Australian Fisheries Management Authority (AFMA) on the preferred method for energy companies to conduct environmental plan consultation through fishing industry associations.	C2	Information used to inform consultation process

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1229	3384	Stating AMCS's functions, interests and activities as relating to the protection and preservation of the health, biodiversity and function of marine ecosystems in Commonwealth and states waters. Also the management of state and Commonwealth marine parks, threatened species and fisheries in the proposed operational area (OA) and environment that may be affected (EMBA) zones.	C2	Information used to inform consultation process
1230	3384	Stating AMCS is Australia's peak marine conservation organisation and Australia's leading national charity dedicated solely to protecting our precious oceans and wildlife. Representing people from all around the country, we work to protect our oceans and coastal environments for the benefit of all marine life, and current and future generations	C2	Information used to inform consultation process
1231	3398	Stakeholder advised they believed they were a person that may be affected, stated why they thought that and requested a catch up to acquire more information.	C2	The Regia MSS team undertook consultation process with Relevant Person.
1232	3415	Person ID 1163/Org ID 316 is busy but keep trying as they do want to be heard.	C2	The Regia MSS team continued to attempt to make contact to arrange meeting. See Appendix C1, Annex 2, 'Southern Ocean Protection Embassy Collective'
1233	3415	Limited social license for seismic blasting along the affected coastline.		Information noted but no further action required.
1234	3417	The Southern Bluefin Tuna fishery also overlaps the proposed activity.	E3, Section 4.1	Southern Bluefin Tuna is not commercially caught in the Operational Area. It is sometimes caught recreationally off Victoria.
1235	3654	***Redacted***	C2	***Redacted***
1236	3672	In-field survey of operators is undertaken to collect the data the economic ABARES information is based on.	C2	Information used to inform consultation process
1237	3672	ABARES data uses logbook and other data collected in fisheries status report assessments, and is reliable.	C2	Information used to inform consultation process
1238	3674	WTOAC has a dedicated Caring for Country Team that, despite being busy, should be involved in any initiatives related to Caring for Country.	C2	Information used to inform consultation process
1239	3674	To make a booking with another relevant person for input.	C2	Information used to inform consultation process

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1240	3674	The WTOAC is involved in aquaculture projects focused on seaweed and kelp, specifically located in Corio Bay.		Information noted but no further action required.
1241	3674	The WTOAC Healthy Country Plan includes coastal values.		Information noted but no further action required.
1242	3674	The suggestion was made for the Regia MSS to engage with the Federation of Victorian Traditional Owner Corporations.	C2	Information used to inform consultation process
1243	3674	The stakeholder expressed skepticism regarding the substantial efforts being dedicated by titleholders to the project, citing a low likelihood of the event occurring.		Information noted but no further action required.
1244	3674	Discussed engagement being difficult with a TO community severely affected by a lack of resources and those available are stretched; lot's of requests for engagement with petroleum titleholders on very unlikely events.	C2	Information used to inform consultation process
1245	3674	Discussed a preference for petroleum titleholders to get together and reduce consultation burden on WTOAC.	C2	Information used to inform consultation process
1246	3674	Briefing to the regional TO Corporation Caucus possible - held monthly online and quarterly in person. In relation to input into the sea country protection program (working title).	C2	Information used to inform consultation process
1247	3674	***Redacted***	C2	***Redacted***
1248	3678	Advised that this meeting did not constitute consultation with Eastern Maar Traditional Owners.	C2	Discussed consultation process for offshore petroleum activities. Outlined that EMAC can request information from the Regia team to help reduce burden on EMAC. Outlined that EMAC can request information on a particular form. Outlined that the public comment period should not be confused with the parallel 'relevant persons' consultation process (Event ID 3678).
1249	3697	Identified Southern Right Whales, Blue Whales, Eels, and Zooplankton as potentially important receptors to be covered.	E2, E3, E7, F3	The Regia EP has conducted a thorough assessment of the literature which is both aspect-focussed and also receptor-focussed for those taxa of increased public concerns. Southern Right Whales, Blue Whales, Eels, and Zooplankton (focus on Bonney Upwelling) have all been subject to increased levels of assessment which have been used to decide outcomes.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1250	3697	Criticised the aspect-by-aspect approach currently published and suggested that key matters reports for matters of national environmental significance would be a preferred way to review information.		
1251	3745	***Redacted***	C2	***Redacted***
1252	3800	Tuna concession owners wish for all environmental plan consultation to be directed through Tuna Australia.	C2	Information used to inform consultation process
1253	3800	Advice informing that the the preferred method for energy companies to conduct environmental plan consultation according to Australian Fisheries Management Authority (AFMA), is through fishing industry associations.	C2	Information used to inform consultation process
1254	3803	The stakeholder identified their FIA's as a local resident and local business owner.	C2	Information used to inform consultation process
1255	3803	Stakeholder relevance as a local resident, ocean lover, surfer, business owner, and sustainability professional.		
1256	3853	***Redacted***	C2	***Redacted***
1257	3891	Stakeholder requested to be consulted with through their fishing association and not directly with Regia Team		
1258	3892	Stakeholder requested to be consulted with through their fishing association and not directly with Regia Team		
1259	3917	The largest jig fishery for squid in Bass Strait in operates in 70 to 130 metres between Portland and the Thylacine platform in Western Bass Strait.	B8 Section 4, E4 Section 4.2, F3 Section 4.8	Extensive assessment done on the jig fishery and no significant impacts are expected from MSS.
1260	3954	Stakeholder requested to be consulted with through their fishing association and not directly with Regia Team		
1261	3955	Stakeholder requested to be consulted with through their fishing association and not directly with Regia Team		
1262	4026	Stakeholder requested to be consulted with through their fishing association and not directly with Regia Team		
1263	4036	Reference to the Blue Whale Study as a regional stakeholder for blue whales.	E7 Section 4 and 8, F3 Section 4.2	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1264	4036	Mention of the survey taking place in a Biologically Important Area for pygmy blue whales.	E7 Sections 4 and 8, F3 Section 4.2	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS

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1265	4043	Provided costs for communication protocols and services	C2	Agreed to engage SETFIA/SSIA for fee-for-service consultation with members to raise awareness about the activity and encourage individual fishers participation in the consultation process. (Events 2930, 3350, 3856, 4039)
1266	4048	Stakeholder provided information on trawling depths: between 100 and 1,100m (mostly <700m).	Appendix E 1 Section 4 and 8, and F3 Section 4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1267	4062	The titleholder requested the stakeholder connect with another person and relay the titleholders messages to date, and encourage the person to engage with the titleholder.	C2	The Regia MSS team want the person to do whatever they believe is best for them with regards to how they engage, however, there is only a short window left to consult prior to submission (Event ID 4062).
1268	4069	GMTOAC invitation to a consultation day.	C2	Information used to inform consultation process
1269	4091	Fauna records identify nearly 200 species within the Belfast Coastal Reserve, over 50 of these are listed as threatened and of conservation significance. Four of these are bird species listed for recovery plans under the Australian Government's Threatened Species Strategy are found in BCS : Orange-bellied parrot, Hooded Plover, Australasian Bittern and Eastern Curlew.	A2, E5, E9	The active source area is located over 30km from the BCR, there is no overlap with the acquisition area.
1270	4091	BCS is culturally significant area for indigenous peoples for ceremony and includes burial sites and shell middens.	A2	The active source area is located over 30km from the BCR, there is no overlap with the acquisition area.
1271	4091	BCS contains habitat of international significance for migratory birds Sanderling and Sharp-tailed Sandpiper.	A2, E5, E9	The active source area is located over 30km from the BCR, there is no overlap with the acquisition area.
1272	4106	The individual shared that he only holds the minimum leased quota and is unlikely to venture far from Port Fairy, suggesting he does not anticipate any overlap with the upcoming survey.		Information noted but no further action required.
1273	4106	The individual indicated that he possesses an 'ocean general' license and expressed interest in possibly making a claim related to the activities.	See Compensation Protocol for fishers	Encouraged him to do so if he were to be displaced from his fishing activities.
1274	4106	Stated he'll fish for squid occasionally in the summer.		Information noted but no further action required.
1275	4106	Stated he only has the minimum quota for southern rock lobster which he leases. Unlikely to go too far from Port Fairy and that he didn't think they'd be any overlap with the survey.		Information noted but no further action required.

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1276	4106	Has an 'ocean general' license and that he may want to make a claim for these activities.	E1	Fisher informed of the compensation protocol in place and all submissions accepted with suitable evidence to support claims.
1277	4107	This feedback provides information about the fishing practices for RL, indicating that most activities occurred in shallower waters closer to ports.	Appendix A2, E 1 Section 4 and 8, E4 Section 4 and 8 and F3 Section 4	Confirmed that the data agreed with this and why the 50 m activity limitation was adopted (Event ID 4107).
1278	4107	This feedback notes that fishing activities, particularly for sharks, often occur close to or even within the area, suggesting potential concerns about the impact of seismic activities on local fishing practices.	See Compensation Protocol for fishers	Reaffirmed the methods of claiming compensation if displaced from fishing grounds (Event ID 4107).
1279	4107	This feedback expresses concern that if the market for reds opens up again, fishers may be incentivised to venture deeper into active source areas.	See Compensation Protocol for fishers	Reiterated that catch history in an area is required to be able to have a successful claim. (Event ID 4107).
1280	4107	Stakeholders expressed concerns regarding the reliability of ABARES data for trawl fishing, asserting that it does not accurately reflect fishing effort or productivity in the trawl sector. They indicated that the data does not provide a true representation of their fishing locations or the effectiveness of trawl fishing activities.	Appendix E 1 Section 4 and 8, E4 Section 4 and 8 and F3 Section 4	Asked where the trawl sector fished if not shown in the maps. Sought clarification from stakeholder that almost all trawl fishing is undertaken between 200 m and 400 m depth contour. Agreed to consider a 200 m activity limitation on the active source area and see if CGG could also minimise the time the vessel spent in the operational area in waters deeper than 200 m (Event ID 4107).
1281	4107	Fishers reported that squid fishing is concentrated in a specific area and occurs primarily during a limited season, with February being the main month for fishing. They did not raise concerns regarding the overlap of ABARES data collected in April/May/June or September/October/November, indicating a consensus on fishing patterns without noted conflicts.	B8 Section 4, E4 Section 4.2, F3 Section 4.8	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS. Assessments were done on squid fishing.
1282	4107	Expression of interest from the fishers about putting their boats forward for a spotter vessel if required.		Information noted but no further action required.
1283	4133	Tuna Australia's role as the peak body for the longline fishing sector in Australia.		Information noted but no further action required.
1284	4133	Changes in tuna fishing grounds due to climate change and increased fish abundance.	E3	Information was noted. Assessments of fisheries impacts from RSS are inclusive of relevant climate change science. Tuna fisheries are not operating in the activity area.
1285	4152	***Redacted***	C2	***Redacted***

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1286	4180	***Redacted***	See Compensation Protocol for fishers	***Redacted***
1287	4180	***Redacted***	Appendix E 1 Section 4 and 8, E4 Section 4 and 8 and F3 Section 4	***Redacted***
1288	4184	The Stakeholder advised that his main interest was in being across the science underpinning mitigations of the seismic testing.		
1289	4185	Stakeholder provided details of their functions, interests and activities: swim and/or surf and/or dive and/or fish and/or kayak and/or sail and/or watch wildlife in the local area.	E1 Section 8	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1290	4218	Stakeholder advised inability to provide fishing data by area and fishery and explained reasons for this.	E1 Section 4 , F3 Sections 4.5 to 4.14	Information noted but no further action required.
1291	4218	Offered to have a virtual meeting if preferred.		Information noted but no further action required.
1292	4218	Offer to provide CPUE fishery data from 2010	E1 Section 4, F3 Sections 4.5 to 4.14	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1293	4219	***Redacted***	E1 Section 4, F3 Sections 4.5 to 4.14	***Redacted***
1294	4221	Stakeholder requested to be consulted with through their fishing association and not directly with Regia Team		
1295	4233	Stakeholder confirmed Facebook post and email was shared a few weeks ago to all members.	C2	Information used to inform consultation process

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1296	4235	Brief email from stakeholder to Regia stating another proponent has looked at the catch and revenue data three times and reduced their proposed area and potential impacts.	C2	Responses in Event ID 2655, Regia team seeks to understand why SETFIA/SSIA are focused on the aggregate tonnes of fish potentially affected by the survey, especially since higher-resolution catch data may not be relevant for a whole fishery analysis. Following this, Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would likely overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information.
1297	4355	Self-identified as relevant person, stated their FIA's as a commercial fisher.	C2	Information used to inform consultation process
1298	4367	Provided scheduling information and states there will be arrangements for individuals to join online. Explained that companies will have a designated timeslot and be pre-informed of questions to assist them in their presentations.	C2	Information used to prepare for consultation day presentation.
1299	4370	The measures and approach proposed in the planning and design of the survey are seen as approaching 'As Low As Reasonably Practicable' (ALARP) for the operations of the SBT fishery in the Great Australian Bight.		Information was noted as supportive of the Regia MSS EP and its approach. No action required.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1300	4370	Preference for the survey to occur within a specific time period after main fishing operations.		
1301	4370	Preference for the survey to start in the shallower portion of the operational area and progress towards deeper areas.		
1302	4378	The presence and location of the temperature logger mooring in the Otway.		Information noted but no further action required.
1303	4405	Time allocated to CGG to present at consultation day		Information noted but no further action required.
1304	4405	Stated each session will be closed to only Gunditjmara, GMTOAC program staff, National Indigenous Australians Agency Vic region representatives, NOPSEMA representatives and the proponent.	C2	Information used to inform consultation process
1305	4406	Then sender would like to maintain the logger in its current position for the foreseeable future.		Information noted but no further action required.
1306	4407	Stakeholder advised the Titleholder that cultural values are not in their remit and they would have to look into any contacts within their organisation that could assist with the sea country protection program, if required.	C2	Titleholder has confirmed that they would appreciate any further contacts the Stakeholder can provide. (Event ID 4456)
1307	4410	***Redacted***		***Redacted***
1308	4410	Stakeholder emailed to clarify their feedback or information provided can be treated as outlined in the terms of agreement as of the new year.	C2	Information noted but no further action required.
1309	4411	***Redacted***	C2	***Redacted***
1310	4433	The stakeholder provided information regarding their functions, interests and activities as a commercial fisher.	C2	Information used to inform consultation process
1311	4478	Stakeholder confirmed King George Whiting is their principal concern.	C2	Information used to inform consultation process
1312	4492	Stakeholder states 80% of their stock comes from or through the proposed acquisition area	F3 Section 4.12	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS. A comprehensive Assessment has been made of the potential impacts of seismic to the King George Whiting Fishery with no risk to population stability found.
1313	4516	Stakeholder provided fishing locations in Portland and Port Fairy.	OMICC Otway Adjustment Protocol	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1314	4546	Relevant Person resends submission as unsure if it had previously been received.		Information noted but no further action required.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1315	4551	Seismic Effects on marine mammals like whales	B8 Section 8, E7, F3 Sections 4.1, 4.2	Regia EP has conducted a thorough assessment of the literature and found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan.
1316	4627	The stakeholder stated that their organisation's input is not required for correspondence with commercial fishers.	C2	Information used to inform consultation process
1317	4627	The stakeholder noted that while collaboration with the petroleum industry is welcome, the fishers and their organisation's board would determine the policy regarding the specifics for fishers. If negotiating individually offers a better deal, they will pursue that option. Ultimately, fishers will seek what is best for them.		Information noted but no further action required.
1318	4637	Noted King George Whiting have long larval duration that makes the species more susceptible to impacts	E1 Section 4 and 8, E 3 Section 4 and 8 and F3 Section 4.	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1319	4669	The stakeholder responded to the team member's query about the data request and suggested that Regia send a separate data request to the mentioned organisation to clarify its purpose.		Information noted but no further action required.
1320	4669	The stakeholder acknowledged and supported the concept of OMICC and appreciated the advance notice. The organisation would consider their involvement once the letter was received. Stakeholder recommended including another specific organisation in Regia awareness-raising activities.		Information noted but no further action required.
1321	4788	Stakeholder states the distribution of trawl fishing is uneven, with over 90% of the trawl fishery closed due to marine parks, fishery closures, and oil and gas exclusions.	C2	Information noted but no further action required.
1322	4788	Agrees that avoiding depths greater than 200 meters may be beneficial.	A2	CGG will implement an activity limitation of no acquisition beyond 200 m depth contour.
1323	4794	Their primary concerns focus on projects with significant impacts, such as seismic surveys and drilling, along with cumulative effects on Gunditjmara Sea Country.	C2	Given that CGG's project involves a seismic survey, the consultation should have been prioritized. It is therefore puzzling that, to our knowledge, GMTOAC and its members have not met to discuss this matter since February 17, 2024.(Event ID 4973)

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1324	4794	GMTOAC plans to deliver a consultation plan to CGG by late May 2024	C2	Information noted but no further action required. The Regia MSS team have has not been received.
1325	4794	GMTOAC is the corporate representative of the Gunditjmara people.	C2	Information used to inform consultation process
1326	4794	GMTOAC are relevant persons	C2	The Regia MSS confirmed this and GMTOAC were identified as such and contacted at the start of the consultation process on 15th February 2023, inviting consultation and co-design, of both the activity and consultation process. Receipt of the letter was confirmed via phone on 23rd March 2023. (Event ID's 46 & 439)
1327	4794	EJA acts for GMTOAC regarding the Regia MSS.	C2	The Regia team noted this information and it was used to inform the consultation process
1328	4934	Explained shark fishing occurs at depths of 50-183 meters, line fishing from 183 meters to about 600 meters, and trawling from 30 to 1,000 meters, all approximate ranges	Appendix E1 Section 4.5 and 8.	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1329	4938	Stating that the consultation plan will not be finalised before late May 2024.	C2	Information noted but no further action required.
1330	4938	GMTOAC advising that the consultation plan will be provided no earlier than GMTOAC's next Board meeting on 28 June 2024.	C2	Information noted but no further action required.
1331	4938	EJA acts for GMTOAC regarding the Regia MSS.	C2	Information noted but no further action required.
1332	4948	GMTOAC is currently working towards getting technical advice to assist them in developing a consultation plan, the plan will contain minimum standards, preferences and parameters for consultation, and that the plan will not be provided earlier than 28 June 2024.	C2	Information noted but no further action required.
1333	4948	EJA acts for GMTOAC regarding the Regia MSS.	C2	The Regia team noted this information and it was used to inform the consultation process
1334	4953	Informing CGG that the Consultation Plan will be shared with proponents no earlier than the next Board meeting, which has been rescheduled from June 28, 2024, to July 5, 2024, due to Sorry Business in the Gunditjmara community.	C2	Information noted but no further action required.
1335	4953	EJA acts for GMTOAC regarding the Regia MSS.	C2	The Regia team noted this information and it was used to inform the consultation process

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1336	5115	The stakeholder mistakenly reported the maximum foraging range for Fairy Penguins as 37.4 km instead of the correct 30.7 km.	E4 Section 4.5, F3 Section 4.4	Information noted but no further action required.
1337	5117	There are at least 5 main Fairy Penguin breeding colonies along the coastline of Western Victoria: Deen Maar (Lady Julia Percy Island), Middle Island, London Bridge, Gibson Steps, and Lawrence Rocks	E4 Section 4.5, F3 Section 4.4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1338	5117	Penguins gather ashore at these colonies (Deen Maar, Middle Island, London Bridge, Gibson Steps, and Lawrence Rocks) to breed from as early as June through to February the following year.	E4 Section 4.5, F3 Section 4.4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1339	5117	Fairy Penguins: Their main food sources are small schooling fish like anchovies and pilchards, as well as squid and sometimes krill	E4 Section 4.5, F3 Section 4.4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1340	5117	Fairy Penguins: Eggs are laid between June and November, taking 35 days to hatch. Young chicks are guarded for 10-15 days, and parents take turns foraging	E4 Section 4.5, F3 Section 4.4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1341	5117	Fairy Penguins, also known as Little Penguins, are the smallest species of penguin in the world, measuring about 30-35cm high and weighing approximately 1-1.5kg	E4 Section 4.5, F3 Section 4.4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1342	5117	Fairy Penguins are protected under Australian federal law by the Environment Protection and Biodiversity Conservation Act 1999 and under state law by the Wildlife Act 1975	E4 Section 4.5, F3 Section 4.4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1343	5117	During the breeding season, adult penguins take turns every second day to forage for food, leaving before dawn and returning within the first one or two hours after dusk	E4 Section 4.5, F3 Section 4.4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1344	5117	Fairy Penguins: After the chicks are 8-10 weeks old, they begin to fledge, and adults can take longer foraging trips out to sea for multiple days	E4 Section 4.5, F3 Section 4.4	Information was noted and used to inform the analysis and assessment of impacts arising from the Regia MSS
1345	5185	The stakeholder suggested distributing information through their general member updates, a weekly newsletter that typically goes out on Fridays. This approach would effectively reach SIV members and license holders with relevant project updates.	C2	Regia Team confirmed with stakeholder that they would be distributing OMICC and project update information shortly.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1346	5185	Stakeholder asked if project team would like to distribute an Information Sheet to SIV members and license holders per the Engagement Agreement, indicating an opportunity for the project to reach a broader audience.	C2	Regia Team confirmed with stakeholder that they would be distributing OMICC and project update information shortly.
1347	5189	Stakeholder mentions having catch history and data that could be relevant to the management of environmental impacts.	C2	The Regia team responded to the stakeholder, noting that they commercially fish and requesting further information on their activities to enable a full assessment of potential impacts to be completed. They were asked for their preference of communication form and provided with a link to the consultation hub, with project information and interactive map. A record of this correspondence can be viewed in Appendix C2, under Org ID 805
1348	5189	Stakeholder expresses frustration about the amount of seismic tubes, electrical wire, and debris left behind from previous seismic surveys	C2	The Regia team responded to the stakeholder, noting that they commercially fish and requesting further information on their activities to enable a full assessment of potential impacts to be completed. They were asked for their preference of communication form and provided with a link to the consultation hub, with project information and interactive map. A record of this correspondence can be viewed in Appendix C2, under Org ID 805
1349	5190	Fishing locations: Portland, Victoria	C2	The Regia team responded to the stakeholder, noting that they commercially fish and requesting further information on their activities to enable a full assessment of potential impacts to be completed. They were asked for their preference of communication form and provided with a link to the consultation hub, with project information and interactive map. A record of this correspondence can be viewed in Appendix C2, under Org ID 805
1350	5190	Financial impact: provided details on annual turnover	C2	The Regia team responded to the stakeholder, noting that they commercially fish and requesting further information on their activities to enable a full assessment of potential impacts to be completed. They were asked for their preference of communication form and provided with a link to the consultation hub, with project information and interactive map. A record of this correspondence can be viewed in Appendix C2, under Org ID 805

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1351	5194	Advised a mapping consultant would be able to complete the work suggested and provided contact information of a suggested consultant, who was cc'd into the email.		
1352	5195	The stakeholder references the efforts of TGS, who ran their spatial overlap analysis three times, reducing their overlap with commercial fishing by 95% from their initial plan, resulting in nearly a $10 million reduction in potential impact. Similar analysis' by DCCEEW and other wind proponents have also reduced trawling impacts, achieving reductions of up to 99% and 90% in various regions. The stakeholder cites extensive experience in this field over the past 15 years.		Information noted but no further action required.
1353	5227	Stakeholder stating he was citing the Greg Jenkins paper.		Information noted but no further action required.
1354	5228	GMTOAC is developing a Consultation Plan, which will guide its consultation approach with proponents of offshore petroleum Environment Plans. This plan is set to be finalized after GMTOAC's next Board meeting, rescheduled to July 5, 2024, due to Sorry Business within the Gunditjmara community. As the prescribed body corporate under the Native Title Act 2003 and the Registered Aboriginal Party under the Aboriginal Heritage Act 2006, GMTOAC must follow specific decision-making protocols that include deliberative processes. The Consultation Plan is essential for GMTOAC's participation in statutory consultations regarding offshore petroleum activities.		Information noted but no further action required.
1355	5228	EJA acts for GMTOAC regarding the Regia MSS.		Information noted but no further action required.
1356	5228	A full meeting of Gunditjmara native title holders is planned for late October 2024 to discuss and potentially adopt the Consultation Plan.		Information noted but no further action required.
1357	5232	Stakeholder advised required format for documents so they can distribute and stated that once the document is received along with request to distribute, they will action the information sharing.		Information noted but no further action required.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1358	5235	The Operational Area for the Regia MSS overlaps with three foraging BIA's of the Little Penguin. These areas are Deen Maar, London Bridge and Gibson Steps.	Appendix E5, Section 4 and 8, F3 Section 4.4.	CGG has acknowledged the presence and assessed the impacts of seismic sound to Little Penguins in relation to the acquisition area.
1359	5259	Stakeholder provided website detailing their completed activities		Information noted but no further action required.
1360	5261	Stakeholder sharing update of their 2023 activities and those beyond, as well as continuation of existing operations.		Information noted but no further action required.
1361	4409, 4411	Confidential information request for all past and future correspondence, whether verbal or electronic, to be treated as privileged and confidential.		Event ID 4457 email sent to clarify the request, responded in Event ID 4413 that all correspondence and information is to be considered sensitive.
1362	2038	Relevant person expressed the need to ensure statutory notifications are made within a two-hour timeframe to relevant authorities and control agencies, and showed interest in following up on this matter.		We will provide periodic updates to relevant persons in line with a consultation and communication plan for the activity, for example, notifications prior to , during and on completion of the activity. ConocoPhillips Australia noted the request for the provision of information on incidents and spills during the activity and requested information on why this information was being requested and how it would support the relevant persons assessment of the possible consequences on their functions, interests and activities.
1363	5117	Specialist in Fairy Penguins should be consulted with, also Warrnambool Coastcare Landcare Network, Warrnambool Field Naturalists Club, Deakin University, Parks Victoria, DEECA, Warrnambool Council. Also other organisations or members of the community with an interest in Fairy Penguins.		Appendix C1 documents how CGG undertook the consultation process, managed risks to as low as reasonably practicable and an acceptable level, and appropriately responded to, incorporated, and adopted measures based on relevant persons objections, claims, and other feedback. This included a broad capture approach to people and information, including specialists on Fairy Penguins, such as the Middle Island Penguin Project. A record of consultation with these groups, including feedbacks, can be found in Appendix C2.
1364	3873	AFMA notifying Regia team of spelling mistake on commercial fishers information sheet, Troll Fishery should be Trawl Fishery		Corrected the spelling mistake in the information sheet and resent to recipients.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1365	4794 & 4948	GMTOAC asserts that prior interactions with CGG do not constitute proper consultation regarding the Environment Plan (EP) and that formal consultation has yet to begin.		Responded in Event ID 4973: GMTOAC and GMTOAC members had many opportunities over a long period of time to voluntarily participate in the consultation process with CGG. Having extended our consultation timeframe on three separate occasions, for a total of five months longer than originally planned, GMTOAC and GMTOAC members have clearly had a reasonable period to instruct CGG on their preferred consultation plan, provide input into the preparation of the EP, review the measures adopted to protect Sea Country, and meaningfully engage with CGG. To further illustrate their efforts, CGG enclosed a summary table of all communications with GMTOAC during the consultation process for the EP, both before and after the submission of the Regia MSS EP, along with copies of additional correspondence not previously referenced. Hoping that this will demonstrate the breadth of the consultation process and potentially shift their perspective. CGG firmly aligns with the interpretations made in Cooper v NOPSEMA (No 2), and believes our pre-submission consultation efforts were not only lawful and sufficient but also exceeded industry norms. (Event ID 4973).
1366	3355	There is disatisfaction expressed made about the titleholders' use of the word 'claim' regarding feedbacks received.		
1367	3746	The stakeholder provides a summary of their record of correspondence with Regia team, then describes Regulation 11A (1)(d), following which stakeholder states their associations to be Relevant Persons.		CGG identified and contacted the stakeholders associations in February 2023, at the start of the consultation process, requesting engagement (Event IDs 4202, 4203 & 3210).

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1368	3415	The use of 'how' not 'if' language does not allow for Traditional Owners consent.		Advised person that the consultation would not be genuine had CGG included consultation on if the activity should proceed. The Australian government has provided permission for development of this region by awarding titles and CGG is clearly of the position that whether these activities can go ahead has already been asked and answered in the affirmative by the government. Provided advice to lobby the government to change decisions if still dissatisfied. Noted that Sea Country protection was a priority and we'd be seeking engagement from Traditional Owner to establish how Sea Country is best protected.
1369	3639	Preferred communication format is written, may request a video call following this.		CGG offered video calls on stakeholders request (Event ID 3637, 3368)
1370	4384	18 other commercial licence holders (around 10 businesses) in the area and an in-person meeting may be worth the trip.		Responded in Event 4452, requesting to have initial online meetings in order to assess if there were potential impacts.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1371	874	Stakeholder referred to well-documented effects of seismic testing which meant their support could not be given to the project.		Thank you for your interest in the planned Regia marine seismic survey. I can confirm you've been added to our records as an interested community member. Regarding your environmental concerns, we recognise the potential to harm marine life and address this by identifying potential impacts and risks and putting mitigation plans in place. Examples of these include: - Conducting the survey during a time of year marine mammals and fish are less likely to be in the area. - Reducing the sound source to the lowest settings and reducing the number of times the sound source is activated. - Implementing marine mammal and fish monitoring programs during the survey. - Implementing exclusion zones around marine mammals and fish to minimize the potential for injury or harm. - In-field monitoring of the ocean for the presence of marine life. - Following strict guidelines as set by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We will also be publishing environmental assessment documents, and the environmental impact and risk treatments, expected in May, in the document library. The Australian Government requires petroleum and greenhouse gas (GHG) companies to conduct their activities in a manner that meets a high standard of environmental protection. The seismic industry's environmental record in Australia, particularly in offshore areas, has been exemplary. No offshore seismic survey proposal would be approved unless the highest environmental standards had been met. If we can clarify any of the information above, or if you have any questions or comments, please don't hesitate to contact us.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1372	653	Introduction of spatial and temporal buffers to any other seismic activities is advised.		The titleholder responded with an explanation that the industry standard control of 40 km separation distance between operating seismic sources will be applied. The cumulative impact assessment will identify if further spatial and temporal buffers are required to manage impacts to an acceptable level. (Event ID: 1751)
1373	653	Set a limit to the number of days for acquisition at full power and, or, the total distance of sail lines for acquisition at full power.		Titleholder responded by clarifying that there are set limits for the seismic survey with the Maximum days of Operation set to 90 continuous days in a single phase. Maximum days of actual acquisition set to 60 days and Maximum sail line distance set to 1700 km.
1374	918	EMAC representatives at the meeting will communicate the information received back to the Eastern Maar community.		Confirmed consultation process with EMAC was as a representative body
1375	3121	EMAC representative confirming the newsletter sign up was for their role within EMAC, not as an interested individual.		Recorded and consulted as EMAC representative
1376	2413	Recipient agrees to a discussion on activity, confirming direct family member operates SOPEC and they can facilitate contact.		Continued to attempt to make contact to arrange meeting. See Appendix C1, Annex 2, 'Southern Ocean Protection Embassy Collective'
1377	4061	Regia team received this email in error, which states stakeholders intention to not acknowledge receipt of email sent to them, on advice from Org ID 249.		Responded in Event ID 4063, stating disappointed that Regia Teams effort to provide opportunity to engage has been seen as a box ticking exercise. Reconfirming points raised in original email. Offering again opportunity to speak to Regia team regarding project, via email, phone, meeting. Again noting that views can be put forward during public comment.
1522	920	Advised that unexploded ordnance (UXO) may be present on and in the sea floor.		Information noted.
1523	920	The titleholder undertakes exploration activities at their own risk		Information noted.
1524	920	Advised that the DoD doesn't take responsibility for reporting the location or type of UXO that may be in area		Information noted.
1525	920	Advised that the DoD doesn't take responsibility for reporting the location or type of UXO that may be in area		Information noted.
1526	920	Advised the DoD doesn't take responsibility for any loss or damage incurred by Regia MSS or third parties as a result of UXO's in the area.		Information noted.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1383	2774	Individual sent link to article: *The impact of seismic survey exposure on the righting reflex and moult cycle of Southern Rock Lobster (Jasus edwardsii) puerulus larvae and juveniles.*	Appendix B8	Information noted. No action taken as already considered in EP
1384	6410	The eastern SRW population is recognised as being genetically distinct from the western population and is estimated to be around 300 individuals.	Appendix E7 - section 4.3.6	This is described in the EP
1385	6410	The rate of increase of the eastern population is estimated to be 4.7% pa.	Appendix E7 - section 4.3.6	This is described in the EP
1386	6410	SRW females have high site fidelity to reproduction areas, meaning that they return to the same calving grounds each calving year.	Appendix E7 - section 4.3.6	Calving SRW area fidelity is described in the EP: Calving females are known to have high site fidelity and a 3 to 4-year calving interval.
1387	6410	There has been no change over three decades in the annual abundance of cow-calf pairs at Logans Beach in Warrnambool, Victoria, the only established calving ground in south-east Australia.		Evidence shows a broader distribution of SRW, including a broader distribution of cow calve pairs, such that isolating metrics to those beaches near the Regia MSS is a narrow and selective approach to the consideration of impacts to SRW and the SRW population.Watson et al. 2021 is referenced to accurately describe SRW use of Logans Beach.
1388	6410	It is estimated that there are probably less than 12 females regularly using the Logans Beach nursery.		CGG notes that this statement is unreferenced and contradictory to Stamation et al. 2020 which confirms the actual number at Logan's Beach in 2018 as 14.
1389	6411	If Southern Rock Lobster larvae are going to be encountered in the region in which the proposed survey will be conducted, it is likely that they will be the planktonic phyllosoma stage, not pre- and post-settlement stages or eggs	Appendix E4 - Section 9.1.2	This is described in the EP
1390	6411	Octopus populations rely on a small number of well-developed offspring.		The Octopus single reproductive episode is described in Appendix E4, section 4.2.2
1391	6411	Cephalopods demonstrate a high level of intelligence and are reliant on neuromuscular coordination.		Cephalopods are described and assessed in Appendix E4.
1392	6412	Stakeholder states that they have learned that the colony they believed was located at Gibson Steps is actually located at The 12 Apostles.	Appendix E5 - section 4.5	This is described in the EP
1393	6412	Stakeholder states that the correct normal breeding season commencement time is June/July for the Fairy Penguins of Western Victoria.	Appendix E5 - section 4.5	Information was noted and the EP updated

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1394	6415	Provided draft update being distributed to members in organisation newsletter under the engagement arrangement.		Noted for consultation.
1395	6421	The relevant organisation plan to create a map incorporating all Otway Basin Eps that is fit for purpose so native title holders can visualise the extent of various projects and their effects.		Noted for consultation.
1396	6432	information on krill	Appendix E2 - Section 4.1	This is described in the EP
1397	6505	The sender mentions a Python file containing most of the constants and data used to run his experimental simulations.		Noted for consultation.
1398	6507	The sender mentions that N. Australis is the primary food source for Blue Whales feeding in and around the ASA from November onwards.	Appendix E7 - Section 4.3.5	This is described in the EP
1399	6509	Historical monitoring of these penguins has been by the local council.		Noted for consultation.
1400	6509	Professor at Deakin University has been involved in past monitoring activities		Noted for consultation.
1401	6511	The sender mentions the proposed operational windows and suggests excluding November and December.		Titleholder responded to relevant person in Event ID 6432
1402	6512	The relevant person provided cumulative calculations for their model and its key assumptions.		Noted for consultation.
1403	6512	The relevant person provided their interpretation of the Regia team's material, specifically the impact of seismic blasting on zooplankton and krill in the Regia Active Source Area and the Otway bioregion.		Noted for consultation. Titleholder responded to interpretation and modelling in Event ID 6815.
1404	6513	The multiplier effect of currents (between 0 and 1 knot) on krill larvae mortality through the ASA is about 5x.		Noted for consultation. Titleholder responded to interpretation and modelling in Event ID 6815.
1405	6525	The relevant person mentioned a paper that suggests the bounce in zooplankton populations due to decreased phytoplankton grazing is a possibility.		Noted for consultation. Titleholder responded to interpretation and modelling in Event ID 6815.
1406	6525	The relevant person informed that the bioregion provided looks reasons and no triggers relating to krill and relevant stressors exist, with chlorophyll-a not a specific enough proxy for krill distribution.		Noted for consultation. Titleholder responded to interpretation and modelling in Event ID 6815.
1407	6526	Mentions the Gunditjmara Nyamat Mirring and Mirring as potentially affected by the project.	Appendix C1 Annex 2 Appendix F3 - Section 3.16	This is described in the EP

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1408	6526	mentions the Budj Bim Cultural Landscape and its integral outstanding values, such as the endangered Kooyang.	Appendix E1 Appendix F3	This is described in the EP
1409	6526	mentions the endangered Pygmy Blue Whale and Southern Right Whale as potentially affected by the project.	Appendix E7 - Sections 4.3.5 & 4.3.6	This is described in the EP
1410	6526	mentions the Kooyang's lifecycle, its migration through the EMBA and/or Operational Area of the EP, and any associated impacts on the Budj Bim Cultural Landscape.	Appendix E7 - section 4.3.6	This is described in the EP
1411	6526	Mention of key feeding, breeding/ calving and transits to and from biologically important areas for key whale species.	Appendix E7 - section 4.3.6	This is described in the EP
1412	6526	Mention of the lifecycle of the Kooyang and its migration through the EMBA and/or Operational Area for the proposed activities.	Appendix E7 - section 4.3.6	This is described in the EP
1413	6526	The relevant person mentioned that under traditional law and custom, Gunditjmara are compelled and have a cultural duty to protect Mirring and Nyamat Mirring. Under traditional law/lore, this is not optional, but mandatory.	Appendix E1 - Section 4.6.2.1	This is described in the EP
1414	6532	Individual questioned the reliability of older estimates of little penguin populations due to rapidly changing ecosystems and increasing predation pressure from recolonising New Zealand fur seals.		Little Penguin are assessed in Appendix E5, with a further assessment in Appendix F3, section 3.4, that discusses population numbers and predation.
1415	6541	Individual stated no monitoring of little penguins had been possible on Middle Island for the last two breeding seasons due to rough sea conditions.		This is described in EP Appendix F3, section 3.4
1416	6541	Individual stated that maremma dogs have returned to Middle Island.		Noted.
1417	6541	Individual stated that penguin tracks had been observed on Middle Island, though it did not help with population estimates.		Noted.
1418	6541	Individual attached graphs depicting the number of arrivals and estimated population sizes during their involvement in the Middle Island project.		Little Penguin are assessed in Appendix E5, with a further assessment in Appendix F3, section 3.4, that discusses population numbers.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1419	6562	Individual stated that they did not consider themselves eligible for compensation as they dive close to shore and therefore had not been personally affected.		Noted.
1421	6654	Individual stated that due to extreme weather conditions over the last couple of seasons, an accurate penguin count had not been able to be completed for the Middle Island Colony.		Little Penguin are assessed in Appendix E5, with a further assessment in Appendix F3, section 3.4, that discusses population numbers.
1422	6654	Individual informed that an estimation of the population of the Middle Island penguin colony had not been able to occur since 2020/21 due to insufficient data.		Little Penguin are assessed in Appendix E5, with a further assessment in Appendix F3, section 3.4, that discusses population numbers.
1423	6654	Individual suggested reaching out to Parks VIC for more recent data on the Little Penguin colony at the 12 Apostles site.		Noted for consultation.
1424	6654	Provided key penguin statistics for 2020/21, 2021/22, 2022/23 and 2023/24 reports.		Noted for consultation.
1425	6691	Relevant person provided updated office address for meeting.		Noted for consultation.
1426	6630	Provided location and time for the 14 February 2025 meeting with the Regia team.		Noted for consultation.
1427	6630	Provided a cost estimate and fee schedule for meeting with the Regia team.		Noted for consultation.
1428	6630	Gunditjmara's obligations to Mirring (including Nyamat Mirring) are dictated by traditional lore, law and custom and apply irrespective of whether Mirring is subject to a determination under the Native Title Act 1993 (Cth) or not.	Appendix E1 - Section 4.6.2.1	This is described in the EP
1429	6870	Provided a link to the Offshore Petroleum: Special Prospecting Authority, Access Authority and Scientific Investigation Consents Guideline		Noted.
1430	6702	The relevant organisation provided their draft position on the agenda items for meeting with the Regia team.		Noted for consultation.
1431	6816	The relevant person had extended their model to attempt to quantify the impact of Nyctiphanes australis depletion by Regia MSS on the food source of Blue Whales in the region.		Noted for consultation. Titleholder responded to interpretation and modelling in Event ID 6815.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1432	6676	GMTOAC and Gunditjmara consult and negotiate by way of a full group meeting, including because their rights and interests are held communally.		Noted for consultation.
1433	6879	Informed that Middle Island Penguin Project had not been able to get onto the island and it had been difficult to complete a population count.		Little Penguin are assessed in Appendix E5, with a further assessment in Appendix F3, section 3.4, that discusses population numbers.
1434	6879	Informed that Middle Island Project is funded by donations, council and dog tours.		Noted.
1435	6878	Provided information that 2024 whale season was poor.		Noted. Whale are assessed in Appendix E7 and Appendix F3.
1436	6878	Provided information that there is a small SRW population in the east and that they are highly variable with their calving cycles stretching out.	Appendix E7 - Section 4.3.6	This is described in the EP
1437	6878	Informed of a SRW migratory corridor as well as a separate breeding population.	Appendix E7 - Section 4.3.6	This is described in the EP
1438	6878	Informed that more research needed to be done about the difference in SRW calls during migration.		Noted. Whale are assessed in Appendix E7 and Appendix F3.
1439	6878	Informed that Eastern Maar people were a prescribed body corporate comprised of 13 families.		Noted for consultation.
1440	6878	Informed that the September project window was preferable due to SRW presence in the local area.		Noted.
1441	6878	Relevant person informed that they were interested in tagging whales but that it had ethical complications.		Noted.
1442	6966	Relevant person provided NatureKit link to 2022 and 2023 SRW data	Appendix E7 - Section 4.3.6	This is described in the EP
1443	6966	Relevant person informed that the best way to keep track of SRW sightings during the season is via the sightings map in WhaleFace.		Noted. Used for sighting information in Appendix E7, section 4.3.6 (SWIFFT)
1444	6893	Relevant person provided details of their responsibility as part of the Middle Island Project Committee for annual population counts of the Little Penguins on Middle Island over the summer period.		Noted for consultation.
1445	6893	Relevant person informed that they had been unable to safely cross to Middle Island for a Little Penguin population count the past 2 summers due to deep channels forming in the Merri River.		Little Penguin are assessed in Appendix E5, with a further assessment in Appendix F3, section 3.4, that discusses population numbers.

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1446	6894	Relevant person provided information that arrival counts and breeding monitoring of Little Penguins is undertaken by volunteers from Warrnambool Coastcare Landcare Network.		Noted for consultation.
1447	6894	Relevant person provided contact information for Warrnambool Coastcare Landcare Network.		Noted for consultation.
1448	6886	Relevant person informed that sightings from SRW monitoring program WhaleFace are submitted to the Victorian Biodiversity Atlas (VBA) where it is publicly available.	Appendix E7 - Section 4.3.6	This is described in the EP
1449	6886	Relevant person provided information on how to extract SRW sighting data up to 2021 via NatureKit.	Appendix E7 - Section 4.3.7	This is described in the EP
1450	6886	Relevant person informed that 2024 SRW sighting data was being processed and not yet submitted to the VBA but 2024 sightings could be viewed via Sightings Map in WhaleFace portal	Appendix E7 - Section 4.3.8	This is described in the EP
1451	6887	Relevant person confirmed that in an emergency situation to ensure safety of life at sea, while trying to minimise environmental impact, the Regia team were allowed to transit through a marine park to reach a safe location, noting that acquisition gear would be turned off and not discharging any sound source.		Noted.
1493	6752	The relevant person confirms that the text in the attachment can be included in the next e-news update to members, scheduled for February 7th, in accordance with the terms of the Engagement Agreement.		Noted for consultation
1494	6753	The relevant person expresses gratitude for the advice provided and confirms that they are the key contact for the Association moving forward.		Noted for consultation
1496	6755	The relevant person attached a slightly updated version of update which they feel is clearer.		Noted for consultation
1516	6876	Informed that catch rates were falling because fishers were not getting the recruitment.		Catch rates are shown and described in Appendix F3 section 3.5
1517	6876	Informed that fishers are targeting red crays because of markets.		Noted. Red cray or the Murray spiny freshwater crayfish is not present in the operational area.
1518	6876	Informed that fishers can hear seismic activity on their vessels.		Noted

Feedback ID	Event ID	Feedback Summary	EP Reference	Titleholder Response
1520	6876	Fisher provided information that it would be good to have a website with lookaheads including telephone numbers and email addresses for the vessel.	Appendix B3 - Section 8.1	This is included in the implementation strategy.

Annex 6 – Information Requests

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2000	2686	Request for information on how the proposed activity may impact the community, marine environment, and marine species.	The titleholder responded with an explanation of how the Regia MSS team addressed potential harm to marine life by identifying potential impacts and risks and putting mitigation plans in place. They also provided detailed examples of these mitigation plans in their response, and provided information on where to find relevant documents within the EP (Event ID 1912).
2001	2686	Request for stated commitments on reducing impacts to the marine environment and species.	The titleholder responded with examples of mitigation plans and industry standard controls for seismic surveys that will be implemented to reduce potential impacts to marine life. The titleholder also provided information on where to find relevant documents within the EP (Event ID 1912).
2002	2687	Request for a map of the EMBA	The titleholder responded by providing the stakeholder with the latest map showing the current activity area and exclusion zones implemented during the stakeholder engagement process, and requested that the stakeholder share the map with communities/areas the stakeholder is active in (Event ID 1912).
2003	2687	Request for information on in-person community consultations within Tasmania.	The titleholder provided information about the upcoming presence of a Regia MSS team member's presence on King Island, and offered for the stakeholder to meet with them. The titleholder also offered to hold an online information session for the stakeholder organisation (Event ID 1918).
2004	1831	Request for approximate dates for seismic blasting.	The titleholder responded with an explanation around how the Regia MSS team were still gathering information through engagement and consultation, therefore no acquisition dates had been decided at the time of the correspondence from the stakeholder (Event ID 2910). Project updates will continue through out the activity.
2005	2708	In-person meeting to discuss publications concerning the scope and impacts of the offshore project proposed for the Victorian coastline.	The titleholder responded by thanking the stakeholder for their engagement, offered to arrange a meeting once relevant documents had been finalised, and offered to arrange a webinar tailored to the stakeholder groups needs. The titleholder also provided information on the topics covered in a recent webinar hosted by the titleholder (Event 1889).
2006	4091	Requested details on how risks of the proposed activity will be reduced and how the effects of seismic testing will be monitored.	The titleholder responded with an explanation of the information sources used to inform the Regia MSS impact and risk assessments, and explained how these information sources and resulting measures are specific to the potential impact. The titleholder also made reference to documents relevant to this claim within the environment plan (Event ID 4092).
2007	4091	Question about the compatibility of the proposed activity with international emissions goals.	The titleholder responded with information on The International Energy Association (IEA) World Energy Outlook (WEO) 2021, Net Zero Scenario, the AEMO prediction of shortfalls of gas, and the current government policy. It was also noted that matters of national energy policy are not within the purview of CGG or the Regia MSS. (Event ID 4092).
2008	4091	Question about whether NOPSEMAs decisions will be consistent with the federal governments Threatened Species Recovery Plan.	The titleholder confirmed consistency with the Threatened Species Recovery Plan and provided a relevant extraction from NOPSEMAs Environment Plan decision making guideline document. (Event ID 4092)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2009	4091	Question about consultation with BirdLife Australia.	The titleholder responded with a statement that they will contact the mentioned stakeholder (Org 333), and included the email address they would use to make this contact (Event ID 4092)
2010	2953	Requested notes from missed event.	The titleholder provided a document containing the requested meeting notes (Event ID 1441).
2011	1281	Requested the minutes from the Warrnambool meeting.	The titleholder provided a document containing the requested meeting notes (Event ID 1441).
2012	4571	Enquired about the next opportunity for in-person small group consultations and there was a plan for more open community sessions in Warrnambool	The titleholder responded with details about the next occurrence of a Regia MSS team member being in the relevant area. The titleholder also offered the option of arranging alternative forms of communication prior to this in-person meeting (Event ID 1729).
2013	2956	Requested the minutes from the Warrnambool Session held at the Surf Club.	The titleholder provided a document containing the requested meeting notes (Event ID 2392).
2014	2958	Enquired about the next date in August for in-person small group consultations in Warrnambool.	The titleholder responded with the relevant dates that a Regia MSS team member would be at the mentioned location for in-person consultation (Event ID 1970 & 2392).
2015	1327	Requested in person meeting to understand more about Regia MSS' processes, environmental considerations and legislative requirements.	The titleholder responded with a proposed date and time to meet the stakeholder (Event ID 1353).
2016	4208	A rationale for choosing the 5 km buffer zone was requested.	The titleholder responded stating that the Regia MSS team undertook a series of risk and impact assessments for the activity. The titleholder then explained how they considered the Twelve Apostles Marine National Park and the Arches Marine Sanctuary Management plan, with relevant highlights shown in a table, providing the rationale for the 5 km buffer. (Event ID 4220).
2017	1893	EPA Victoria would like to be kept informed of activities and progress with the Regia EP.	EPA were placed on the campaign email list, to receive project updates.
2018	2192	Stakeholder requested a meeting between available dates and times outlined within the email.	Titleholder contacted Stakeholder to confirm alternate date and time for the requested meeting. (Event ID 2243)
2019	2244	Stakeholder requested alternate meeting date and time.	Titleholder contacted Stakeholder to confirm alternate date and time for the requested meeting. (Event ID 2243)
2020	3697	Requested single map of the TGS survey and the Regia MSS.	Map provided (Event ID: 3890, Document ID 3086)
2021	4106	Asked whether he'd be eligible for compensation.	Stated that the protocol would allow for commercial fishers to make a CPUE claim if they had a catch history in the area. (Event ID 4106)
2022	740	Why seismic again, there has been a lot in the region before?	Clarified that we're surveying mostly where there has been no seismic before. Clarified where the activity planning area is (Event ID 740).
2023	740	Stated the time of year we survey is important to know.	Explained that this isn't set yet as we'd like input from fishers and the community about when the best time to survey might be (Event ID 740).
2024	917	Details about the timing, duration, and exclusion zones of seismic testing.	Responded (Event ID 1018) with information and requesting a meeting to discuss further (Event ID 2011)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2025	2179	Details about the timing, duration, and exclusion zones of seismic testing.	Responded (Event ID 1018) with information and requesting a meeting to discuss further (Event ID 2011)
2026	2179	Information on the impact of seismic testing on marine species.	Responded (Event ID 1018) with information and requesting a meeting to discuss further (Event ID 2011)
2027	2259	The stakeholder requested further information regarding the impact of the proposed activity on the Warrmambool community and marine environment.	The titleholder responded identifying potential impacts and risks and putting mitigations in place, such as conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, and following strict NOPSEMA guidelines. Also provided information on how activity should not affect recreational activities. Provided link to PEIRA. (Event ID 783)
2028	834	Request for information on the activity, environmental considerations, consultation process and regulations.	The titleholder responded with the requested information. (Event ID 833)
2029	839	Request for information on the activity, environmental considerations, consultation process and regulations.	The titleholder responded with the requested information. (Event ID 838)
2030	1258	Request for information on the activity, environmental considerations, consultation process and regulations.	The titleholder responded with the requested information. (Event ID 1257)
2031	1747	Asking who the Federal Minister is who has given permission for this activity	The titleholder responded with information on the regulations and authorisation process (Event ID 2787)
2032	3450	The stakeholder requested information regarding how the safety of the marine ecosystem would be ensured in the Bonney Upwelling zone.	The titleholder responded with information on assessment of, and mitigations for, the ecosystem and the Bonney Upwelling Key Ecological Feature. (Event ID 3450)
2033	3450	The stakeholder asked if any cultural heritage sites had been identified across the operational area.	The titleholder responded with information on assessment of, and mitigations for, cultural heritage. (Event ID 3450)
2034	3450	the stakeholder asked if there was traditional owner consent to impact their whale songline and sea country.	The titleholder explained that consultation with relevant persons which is not a consent seeking activity, rather a mechanism designed to be able to information share, allowing titleholders to consider, and put appropriate measures in place to address, potential impacts on functions, interests, or activities. (Event ID 3450)
2035	168	Further information required includes proposed activity location/s, proximity to Australian Marine Parks, Impacts to marine park values, and risk mitigations.	The titleholder responded with the relevant documents and shape files for both the proposed activity and environmental planning. The titleholder confirmed that they were refining the project they engaged with stakeholders therefore changes/refinements to the areas or plans may occur. (Event ID: 559, Document ID: 333)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2036	1446	Stakeholder requested an attached data request form be completed and advised approx. 6 week data request timeframes.	The titleholder responded with a completed form and a request for data on a number of fisheries. (Event ID: 1728, Document ID: 924)
2037	3400	Stakeholder responded to meeting information request to advise the points of interest they wanted clarified and gave options for convenient meeting times. Points for clarity were regarding research done on impact to marine life, mitigation measures, and impacts on state marine national parks.	The Titleholder provided the information requested (Event ID 3411) for discussion in meeting (Event ID 3783)
2038	3752	Stakeholder responded to correspondence to advise they weren't able to locate a specific document and request it be sent to them via email.	Titleholder responded explaning the information they are looking for in within the provided documents (Event ID 3753)
2039	421	Stakeholder took part in an online survey and advised they would like to receive further information regarding the project risks, impacts and processes.	The titleholder responded with the requested information. (Event ID 690)
2040	4381	Stakeholder queried the duration of the comment period for the EP as they couldn't find it on NOPSEMA website.	The titleholder responded with the requested information. (Event ID 4448)
2041	1655	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2806)
2042	1659	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2688)
2043	1661	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2817)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2044	1662	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2780)
2045	1663	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2785)
2046	1665	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2809)
2047	1668	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2771)
2048	1672	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2772)
2049	1670	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 3190)
2050	2586	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2812)
2054	4476	Stakeholder requested a timeline update regarding the EP and dates required for feedback.	The titleholder responded with the requested information. (Event ID 4499)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2055	4483	Stakeholder Enquired if there is an anticipated date for EP submission and noted they haven't received feedback on the information sheet.	The titleholder responded with the requested information. (Event ID 4499)
2056	4552	Stakeholder requested information on whether previously discussed survey research and analysis has taken place and if so, requested the findings to be shared.	The titleholder responded with the requested findings. (Event ID 4542)
2057	4600	Stakeholder queried if a similar analysis to those previously reported could also be done for King George Whiting catch in Corner Inlet also to address more queries they are receiving.	Titleholder responded confirming this is something they were exploring, if it is possible to gain access to data. (Event ID 4599)
2058	1653	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2936)
2059	2702	Why does the operational area include a large area in waters less than 50m deep off the Warrnambool - Portland area when you advise that you will no longer to acquire data in these areas.	The Titleholder responded explaining that the operational area is where the vessel may be present, the active source area (in pink) is where the sound source may be discharged at full-power and data acquired. Data won't be acquired in water shallower than 50m. (Event ID 2558)
2060	3209	The Stakeholder requested to know the qualifications of the Regia Team.	The Titleholder responded explaining that the team is comprised of specialists in several areas, including Environmental Science, along with contracted companies and scientists to complete project reports. Examples provided. (Event ID 2410)
2061	4184	Stakeholder requested information on mitigation methodology	Titleholder responded explaining the assessment and mitigation process. Provided links to PEIRA documents (Event ID 1764)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2062	4389	The Stakeholder quoted from project information on the NOPSEMA website, namely “The Regia 3D MSS will take a maximum of 90 days to acquire, and may be undertaken in any month except January, February, and March. The precise timing of the survey is subject to vessel availability, weather conditions and other operational considerations, and will consider the seasonality of environmental sensitivities, where practicable.” Stakeholder then asked "Does this mean CGG is willing to conduct seismic surveying over southern right whale calving grounds, including the Logan’s beach exclusion zone, during calving season?"	The Titleholder responded by email confirming that there will not be seismic surveying over the Southern Right Whale (SRW) calving grounds, during calving season. (Event ID 4390)
2063	4450	Stakeholder thanked representative for helping her understand CGG’s proposed Regia 3D Marine Seismic Survey and asked a couple of clarifying questions. "Looking at the map... link: Industry environment plans (nopsema.gov.au) it looks like the active source area and the operational area run parallel to Logan’s Beach Whale Nursery. Would it be correct to say that the active source area runs parallel to Logan’s Beach Whale Nursery, but does not overlap it? And what about the operational area?	The Titleholder responded in an email exchange, confirming parallel to the coast, but more than 16 km offshore at the closest point to Warrnambool. (Event ID 4451)
2064	3356	Stakeholder requested confirmation of the meeting start time and location.	Titleholder provided this information in Event ID 3073
2065	1259	Stakeholder queried the Environmental impact of the process on the community.	Titleholder responded confirming individual had been added to Regia MSS records as an interested community member and requested the individual outline their functions, interests and activities in the area and any specific concerns they may have regarding the activity. Titleholder provided links to the PEIRA and consultation website and attached the NOPSEMA brochure. (Event ID 1260)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2066	3035	The sender requests to remain informed about the proposed Otway Seismic Survey.	Titleholder responded requesting the individuals outline their functions, interests and activities in the area and any specific concerns they may have regarding the activity. Titleholder provided links to the activity description and consultation website and attached the NOPSEMA brochure.
2067	722	Request for independent research results on the harm caused by seismic blasting and asked for a document defining "adequate community consultation".	Titleholder responded providing a link to the PEIRA and advised that individual would be able to view the reference list of research used. Titleholder provided context on the difference between relevant person consultation and community consultation and went on to provide outline what information has been available for members of the community and approaches used for engagement. (Event ID 2819)
2068	2926	Clarification on phasing the activity.	Titleholder responded providing clarity on the phasing of the activity, specifically the protection of whales by providing the Protection of Marine Mammals document (Event ID 387) and shared that the full Marine Mammal Adaptive Management Plan would be available via the consultation website one completed.
2069	2926	Process for sending out pre-survey notifications and community awareness.	Titleholder responded providing general approach for communicating with relevant persons and interested members of the public for the project. Titleholder advised that SMS notifications would be used when the activity occurred to provide vessel location information to ocean users that may be affected and queried if the individual had a preferred notification method or any additional recommendations for notifications (Event ID 387)
2070	2926	Request for a detailed map with a legend including the permit zone.	Titleholder responded providing map that included a legend and an outline of the permit. (Event ID 387)
2071	2926	Request for a list of stakeholders/contracted and subcontracted companies involved, specifically marine fauna observations.	Titleholder advised that MFOs had not been contracted as yet and provided the name of two companies that frequently provided these services. (Event ID 387)
2072	2926	Inquiry about MFO training procedures.	Titleholder responded advising that the companies providing the service provide training materials for MFOs and that CGG did not have access to this training material and that it was not publicly available. Titleholder sought to clarify if the individual had a specific concern or wish to know what was included in the training and key documentation. Titleholder went on to provide and overview on how contracted MFOs met the requirements under the EPBC Act Policy Statement 2.1 and that the EP would detail competency requirements for MFOs and ongoing awareness. Also provided a link to the Regia MSS Implementation Strategy (Event ID 387)
2073	2926	Question about testing Modular Buoys for PAM and the study schedule.	Titleholder responded outlining plans to test tethered buoys with passive acoustic monitoring technology and committed to providing results of test when complete. (Event ID 387)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2074	1395	Stakeholder requested clarification on being classified as a 'relevant person'.	Titleholder responded outlying requirements of titleholders to respond to concerns raised about the Regia MSS, including evaluation, mitigation and response requirements. Titleholder advised the individual that they had a duty to consult but that the consultee was not obligated to participate in consultation. Titleholder provided the Consultation Framework flyer and Engagement Plan (Event ID 3022).
2075	2089	Request for clarification on the exploration part that people are most worried about.	Titleholder responded to online comment via email asking if the individual would like to opt-in to ongoing correspondence on the Regia MSS. The titleholder also requested more information from the individual including interest/activities in the area and any specific concerns they might have about the proposed activity.(Event ID 1338)
2076	2089	Inquiry about the impact of seismic blasting on the Bonney upwelling and marine mammals.	Titleholder responded to online comment via email asking if the individual would like to opt-in to ongoing correspondence on the Regia MSS. The titleholder also requested more information from the individual including interest/activities in the area and any specific concerns they might have about the proposed activity.(Event ID 1338)
2077	2089	Inquiry about whether comments are still allowed on the map.	Titleholder responded to online comment via email asking if the individual would like to opt-in to ongoing correspondence on the Regia MSS. The titleholder also requested more information from the individual including interest/activities in the area and any specific concerns they might have about the proposed activity.(Event ID 1338)
2078	1452	Request for information on whether the beaches will be shut off during testing.	Titleholder responded via email confirming the individual had been added to Regia MSS records as an interested community member. The titleholder also requested more information from the individual including interest/activities in the area and any specific concerns they might have about the proposed activity and provided the NOPSEMA brochure. Titleholder advised that the summaries on sound and marine mammals would be provided when finalised. (Event ID 1492, 1745)
2079	1453	Request for information on how the activity will affect the community and environment	Titleholder responded via email confirming the individual had been added to Regia MSS records as an interested community member. The titleholder also requested more information from the individual including interest/activities in the area and any specific concerns they might have about the proposed activity and provided the NOPSEMA brochure and consultation framework flyer. Titleholder provided overview of the activity, the environmental assessment process, the consultation process, and regulations and regulatory process. Links to the PEIRA, Community Consultation and Engagement Plan, and document library were also provided (Event 1454)
2080	3229	Stakeholder advising that any anomalies found that may be a potential heritage site must be reported to Heritage Victoria and noted that the Minister is also to be notified.	Titleholder responded acknowledging information provided regarding reports and enquired as to whether individual would like to receive updates about the proposed activity (Event ID 558)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2081	1455	Requested more information and consultation on the effects of this activity on Warrnambool, Port Fairy and its surrounds.	Titleholder responded via email confirming the individual had been added to Regia MSS records as an interested community member. The titleholder also requested more information from the individual including interest/activities in the area and any specific concerns they might have about the proposed activity and provided the NOPSEMA brochure and Activity Description flyer. (Event 1456)
2082	1656	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement.
2083	1669	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement.
2084	1673	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement.
2085	2766	Request for clarification on how concerns about environmental risks will be mitigated.	Titleholder responded providing overview on environmental risk management that included scientific data on marine surveys, protection of the marine environment and links to five large scale studies on MSS in Australia. (Event ID 1862)
2086	2766	Request for information on how the seismic testing proposal aligns with the push for renewable resources and consideration of marine environment vulnerability.	Titleholder responded providing a perspective on the role of gas in the Australian and global energy mix. (Event ID 1862)
2087	2677	Request for further information on direct primary research into the safety of activities in the Port Fairy area.	Titleholder responded outlining how environmental information not specifically related to the location of the activity can be used to inform the description of the existing environment in an EP. Titleholder also provided insight that research and data from the Otway and other applicable regions had been used to inform the Regia MSS assessments and measures and provided a link to an example. (Event ID 1907)
2088	2773	Request for the recipient to listen to a recording regarding concerns raised by the community and scientists prior to the seismic survey.	Titleholder responded clarifying the Regia MSS activity and sharing link to consultation opportunities for other drilling activity the individual referred to. Titleholder provided information on the marine environment including links to the PEIRA, environmental impact and risk treatments and links to five large scale studies on MSS in Australia. (Event ID 2281)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2089	2773	Request for comparison of the damage done to one species with the potential impact of the recipient's activities.	Titleholder responded providing outlines on rock lobster, whales, oil spill and the marine environment. (Event ID 2281)
2090	2383	Role-Modelling: Request for Regia MSS to reflect on their ethical responsibilities and consider the positive qualities they demonstrate to society.	Titleholder responded providing CGG perspective on need for gas in Australian energy mix and role in energy transition. Provided clarification on range of terms and names and advised that the claims related to the ongoing need for gas whilst not relevant to the adverse effects of the activity, would be provided to NOPSEMA. (Event ID 2815)
2091	2383	Request for clarification on how concerns regarding environmental risks and indigenous heritage will be mitigated.	Titleholder responded providing outline on current activity limitations put in place because of consultation around First Nations considerations. Provided outlying on approach to marine mammal protection, requirements of titleholders under EPBC Act Policy Statement 2.1 and other controls being considered for the activity. (Event ID 2815)
2092	2383	Request for an explanation on the rationale behind taking significant risks with the marine environment amidst the push for renewable resources.	Titleholder responded providing overview on environmental risk, specifically scientific data on marine seismic surveys. This included the assessment that impacts to displaced marine fauna are typically short term with no impact to ecosystem function, providing an overview on the legislations and providing links to five large scale studies undertaken in Australia on MSS. (Event ID 2915)
2093	115	Request for details of the proposed seismic activity in the Otway Basin. Request for more information or previous environmental plans related to the seismic blasting.	Titleholder responded by sending newsletter (Event ID 1182), a summary document for a SIMOPS plan for comment and review (Event ID 1752) and providing the Activity Overview and Consultation Framework information sheets and the NOPSEMA brochure (Event ID 1757)
2094	3203	The stakeholder requests clarification on the purpose of the documents and outlines for discussion with the Managing Director.	Titleholder responded clarifying that intent of contact was to establish if the organisation was a stakeholder or interested party for the Regia MSS, provided additional links on how to engage and where to find more information about the activity. (Event ID 621)
2095	353	The activity	Titleholder responded providing Activity Overview Flyer and NOPSEMA Brochure (Event ID 1755)
2096	353	The environmental assessment process	Titleholder responded providing link to the PEIRA (Event ID 1755)
2097	353	Environmental aspects (i.e. the ways the activity interacts with the marine environment)	Titleholder responded providing link to the PEIRA (Event ID 1755)
2098	353	Predicted levels of environmental impact	Titleholder responded providing link to the PEIRA (Event ID 1755)
2099	353	Predicted levels of environmental risk	Titleholder responded providing link to the PEIRA (Event ID 1755)
2100	353	The environmental management of the activity	Titleholder responded providing link to the PEIRA (Event ID 1755)
2101	353	The consultation processes	Titleholder responded providing Consultation Framework Flyer (Event ID 1755)
2102	353	The regulations or the regulatory processes	Titleholder responded providing overview of regulatory process, including NOPSEMA's role in assessment. (Event ID 1755)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2103	649	The stakeholder requests information on the estimated size of the Environmental Planning Area and the Activity Planning Area.	Titleholder provided the estimated size of the Environmental Planning Area and the Activity Planning Area in Event ID 3154.
2104	3173	Request for a briefing with a focus on what is proposed, approval process and timelines along with any impact assessment/environmental assessment that you able to share.	Titleholder provided in person briefing, presenting the requested information and responding to questions (Event ID 2322)
2105	3178	A request for Matt's surname is made by the stakeholder.	Titleholder provided this information in Event ID 899.
2106	3182	The stakeholder requests a written response to the paper "McCauley et al. 'Widely used marine seismic survey air gun operations negatively impact zooplankton' 2017."	Titleholder provided written response to the paper (Event ID 2356)
2107	626	Request for the coordinates of the EP boundary in Excel format.	Titleholder provided the requested coordinates (Event ID 724)
2108	4370	Forward reports for baseline surveys, plankton, fish, and whales, and observations/sightings from ongoing aerial surveillance for marine mammals.	Titleholder will provide all information post-survey.
2109	4370	Reports of sound source verification, particularly at a distance seaward of the survey area.	Titleholder will provide all information post-survey.
2110	4370	Updates on survey progress and daily/weekly look-ahead.	Titleholder will provide look ahead and project updates
2111	2762	The stakeholder requests information on the survey's location to assess if potential impacts on fishing operations.	Titleholder provided latest map in Event ID 1788, offered stakeholder co-ords if they would prefer. Event ID 2642 followed up following area refinement with updated map.
2112	2742	The stakeholder requested the recipient to send through any specific information about the potential impacts of their work on Bunurong Country.	Titleholder responded in Event ID 2386, with information on how Regia may have potential impact. Providing map showing overlap, stating potential impact oil spill, explaining that concerns can be outside of RAP area.
2113	832	Request for waste management plan.	Titleholder provided information on garbage management plan and commitments. Offered to share the specific garbage management plan once vessel has been contracted. (Event ID 831)
2114	832	Request for any plan for disposal of crude oil balls.	Titleholder clarified to stakeholder that the vessels only carry marine diesel, which does not result in oil balls. (Event ID 831)
2115	1831	The stakeholder requests the approximate dates of the seismic blasting.	We are currently still gathering information through engagement and consultation, so as yet we don't have acquisition dates.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2116	4133	Tuna Australia requests a map from proponents to determine potential impacts on member interests.	Map provided
2117	1181	Tuna Australia wishes to be contacted when any proposed activity has the potential to impact vessel navigation, fishing activities, and/or the conservation of fish resources consistent with the Offshore Petroleum and Greenhouse Gas Storage Act 2006.	Titleholder responded acknowledging Tuna Australia's position on consultation on offshore activities and requested the services agreement be provided for consideration. Titleholder requested how under a services agreement, Tuna Australia could provide evidence that they had authority to represent Tuna Fishers in consultation with titleholders and requested a full list of members they represented to ensure Regia MSS did not duplicate consultation efforts. (Event ID 1177)
2118	3383	Consultation not conducted through Tuna Australia's fee for service is likely to be incomplete.	Titleholder responded advising they would like to engage Tuna Australia per the provided proposal and noted that they would also need to contact fishers per the AFMA data base and outlined reasons for this. (Event ID 3796)
2119	604	The stakeholder requests an email from March 10th to be resent.	The email in question is resent to the stakeholder. Event 605.
2120	969	The stakeholder requested a phone number to discuss a meeting.	Phone number provided, Event 3166.
2121	3167	The stakeholder requested maps of the proposed Regia seismic area.	Map provided, Event 1176.
2122	5261	Request to be kept informed on any timing of offshore works.	Replied to stakeholder informing them that their details had been forwarded to Regia Environment Manager who would keep them updated as part of the ongoing consultation process
2123	3917	Request for proposals to mitigate the impact on the squid fishery during the survey period and on squid reproduction in the long term.	Titleholder responded requesting confirmation that the individual was referring to the Regia MSS and confirmed previous registration and historic communications and information provision, including a map. Titleholder advised of reduced activity and operational areas and active source areas. Titleholder confirmed the Southern Squid Jig Fishery had been identified and assess in impact assessments and provided outline on current proposed mitigations and effectiveness. Provided overview on adjustment protocol and outlined future consultation. (Event ID 4464)
2124	5189	There was not any information requested within this event.	Titleholder responded providing overview of OMICC, the adjustment protocol
2125	5190	Request for details on how compensation will be provided	Titleholder responded providing overview of OMICC, principles of compensation approach and basic application process. (Event ID 5241)
2126	1051	Information needs related to the activity, environmental assessment process, environmental aspects, predicted levels of environmental impact and risk, environmental management, consultation processes, and regulations or regulatory processes.	Titleholder responded confirming individual had been added to records as an interested community member and provided overview of activity, the legislative framework, and the consultation process. Titleholder also provided links to the consultation website and PEIRA. (Event ID 1052)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2127	2830	Enquired about the investigation into underwater noise capture methods.	Titleholder responded confirming approach to consultation and consultation requirements. Titleholder provided clarification on the use and attributes of an acoustic blanket in an MSS and provided anecdotal information received through consultation regarding the marine environment in the operational area. Titleholder provided links to five large scale studies on MSS in Australia and advised that no causal links had been found between whale strandings and MSS. (Event ID 2381)
2128	1653	Stakeholder requested confirmation of receipt of the email and recording of their vote and strong objection to Regia MSS's proposal. Requested a transcript of the Apollo Bay information session.	Titleholder responded in explaining no official vote, the purpose of the information session and consultation plans and NOPSEMA brochure. Requesting information for engagement. (Event ID 2936). Stakeholder had previously been contacted and invited to engage (Event ID 2936) following their attendance at an information session (Event ID 762).
2129	3043	Stakeholder requested to register as a Relevant Person and requested a meeting to discuss their questions regarding damage caused by seismic blasting, awareness of future litigation for environmental harm and what the ESG is in regard to continuing prospecting for fossil fuels?	Titleholder responded in Event ID 1820, providing information regarding their enquiry, and offering engagement in a format of their choosing.
2130	1832	Stakeholder thanked the team for the response to their questions and raised a concern that the team was signing off correspondence and not a real full name.	The Titleholder responded explaining that the dedicated activity email was a shared inbox, and why a team's/activities details not individuals are in the signature. Provided full names and roles of individuals involved in the project, and how enquiries are managed by the team. (Event ID 3044)
2131	1181	Tuna Australia requests a map from proponents of the proposed activity to determine if member interests may be affected on a case-by-case basis. Where potential effects exist, there is a need for a service agreement.	The titleholder requested Tuna Australia provide evidence of the Board resolution and evidence that all members agree to the position statement (Event ID 1177)
2132	879	Enquired whether the seismic blasting project falls under the category of a Special Prospectors Authority (SPA).	The titleholder responded that the title referenced by the stakeholder expires after 183 days so it is quite normal to apply for these after the Environment Plan is submitted and not before. Questions about the purpose and use of titles are best answered by the National Offshore Petroleum Titles Administrator (NOPTA) (Event ID 879).
2133	879	Stakeholder asked why the Regia MSS project was not on the NOPTA application tracking system.	The titleholder responded that questions about the purpose and use of titles are best answered by the National Offshore Petroleum Titles Administrator (NOPTA) (Event ID 879).
2134	923	Cray fisherman's concern about the proximity of seismic activities to Port Fairy and inquiries about when these activities will take place throughout the year.	The titleholder responded that they were in the process of refining the survey area and timing as consultation with stakeholders continued (Event ID 922).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2135	1038	Raises concerns about the potential impacts of proposed activities on endangered species, specifically asking if the effects on hooded plovers and shearwaters, which nest in the area, have been considered.	The titleholder responded that these species will be considered in the impact and risk assessments. The effect to birds is from artificial light from our survey during nighttime and made a commitment to using the minimum lighting needed for navigation and safe operations. The titleholder also stated they will have a porthole shroud to minimise light impacts to all birds (Event ID 1038).
2136	1529	A request was made to clarify whether the studies being used are from the Fisheries Research and Development Corporation (FRDC) and if the fishing industry can submit their studies.	In the in-person meeting the Titleholder discussed the review of the EP chapter and scientific papers supporting it (Event ID 1529) and forwarded the papers (Event ID 2996).
2137	1529	A participant inquired whether fishing data is obtained from the Victorian Fisheries Authority (VFA), seeking clarity on the sources of fishing data used.	In the in-person meeting the Titleholder responded and described how commercial fishing and underwater sound is assessed in the EP (Event ID 1529)
2138	1529	A stakeholder enquired whether new research is required or if there is a commitment to research as part of the Regia MSS.	In the in-person meeting the Titleholder described how the EP has assessed potential impacts on commercial fishing and fish species (Event ID 1529)
2139	1782	Asking for clarification about the vessel's allocated zone on the map, noting it has not been extended due to the exclusion around Deen Maar. They want the map updated to show this change accurately.	The titleholder provided the requested map (Event ID 2387).
2140	1782	Questioning why the vessel could not turn within the originally proposed zone. They wonder if this decision is intended to maximise the area covered during the surveying process.	The titleholder responded that the extended area is for vessel turning only and not acquisition. (Event ID 2387)
2141	1782	Asking for confirmation that the extension being discussed is still within the boundaries of the licensed zone.	The titleholder responded that the extended area is included in the Environmental Planning Area (Event ID 2387).
2142	1782	Inquiring whether the proposed operational zone is not considered final until the Environmental Plan (EP) is submitted.	The titleholder responded that the extended area is included in the Environmental Planning Area (Event ID 2387).
2143	1846	The feedback requests a link to the reference document used for determining safe distances for seismic in relation to different life forms.	The titleholder responded that the Sound Modelling report could be located on the Regia website and that they could not provide a link directly to it via an interactive map comment (Event ID 1846).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2144	1891	The stakeholder requested for clarification on the specific activities and provided a titleholder's map.	The titleholder responded with which titleholder activities were which and clarified activity areas. Also explained why they were hosting a joint meeting - to collaborate in consultation and reduce fatigue (Event ID 1891).
2145	1892	Fishers asked if there could be opportunities for local vessels to be contracted as support vessels for project-related activities.	In the in-person meeting the titleholder discussed that support vessels would be used and opportunity to offer that service (Event ID 1892)
2146	2010	The stakeholder requested to be kept informed of the consultation activities.	VFA were placed on the campaign email list, to receive project updates.
2147	2075	The statement expresses a request for clarification on what the organisation considers unacceptable impacts on marine life, acknowledging that NOPSEMA holds the final authority on such matters. The person seeks to understand the organisations stance on environmental concerns related to their operations.	The titleholder responded that they believe it would be unacceptable to have long-term, regional scale, or irreversible effects on the marine environment. This would also be inconsistent with the principles of ecologically sustainable development that the Regia MSS must be consistent with. You can comment on our Decision-Making Criteria recently published on the Regia website (Event ID 2075).
2148	2084	The stakeholder requested details on how the current seismic survey efforts differ from previous ones that resulted in significant mortality among molluscs, indicating a concern about the potential environmental impacts of seismic activities on marine life.	The titleholder responded that through our extensive research, they had not found any evidence of causation between seismic survey and mortal effects on molluscs. In fact, the evidence found (which would be published), suggested seismic and fishing can happily co-exist. The titleholder requested references, evidence, or testimonials for the stakeholder's claims so that they could be taken into consideration in the proper process (Event ID 2084).
2149	2091	The comment seeks clarification on how seismic blasting will be managed to prevent impacts on the Bonney Upwelling, emphasising the unpredictable nature of its location and the need for assurances that blasting will not occur nearby.	The titleholder responded that they were still working through the impact assessment and would publish the predictions of impact on the Bonney Upwelling as soon as possible (Event ID 2091).
2150	2091	The comment questions how the organisation can ensure that seismic blasting will not affect whales and larger marine creatures, given that the impact zone extends thousands of kilometres. It expresses concern over the potential for significant adverse effects on these species.	The titleholder responded that the preliminary results for the impact zone for marine mammals is 10.3 kilometres (single pulse) and 13.2 km (over time). There will be effects to whales, and it is only acceptable if those effects are behavioural i.e. not injurious (Event ID 2091).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2151	2093	This feedback seeks clarification on whether the organisation is responsible for past ecological damage to the scallop industry and what measures are being implemented to prevent a similar disaster in the future. It emphasises the importance of accountability and the need for transparency regarding the company's environmental practices.	The titleholder responded that it would be unacceptable to have mortal effects on any marine species from our or any marine seismic survey and that they do not predict mortal effects to molluscs (including scallops, abalone, oysters, clams, mussels, limpets, squids, octopus, and cuttlefish etc.). The titleholder stated that their full assessment of predicted impacts on molluscs would be made publicly available as soon as it is completed (Event ID 2093).
2152	2099	The stakeholder sought clarification on the decision-making process regarding acceptable risks to whales associated with seismic activities, indicating the need for more information about regulatory bodies and their criteria.	The titleholder responded that the Federal Department of Environment, through the EBPC Act, protect matters of national environmental significance. Whale species have specific levels of protected enacted through legal instruments such as Conservation Management Plans. These plans often contain information about the levels of impact that is unacceptable, and we must adopt them to comply with the law (Event ID 2099).
2153	2102	The stakeholder seeks clarification on the adequacy of a 52-meter depth exclusion zone for protecting abalone in regions where they might be impacted by seismic activities within the REGIA MSS area.	The titleholder responded that sound propagation is considered in both the vertical and horizontal directions. The 52m referenced here is the horizontal distance. Even with the 40m depth exclusion zone there may be abalone exposed above threshold levels, and we will contend that the residual impacts will be of an acceptable level at a population/ecosystem level (Event ID 2102).
2154	2322	The stakeholder attended a briefing with a conservation group earlier in the month, in relation to the impact of MSS on zooplankton. The stakeholder requested the titleholder create a submission in response to this.	The titleholder requested a written response to the paper McCauley et al. 'Widely used marine seismic survey air gun operations negatively impact zooplankton' 2017 (Event ID 3182) and provided formal written response to the paper with supporting documentation (Event ID 2356).
2155	3228	Request on information about the types of compensation that would be paid via NERA protocol.	Discussions are underway with fishing associations to provide an opportunity for all commercial fishers in the region to review and input into the final content of the adjustment protocol. Outlined that fishers would also be able to nominate suitably qualified competent assessors for compensation claims (Event ID 3228).
2156	3228	Request from fishers to get the active source area and the operational area data for themselves.	The titleholder agreed to provide the lat/longs of the areas in WGS84 format prior to the survey and as soon as they are finalised (Event IDs 3228; 4107).
2157	3350	The stakeholder requested that consultation services be paid on a fee for service basis.	Agreed to engage SETFIA/SSIA for fee-for-service consultation with members to raise awareness about the activity and encourage individual fishers' participation in the consultation process. (Events 2930, 3350, 3856, 4039)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2158	3367	It was recommended to reach out to the Victorian Scuba Divers Federation to facilitate contact with recreational divers who may be impacted.	The titleholder responded that they had contacted Victorian Scuba Divers Federation and that notice on popular boat ramps would be place prior to the survey starting to notify recreational divers of the risks and the SIMOPS plan (Event ID 3367).
2159	3697	The stakeholder requested a single map of the respective titleholder survey area maps.	The titleholder provided a map of the TGS survey and Regia MSS areas (Event ID 3890).
2160	3678	Requested for a summary to be put together of the differences between the TGS seismic survey and the Regia MSS.	The titleholder provided a document with a summary of the summary of the differences between the TGS Seismic Survey and the Regia Seismic Survey (Event ID 3887).
2161	3678	Request for a map to be provided of the TGS activity area and the Regia MSS area.	The titleholder provided a map of the TGS survey area and the relevant Regia MSS areas (Event ID 3887).
2162	3678	Request for the draft Sea Country Protection Plan.	The titleholder provided the draft Sea Country Protection Plan (Event ID 3887).
2163	4076	The stakeholder requested coordinates of the acquisition area.	The titleholder provided a document with the requested coordinates of the active source area (Event ID 4101).
2164	4106	Expressed interest in eligibility for compensation.	The titleholder responded that the NERA protocol did allow for any fisher to make a CPUE claim if they had a catch history in the area (Event ID 4106)
2165	4106	Advised occasionally fish for squid in the summer.	The titleholder advised that the activity had no overlap with summer months (Event ID 4106).
2166	4108	The operator of a growing fresh fish market at the port expressed a desire to ensure that their business would be included in the compensation protocols established by CGG for the seismic survey.	The titleholder responded that the NERA protocol did not explicitly cater for a calculation method for fishing co-ops or markets. However, agreed that the co-op could be commercially affected and that a claim put forward to CGG would be considered for compensation. Outlined that evidence would be required to support such a claim. (Event ID 4108)
2167	4433	the stakeholder requested a 12-month monitoring program of recruitment prior to the survey commencing to determine the effects that should be compensated.	The titleholder replied that work had been completed to determine effects on spawning of commercial fish species and promised to provide information on assessment. Stated that effects from seismic on recruitment to fisheries were not found (Event ID 4433).
2168	5051	The stakeholder asked how the changes to the National Recovery Plan for the Southern Right Whale would be considered within the EP.	The titleholder replied that they had considered and referred to the draft recovery plan and now the final had been published, they would follow the processes in place to handle changes such as these. The titleholder stated they plan to send out a project update to relevant persons to notify them of changes (Event ID 5051).
2169	5051	The stakeholder asked how the changes to the Cultural Heritage Act would be considered within the EP.	The titleholder responded that Regia MSS is proposed to be undertaken in Commonwealth waters and therefore there is no obligation to comply. However, state heritage had been considered and this is reflected in cultural heritage notifications and reporting implementations (Event ID 5051).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2170	5051	The stakeholder asked for information regarding the timeframe on the project's start date and decisions on the EP.	The titleholder responded that NOPSEMA had extended their assessment timeline and that they have made a commitment to publish every decision letter we receive, for full transparency. The titleholder stated that the re-submission timeline will depend on the decision made by NOPSEMA, and that the overall timeline is tied to this. However, during consultation with community and their concerns over increased summer biodiversity, it was agreed that they would not acquire in the summer months, January to March and that the earliest start time would be 1 April 2025 (Event ID 5051).
2171	5051	The stakeholder asked what the titleholder did with data collected.	The titleholder responded that multi-client data is acquired, processed by CGG and can then be sold to multiple clients. (Event ID 5051)
2172	5051	The stakeholder asked if there would be another public comment period.	The titleholder responded that there would not be a further Public Comment process, but there would be ongoing consultation with relevant persons (Event ID 5051).
2173	5051	The stakeholder asked if track lines are part of the EP and if there were any plans to do further work on them.	The titleholder responded that more work is being done and that a map with the latest refinement of lines would be published in due course (Event ID 5051).
2174	5211	This feedback seeks clarification on the measures that will be implemented to protect whales during nighttime operations, expressing concern for their safety in low-visibility conditions.	The titleholder responded that they are assessing a range of measures to detect whales at night, or during poor visibility. These include the measures outlined in Policy Statement 2.1 (Part B), which is the standard set by the Federal Government for management of interactions between whales and seismic surveys. The titleholder stated they would publish our marine mammal adaptive management plan as soon as it is complete (Event ID 5211).
2175	4107	This feedback raises a concern about how intangible losses related to relocation will be addressed, such as time spent away from family and the need to fish in Gippsland instead of the preferred Otway region.	The titleholder responded that the NERA protocol did not have such provisions, and they would be difficult to calculate. Reiterated that this type of feedback could be provided and CGG would consider it (Event ID 4107).
2176	4107	Feedback requesting more information on what compensation would be paid to fishers.	The titleholder outlined that discussions are underway with fishing associations to provide an opportunity for all commercial fishers in the region to review and input into the final content of the adjustment protocol. Outlined that fishers would be able to nominate suitably qualified competent assessors for compensation claims (Event ID 4107).
2177	4107	Request from fishers to get the active source area and the operational area data for themselves.	The titleholder agreed to provide the lat/longs of the areas in WGS84 format prior to the survey and as soon as they are finalised (Event ID 4107).
2178	5203	The stakeholder inquired about the timeline for the Environment Plan (EP) resubmission to NOPSEMA, specifically seeking information on when the next version of the EP will be available for assessment.	The titleholder provided details about the timeline for resubmission of the Regia MSS EP to NOPSEMA and stated that CGG would update relevant persons when there is information to share (Event ID 5204).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2179	5181	The stakeholder requested clarification regarding CGG's recent name change and why it was changed.	The titleholder responded to confirm CGG's recent rebrand and explained that the CGG business name was being retained for consultation. The titleholder provided a link to a press release about the name change (Event ID 5187).
2180	5183	The stakeholder requested a link to the latest Environment Plan (EP) as they were uncertain where to find it.	The titleholder responded that the latest EP is the version submitted to NOPSEMA following Public Comment and provided a link to its location on the NOPSEMA webpage and Regia consultation hub (Event ID 5182).
2181	5183	The stakeholder asked whether the Environment Plan includes the newly updated, reduced Active Source Area map, indicating a desire to review this specific aspect carefully.	The titleholder responded that the EP was being updated to ensure it is updated with relevant new information, such as the latest active source area (Event ID 5182).
2182	5186	Seeks clarity on when the survey will take place including the time of year.	The titleholder provided an update that the Regia MSS survey timings would be between April-June or September-November, with the survey occurring once for 90 days and that the precise timing is subject to EP approval, vessel availability, weather approval and other operational considerations (Event ID 5191).
2183	5230	Stakeholder re-forwarded previous correspondence regarding OMICC adjustment protocol. Requested confirmation that Regia team had received their correspondence.	OMICC team responded confirming receipt of email.
2184	740	Stakeholder queried why there was seismic activity again as the region has already experience numerous events in the past.	The titleholder clarified that the survey is primarily being conducted in areas with no prior seismic activity and provided details about the activity planning area (Event ID 740)
2185	1183	Stakeholder asked what measures would Regia implement to minimise the impact on their ocean activities.	The titleholder responded requesting a description of the stakeholder's interests and activities in the area to supply information specific to them (Event ID(s) 1186; 3090).
2186	2967	Stakeholder requested for updates regarding the proposed activity.	The titleholder responded that the Environmental Impact Assessments were available (Event ID 2967) and re-forwarded link to the documents (Event ID 2960).
2187	3883	Stakeholder reiterated their request to be notified about the surveys to ensure they can provide the necessary safety information.	The titleholder noted the request and continued to provide the organisation with relevant project update correspondence regarding Regia MSS (Event ID(s) 4403; 4404; 4897; 5134).
2188	4359	Stakeholder requested an update on the status of the Regia MSS EP.	The titleholder responded that submission had been made to NOPSEMA and that they were waiting for confirmation that the EP was ready for public comment (Event ID 4359).
2189	4359	Stakeholder enquired if the changes made to the EP would be shared to assist their organisation in their content assessment.	The titleholder responded that each EP document contains a section which reflects feedback received on the topic and actions made in response to the feedback that are referenced in the document (Event ID 4359).

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2190	4365	The stakeholder mentioned that their organisation wished to submit to the titleholder and asked about the best way to proceed.	The titleholder explained the consultation process and advised that as a relevant person, ASBTIA could make representations to CGG at any time and submit public comment (Event ID 4365).
2191	4468	Stakeholder queried how ALARP decisions can be made without knowing the profitability of the company.	The titleholder explained the origins of ALARP from safety and that the cost of implementing a measure is to be compared against the risk reduction it achieves. If the measure is reasonably practicable the company must adopt it, and if it can't afford to do so then it shouldn't undertake the activity (Event ID 4468).
2192	4468	Stakeholder inquired about the role of ALARP under the EPBC Act.	The titleholder clarified that the ALARP construct is from OPGGSA and that it is only linked to the EPBC Act through a Part 10 approval of NOPSEMA's authorisation process (Event ID 4468).
2193	4468	Stakeholder questioned whether ALARP was linked under the principles of ESD.	The titleholder clarified that ESD have a valuation principle that is more about the value of development or pricing principles and does not reflect the ALARP principle (Event ID 4468).
2194	817	Stakeholder requested to see a project map with more features and clarity on SPA's.	The titleholder responded with an overview to the names involved in the project: Regia; CGG; EP and Klarite and attached a project overview sheet for reference. The titleholder also provided a link to the interactive map and noted that the activity area was in the process of being refined (Event ID 813).
2195	4627	The stakeholder requested that Regia avoid explicitly mentioning consultation with their organisation and instead use general terms in their letters.	The titleholder acknowledged the request and noted that consultation with the entity would have to be reported but that the content would remain confidential. The titleholder also agreed to remove the entity name from future correspondence. (Event ID 4627)
2196	4669	AFMA representative queried if consultation with a fishing organisation was proceeding.	A Regia team member outlined a request for data regarding tonnage of catch in the Regia area. CGG's experience was that this data is inaccurate and not required for previous surveys and is yet to receive information from organisation on how it can help in the management of impact and risks, so for now CGG is not inclined to undertake this work. (Event ID 4669)
2197	2331	Stakeholder requested a descriptive outline of what Regia/seismic is and what they are seeking from the organisation.	The titleholder responded with a description of Regia MSS and directed the stakeholder to the activity webpage. The titleholder explained how permitting works and how they had been contacting traditional owner groups in the region (Event ID 2331) and re-sent email correspondence stating who had been contacted as part of consultation (Event ID 2332).
2198	3224	Request for an online meeting to better understand the project and consultation process.	Held online meeting, Event ID 2009
2199	918	Requesting a visit on Country in Warrnambool to discuss the proposed activity	Met on Country, Event ID 3678
2200	930	Requested name of Regia representative to address correspondence to.	Responded in Event ID 4225 with Regia team names and roles, also clarified other names (survey name, company names) related to the activity.
2201	1517	Stakeholder requesting to discuss survey before consultation period ends.	Online meeting held, Event ID 2032

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2202	1027	Stakeholder requesting clarification that the advertised community session will be CGG only information.	Confirmed session was CGG standalone, Event ID 4183
2203	3908	Enquiry if full financial position of companies project would need to be known in order to consider if something is ALARP.	Called stakeholder, Event ID 4062, to discuss concept of ALARP in detail. Agreed to prepare dedicated report on ALARP assessment (Appendix F2)
2204	4292	Clarifying understanding of PTS/TTS distances for effects to Blue Whales from webinar.	Responded in Event ID 4292 following questioning in Event ID 4280, confirming PTS and TTS may have been confused.
2205	4292	Seeking information on submission timing.	Event ID 4292 provided update on submission process and timing.
2206	4600	Run analysis on King George Whiting catch in Corner Inlet	Completed the analysis of historical seismic data and the investigation of correlation with KGW recruitment.
2207	4483	Requesting anticipated submission date of EP	Event ID 4503 provided information on submission process and timing.
2208	4152	The sender requests assistance in scheduling a Teams meeting in June with the new SIV CEO.	Online meeting held, Event ID 1815
2209	4161	Requesting signed agreement is resent.	Resent, Event ID 4163
2210	4476	Enquiring as to timeline update for Regia EP and if there is a timeline for feedback from SIV.	Information provided in Event ID 4499
2211	4552	The inquiry seeks confirmation on whether analysis discussed at meeting was completed and requests access to the relevant findings. The case study discussed was to analyse trends in fishery data related to large-scale seismic surveys along the Victorian coastline. The analysis would examine data from two years prior, one year during, and seven years after these surveys to identify any correlations with recruitment and productivity in key fisheries. The specific surveys mentioned included the Enterprise and Crowes Foot projects.	Responded in Event ID 4542, forwarded full write up of work in cumulative impact assessment re query on fishing data. Monthly data (2006-2023) was conclusive that there are no detectable long-term effects to catch rates.
2212	4607	Stakeholder explaining they received a bounceback from their email and confirming if previous email had been received.	Confirmed email received (Event ID 2532)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2213	4180	The VRLC requests to hear back on how the points raised in their letter will be considered in determining an appropriate way forward.	As the feedback concerned the Otway adjustment protocol, these points were addressed in a response to SIV from the Otway Marine Industries Co-Existence Cooperative on 13/9/24.
2214	5234	Stakeholder requests summary of how the following receptors are addressed in the EP: Southern Rock Lobster, Octopus, and Giant Crab	Provided the relevant person with the requested information summaries on SRL, Octopus and Giant Crab assessments. (Event ID 5298)
2215	2898	Request for clarification on seismic information sharing with permit holders	Responded in Event ID 633, explaining multi-client data
2216	2898	Inquiry about times for surveys in the area and correlation to other seismic plans in the Otway's Basin.	Provided information on survey timing and cumulative effects Event ID 633
2217	2901	Provide information regarding exclusion zones and modelling informing the work in progress.	Informed stakeholder that initial sound propagation modelling was published on the Regia website that day. Explained it was initial modelling undertaken based on feedback from relevant person consultation that the areas of most concern were near to Deen Maar/Lady Julia Percy Island. Stated likely to commission further modelling (which will be published) once settled on an activity design. Stated that we have implemented three exclusions zones as a result of relevant persons objections: - No survey activities in the SRW reproductive BIA whilst they are present in the area (May-November) - No acquisition (i.e. full power discharge of the sound source) within 10.3km of Deen Maar as this is the behavioural response threshold for marine mammals. - No acquisition in water depths of less than 40m as this is protective for abalone divers, abalone, and other recreational marine users. Event ID 1231
2218	2901	Regia will include AMCS to the distribution list of data information provided to Antarctic Division and other organisations.	Regia team committed to preparing a Communications Plan for the activity and confirmed that AMCS will be added to the distribution list of data provided to AAD. Agreed to add AMCS to the distribution list of shut-down notifications for sightings of marine mammals. Stated if they would like other information during the survey, to let us know and they can be added to those distribution lists also. Event ID 1231
2219	2901	AMCS to be provided information on shutdown occurrences due to sightings of marine mammals.	Regia team committed to preparing a Communications Plan for the activity and confirmed that AMCS will be added to the distribution list of data provided to AAD. Agreed to add AMCS to the distribution list of shut-down notifications for sightings of marine mammals. Stated if they would like other information during the survey, to let us know and they can be added to those distribution lists also. Event ID 1231
2220	2901	Stakeholder asking if daily survey reports of marine life spotted in the areas will be shared.	Explained CGG are happy to share our reports of marine life spotted from our survey, but they will not be from within or near the Apollo Reserve, as the Vic-P70 title is approx. 100km from the reserve. Event 1231

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2221	2901	Stakeholder asking to be provided with biodiversity and critical habitat BIA data being used for the EP	Stated we use data from primary research of peer reviewed literature and data from the DEECCW websites (SPRAT Database, PMST reports, conservation advice, management plans etc.), information published by State agencies, and information received during consultation. Asked if AMCS have any biodiversity data or critical habitat BIA data, as we would welcome the opportunity to input that into our impact assessments. We are aware of the draft conservation management plan for Southern Right Whales and have taken this latest information into account in our activity plan, despite it not being the legal instrument yet. Explained we are also aware that the South-east Commonwealth Marine Reserves Network Management Plan is due to expire in June 2023, and we are not aware of any published draft or updated plan. Asked if AMCS have any information on the update to either of these plans, as we would happily take that information into consideration in our EP. Event ID 1231
2222	2901	Stakeholder asking for identified impacts of seismic operations on the values of the Apollo marine park	Explained the Vic-P79 title is approximately 100km from the Apollo Commonwealth Marine Reserve. As such, the Regia MSS will come no closer than approximately 35km from the Reserve. Regarding the impact of seismic operations, given the distances of the Regia MSS to the Apollo Commonwealth Marine Reserve, no predicted change to the conservation values or conservation pressures within the Reserve. Event 1231
2223	2901	Requesting specific measures being taken to ensure operations are not ongoing during migration times for federally listed species in VP79	Explained the Regia MSS is not just limited to the Vic-P79 title. Seismic surveys are allowed to be conducted during migration times provided that appropriate control measures are in place to mitigate effects. We will adopt Policy Statement 2.1 management measures to protect whales, and we will increase shutdown distances for all whales to 2000m from the vessel. Event ID 1231
2224	2901	Which species are their measures to monitor and mitigate for	Stated additional assessment of mitigation measures for Southern Right Whales and Blue Whales had been undertaken and have implemented an exclusion for SRWs in their new reproductive BIA. For Blue Whales we are investigating new technologies that will help us detect whales beyond our visual capabilities including running tethered passive acoustic monitoring buoys deployed before, and during the survey with real-time reporting of SRW/BW presence in the area. We are also looking into the feasibility of Autonomous Underwater Vehicles to assist in marine mammal detections. Event ID 1231
2225	2901	The inquiry is about how the seismic plans are being modified in light of ongoing criminal investigations related to Schlumberger's breaches during seismic operations that affected the Bonney Upwelling.	Requested AMCS to provide a reference to the proceedings they'd like us to consider, so we can properly respond. Event ID 1231
2226	2901	Requested history of seismic over the proposed area in the last 15 years	Agreed to produce this, with underlying titles also shown. This was provided in Event ID 2802

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2227	2901	Request for information on cumulative impact of operations on marine values and threatened species	Agreed to produce the cumulative impact assessment. This was provided in Event ID 1830
2228	2901	Asked how data from CGG's noted citizen science projects on the Victorian coast has shaped our operations	Explained CGG haven't surveyed in this area before but are looking into how we can utilise the citizen science projects as they relate to marine mammal observations. Explained we are consulting with the relevant State agencies to access their data on citizen science observations Event ID 1231
2229	2901	Where will vessels be brought in from, and what biosecurity risks and mitigation measures are involved?	Explained that do not have a vessel specified for the survey yet. It may be a vessel already operating in Australia or a vessel coming from international waters. Stated we have just published our risk assessment of introducing invasive marine species which is available on our website. Event ID 1231
2230	2901	How is the Regia data different to already available seismic in the area?	Explained the Regia MSS is targeting areas of geology that have not been previously surveyed although there will be some overlaps with previous surveys to tie the data together. We will provide the map previously mentioned that will show where previous surveys have taken place. Event ID 1231
2231	2901	Was the title obtained through an SPA	Explained that due to being a multi-client project, an SPA would be applied for over areas of open acreage and access authorities over award petroleum titles. Event ID 1231
2232	2680	AMCS seeking clarification on the title under which the seismic exploration is being conducted, following feedback from community consultation sessions.	Event ID 2799 reiterates that combination of SPA and AA will be applied for. Supplied map of recently confirmed active source area and the overlap with existing titles.
2233	2680	Information on timeframes	Event ID 2799 provides the latest timelines, including the intention to pause consultation on October 20th.
2234	2535	Sought clarification on the submission dates and the start of the Public Comment phase.	Provides expected dates and timelines in response Event ID 2536
2235	2798	Stakeholder asking if AA and SPA permits will still be used for the activity.	Event ID 2799, reiterates that combination of SPA and AA will be applied for. Supplied map of recently confirmed active source area and the overlap with existing titles.
2236	2798	Requesting clarification on consultation and public comment timelines, stating community groups are confused.	Event ID 2799 provides the latest timelines, including the intention to pause consultation on October 20th.
2237	4380	AMCS representative requesting clarification on timeframes. Latest project update sent out by CGG is different to what they've heard from relevant person community members.	Event ID 4447 explains that we currently do not have date for public comment yet. When the date is known a project update will be sent out, with updates on website and social media. As per regulations also print media advertisements will be produced.
2238	4357	AMCS representative (different representative to Event ID 4380) requesting clarification on timeframes. Latest project update sent out by CGG is different to what they've heard from relevant person community members.	Event 4358 explained communications with their colleague and confirmed, as per Event ID 4403, that the EP was available for Public Comment.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2239	5040	AMCS requests information on the steps being taken to update the EP and the public consultation processes for the necessary revision.	Confirmed that the Environment plan adhered to the draft National Recovery Plan for Southern Right Whales and noted that now the final recovery plan has been released, the team is working to identify changes and additions and will make necessary updates to the Regia MSS Environment Plan after the next decision. Provided information that the Regia MSS EP outlines how CGG have committed to handling new information. This is provided in Section 4 of Appendix B3 - Implementation Strategy. Noted that an information sheet will be compiled for distribution to inform on the update to conservation plan and how it relates to the Regia MSS EP. Event ID 5034
2240	5076	AMCS requests to know when relevant persons will be given opportunity to consult on the changes to EP, what this means for expected approval timelines from NOPSEMA.	Event ID 5125 reaffirms there are no changes to management measures affecting relevant persons, and if changes occur, feedback will be requested.
2241	5076	AMCS requests information on how First nations and community groups along coast of Victoria with interest in southern right whale are being consulted.	Event ID 5125 provides direction to specific sections of the EP for details on First Nations consultation.
2242	5076	Requesting information on how recent GHG permit announcements by federal government may impact the EP currently with NOPSEMA and what GHG/CCS exploration utility this seismic project may have.	Event ID 5125 clarifies that greenhouse gas release is not relevant due to uncertainty about hydrocarbons in the area.
2243	5121	Requests clarification on why the Environmental Plan (EP) was sent back to the titleholder, CGG, and asks whether NOPSEMA issued a Request for Further Written Information or an Opportunity to Modify and Resubmit	Event ID 5124 informs stakeholder that the RFWI letter has been published on the consultation hub.
2244	5121	AMCS requests a copy of the letter NOPSEMA provided to CGG stating the reasons for returning the EP	Event ID 5124 informs stakeholder that the RFWI letter has been published on the consultation hub.
2245	5203	Inquired when the Environmental Plan (EP) for the CGG Regia MSS project will be resubmitted to NOPSEMA, expressing an understanding that it is imminent and seeking insights on when the next version can be expected for assessment.	Stakeholder informed that CGG has 90 days from August 29 to resubmit the Regia MSS EP, with a deadline of November 27, though the submission may occur earlier or potentially be delayed. Clarified that the resubmission is not imminent, and CGG will keep relevant persons updated. Event ID 5124

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2246	2713	Confirming they would like a meeting when Regia team is in the area, flexible on times, query on whether it would be a one-on-one meeting or venue?	Event ID 2723 offers meeting size of their choosing, requested feedback from stakeholder on preference. Followed up with phone call, Event ID 2967. Offered online options if in person was not convenient for stakeholder.
2247	2713	Query on if project is an SPA or AA?	Event ID 2723 confirmed that as per previous meetings, it remains the case that the Regia MSS is likely to be acquired under AAs and SPAs.
2248	1246	Requested phone call to discuss information session	Attempted to call multiple times (Event ID's 4569, 1288, 1290, 1291). Managed to make contact via phone Event ID1309
2249	5039	Requested information on how Regia had adjusted the EP since the implementation of the new Southern Right Whale Recovery Plan and details on how the changes came into effect.	Replied to stakeholder's query regarding the implementation of the new Southern Right Whale Recovery Plan, stating Regia team are identifying changes and additions to EP and will make the necessary updates. Explained the EP outlined how CGG committed to handling new information in section 4 of Appendix B3. Stated Regia Team were compiling an information sheet. Event ID 5046. Provided follow up email to confirm the information sheet (Event ID 5134) had been received. Event ID 5238
2250	5235	Stakeholder asks for details on how to revise the environment plan and the project to prevent any negative effects on Little penguins. It seeks specific strategies or measures that will be implemented to protect this species.	The titleholder responded in Event ID 5299, defining what a BIA is and how they are identified. Also described is the assessment of Little Penguins in the Regia EP. Appendix F3, 'Further Assessment of Key Environmental Values and Sensitivities', was provided, directing the stakeholder to Section 4.4 that summarises the work undertaken on Little Penguins, including the mitigation effectiveness summary.
2251	5235	The request asks for clarification on why there are no specific receivers identified at Deen Maar, despite it being a sensitive location and falling within the foraging Biologically Important Area (BIA) for Little penguins. It seeks an explanation of the reasoning or criteria used to determine that no specific receivers were deemed necessary in this context.	The titleholder responded in Event ID 5299, defining what a BIA is and how they are identified. Also described is the assessment of Little Penguins in the Regia EP. Appendix F3, 'Further Assessment of Key Environmental Values and Sensitivities', was provided, directing the stakeholder to Section 4.4 that summarises the work undertaken on Little Penguins, including the mitigation effectiveness summary.
2252	5235	The inquiry seeks clarification on how the declared Little penguin Biologically Important Areas (BIAs) are considered to be outside of the noise Emission Management Buffer Area (EMBA), given that the project area overlaps with three BIAs. It highlights concerns about the potential for vessels to come close to foraging Little penguins, and asks for an explanation of the criteria or assessments that led to this determination.	The titleholder responded in Event ID 5299, defining what a BIA is and how they are identified. Also described is the assessment of Little Penguins in the Regia EP. Appendix F3, 'Further Assessment of Key Environmental Values and Sensitivities', was provided, directing the stakeholder to Section 4.4 that summarises the work undertaken on Little Penguins, including the mitigation effectiveness summary.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2253	4543	Requesting details for invoicing	Provided in Event ID 4538
2254	4368	Stakeholder asking for Regia presenters' name	Provided in Event ID 4498
2255	4405	Requested CGG's presentation at the consultation day covers the following: What your project(s) are, what stage it/they are up to, are there likely to be and/or is Gunditjmara Sea country being impact by the project(s)? If so, how? What plans are in place to protect the Gunditjmara cultural values? What do you see as good consultation/engagement with Gunditjmara?	These topics were covered in the presentation given, Event 4469.
2256	4936	Requesting to know the revenue overlap	CGG responded to this request many times, including Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would likely overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information. Event ID 4969 requested from the stakeholder the reasoning behind purchasing this report, and how it would help avoid interference, and provide information for mitigations.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2257	4787	Requesting CTS tonnage of the catch taken in proposed survey area.	CGG responded to this request many times, including Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would likely overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information. Event ID 4969 requested from the stakeholder the reasoning behind purchasing this report, and how it would help avoid interference, and provide information for mitigations.
2258	4553	Stakeholder queried what Titleholder's position on understanding the materiality of trawl fishing in the MSS area.	CGG responded to this request many times, including Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would likely overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information. Event ID 4969 requested from the stakeholder the reasoning behind purchasing this report, and how it would help avoid interference, and provide information for mitigations.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2259	4128	Stakeholder questioned if there was any work being done on trying to understand the volume of fishing occurring in the proposed area.	CGG responded to this request many times, including Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information. Event ID 4969 requested from the stakeholder the reasoning behind purchasing this report, and how it would help avoid interference, and provide information for mitigations.
2260	4046	Stakeholder emailed with regards to understanding how much fishing overlaps the proposed area, and expressed it remains critical for them.	CGG responded to this request many times, including Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information. Event ID 4969 requested from the stakeholder the reasoning behind purchasing this report, and how it would help avoid interference, and provide information for mitigations.
2261	3857	Brief email from stakeholder to Regia, requesting additional items to be added to purchase order. Request for materiality of trawl impacts as per letter previously supplied (Event ID 3747).	Responded and agreed (Event ID 4039)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2262	3746	Fishing associations request the need to understand the financial overlap of the survey with historical fishing activities.	Challenged the utility of such information that fails to consider behavioural movements for target species, cooperative measures the fishing industry could take, and the adoption of a compensation protocol for affected fishers. In CGGs experience such information provided no basis for protection measure nor a reasonable estimation of the compensation that was due.
2263	3746	Request review of AFMA data and report back to us on the extent of average annual overlap with each fishery in terms of tonnes or monetary value.	Provided information that we have confirmed the accuracy of ABARES data with AFMA and that we have provided information on the worst-case overlap with associations fisheries, just not to the fidelity requested. CGG sees no utility in gaining more accurate figures on the overlap between the survey and the fishery for reasons shared in response to Feedback ID 172.
2264	3382	Fishing associations request the need to understand the financial overlap of the survey with historical fishing activities.	Challenged the utility of such information that fails to consider behavioural movements for target species, cooperative measures the fishing industry could take, and the adoption of a compensation protocol for affected fishers. In CGGs experience such information provided no basis for protection measure nor a reasonable estimation of the compensation that was due.
2265	3351	Titleholder stating, they need to know the tonnage/financial displacement totals.	CGG responded to this request many times, including Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information. Event ID 4969 requested from the stakeholder the reasoning behind purchasing this report, and how it would help avoid interference, and provide information for mitigations.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2266	4237	Requesting data relating to the catch (tonnes) and materiality in each fishery, specifically trawl and shark. The titleholder stated catches in the area are not deemed to be confidential when 5 or more fishers are present in the survey area and requested the titleholder to go back to the data team for updated information.	Initially responded in Event ID 2655, Regia team seeks to understand why SETFIA/SSIA are focused on the aggregate tonnes of fish potentially affected by the survey, especially since higher-resolution catch data may not be relevant for a whole fishery analysis. Following this, Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information.
2267	2557	The titleholder stated the report lacks comprehensive data and has asked for further clarification around volume and value of the catch (trawl and shark gillnet) in the area for compensation purposes.	CGG responded to this request many times, including Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information.
2268	2002	Stakeholder requests to know how they can provide input into compensation protocol	Event ID 4700 provides information on, and invitation to engage with, the Otway Marine Industries Co-Existence Cooperative (OMICC) on the Otway Adjustment Protocol
2269	2002	Request for fisheries and survey overlap data	This Commercial Fisheries review was compiled via a fisheries consultant who was engaged to analyse the publicly available ABARES data and produced a comprehensive report which demonstrated the overlap of each fishery. See Appendix B6
2270	2003	Requests single point of contact	This was provided (Event ID 1974) and a meeting held (Event ID 3350)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2271	4601	Stakeholder requested the months of the active seismic surveys conducted previously and to be shown that they do not align with the downturns in recruitment.	Event ID 4635 describes the assessment process and provides a linear regression graph, that tests for any correlations between the past 22 years of annual recruitment of KGW to PPB and the annual count of seismic surveys across Victorian waters, which was then lagged by 1,2 and 3 years. The figure shows there is no significant relationship between frequency of seismic events in the region and the levels of recruitment.
2272	4637	Stakeholder requested copies of the references	Copies of the 44 papers referenced were provided in Event ID 4636
2273	4637	Required further information on assessment of potential impacts on KGW recruitment.	In Event ID 4635, the Regia team outlines their investigation into potential effects of marine seismic surveys on King George Whiting (KGW) and their recruitment. They reference extensive scientific citations in their impact assessments, including a specific evaluation of literature provided by the other party, and encourage feedback supported by validated sources. To assess any correlation between seismic activities and KGW recruitment, they analysed long-term datasets from Port Philip Bay (PPB) and the National Offshore Petroleum Information Management System (NOPIMS). They noted that if seismic testing significantly impacted fish populations, increased seismic frequency should correlate with declines in recruitment. However, their analysis revealed no significant relationship between the frequency of seismic events and KGW recruitment levels over the past 22 years, indicating that recruitment can vary independently of seismic activity. They emphasized that while proving direct cause and effect is challenging due to various confounding factors, their data did not support the claims of adverse effects on KGW stocks. They conclude that extensive research shows no measurable impact from seismic surveys and assert that the concerns raised are not substantiated by evidence
2274	4048	Stakeholder requested overlap in value or at least tonnes to provide meaningful feedback from the stakeholder, expressed that this was the first time a proponent has refused to consider the provided fishing data.	CGG responded to this request many times, including Event ID 2894, explaining that after further discussion, it was concluded that information about the value of previous catch is not necessary or useful for several reasons. First, historical catch data does not help understand how individual commercial fishers or fishing associations may be affected in the future. Second, this information is irrelevant to assessing the impact of underwater sound on fish and fishing activities, as monetary values do not contribute to the cause-effect pathways in impact assessments. Additionally, aggregated data does not provide the appropriate level of analysis needed for individual fishers, nor is it needed for an effective compensation protocol. The data would likely overestimate the economic impact, as fishers must fish to qualify for compensation and would still receive remuneration regardless. Lastly, historical data only indicates that some unspecified fishers may have been affected in the past under hypothetical scenarios that could not have coincided with actual surveys. Overall, no improvements to predictive accuracy in impact assessments are expected from obtaining or sharing this information.
2275	2020	Look into how compensation could apply to a co-op market retailer.	In the in-person meeting the Titleholder agreed to table this with OMICC (Event ID 2020)

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2276	917	Questions about the benefits for Port Fairy and local employment opportunities.	Individual attended community information session where title holder addresses this issues (event ID 1501)
2277	2092	Feedback seeks clarification the organisations view on what people are concerned about regarding the activity. Suggests organisation is implying that seismic surveys are not the primary element people are concerned about.	Titleholder responded clarifying that they have received many concerns about varying aspects of the activity and the underlying merits of proceeding. Stated they are openly consulting to learn about the environment from the local community to protect their values and sensitivities. Stated they will register objection to gas developments. (Event ID 2092).
2278	2179	Questions about benefits for Port Fairy, local employment opportunities, and visibility of rigs from shore.	Individual attended community information session where titleholder addresses these issues (event ID 1501)
2279	2830	Questioned the coordination between public consultation activities and the Environment Plan preparation, and the relevance of public concerns.	Titleholder responded addressing the questions in Event ID 2381.
2280	2821	The stakeholder requested video footage showing the impact at the sea floor, and other potentially impacted areas.	The titleholder provided video footage as requested (Event ID 1077).
2281	4208	The stakeholder requested the rationale for the 5 km buffer limit and any environmental risk assessment or other methods that were used to determine that the 5km buffer zone provides significant protection from the seismic surveys.	The titleholder provided the link to the Regia MSS website and directed the stakeholder to the risk and impact assessments within the Document Library (Event ID 4220).
2282	4966	Are the documents provided in this email the sum total of new information Regia will be providing to NOPSEMA in their updated EP?	The titleholder responded in Event ID 4931, stating the new information in the EP.
2283	3783	The stakeholder also made a specific request for the EP to have regard to the marine and coastal policy and act for Victoria	The titleholder agreed and the policy is referenced in the EP (Event ID 3783)
2284	806	The sender requests contact via phone number provided.	Called stakeholder, Event ID 817.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2285	3855	The stakeholder requested confirmation on acceptance of price and invoicing. Nominated a fee structure for all work ongoing related to the MSS and will cover all businesses involved.	Agreed to engage SETFIA/SSIA for fee-for-service consultation with members to raise awareness about the activity and encourage individual fishers' participation in the consultation process. (Events 2930, 3350, 3856, 4039)
2286	3355	Requested the titleholder provide additional financial data on survey/fisher activity overlap to allow reduction of impact from activities in the area.	As detailed in Event ID's 4129 & 3989, knowing a value or tonnes of historical fishing averages in an area does not add to the solutions already in place for this proposed activity.
2287	3746	Request for confirmation of ongoing engagement by responding to their October 4 email regarding a proposed commercial arrangement.	Agreed to engage SETFIA/SSIA for fee-for-service consultation with members to raise awareness about the activity and encourage individual fishers' participation in the consultation process. (Events 2930, 3350, 3856, 4039)
2288	994	Stakeholder requests in-person consultation to address concerns outlined in the relevant person survey submission.	In-person meetings held: Event ID's 2024, 3413, 4062
2289	5242	Request from EMAC employee to be added to the project list for Regia MSS.	Added their details to project list.
2290	994	Stakeholder requests separate public information sessions for projects presented by ConocoPhillips and CGG.	Separate community information sessions held, Event ID's 4112, 1731
2520	4469	Query about the assessment of 'no measurable effect' on the world heritage values of Budj Bim	Outlined the reasons for the statement and noted that the information of our assessment had been available to GMTOAC since Sept 2023. Produced and provided an information sheet on the Regia assessment of the Outstanding Universal Values of Budj Bim (Event ID 4634).
2521	4469	Request for information on the impact assessment on Kooyang (short-finned eels) and on Kontapool (SRW).	Agreed to provide the detailed assessments. Produced and provided information sheets on Kooyang and Kontapool (Event ID 4634).
2522	4469	Query about whether seismic surveys were the same as 'fracking'.	Outlined the differences between fracking and seismic mapping.
2523	4469	Query about the timing of the activities being limited to exclude January, February and March and whether any other months are excluded	Explained that the July and August weather made surveying impossible and unlikely to occur in those months. Also outlined the current position to carry two separate windows through the assessment at this time. Notified that the survey area and the timing may narrow as the assessment and our planning progress.

Feedback ID	Event ID	Feedback Summary	Titleholder Response
2524	5220	Request for names and qualifications for members of the Whale Expert Panel to be publicly available, along will all meeting minutes and discussions between the panel and CGG.	Acknowledged their interest in the composition and activities of the Whale Expert Panel, which plays a critical role in advising on the implementation of the Fauna Management Plan (FMP). Explained that whilst unable to share individual panel members' names or qualifications publicly, nor make meeting minutes available, this information will be accessible to NOPSEMA, the regulatory body responsible for overseeing compliance with the EP. NOPSEMA's oversight provides the necessary accountability for the commitments made in the EP. Explained that in this instance, public involvement, particularly from organisations with clear objectives to end oil and gas activities, is not appropriate in the operations of the Whale Expert Panel. This independent panel is designed to function objectively within the regulated framework, aligning with best practices to ensure marine environmental protection of sensitive marine fauna. Event ID 5302
2291	6323	request for confirmation on distribution of information sheet	Responded in Event ID 6322, providing PDF for distribution to members
2292	6324	Requested information on next steps in the process and if any further concerns should be sent straight to NOPSEMA	Event ID 6318 - Titleholder informed relevant person that it would be best to send straight through to project however anything sent to NOPSEMA would be given to CGG to have an opportunity to provide a response
2293	6326	The relevant person requested confirmation of the date of the resubmission of the Regia MSS project.	Event ID 6314 - The Regia team responded that the Regia MSS EP remained under assessment and that CGG would issue an update to all relevant persons on the status of the submission in due course.
2294	6326	The relevant person requested the most recent version of the EP that has been resubmitted to NOPSEMA for assessment.	Event ID 6314 - The Regia team responded that there was no requirement for the titleholder to publish the updated EP throughout the assessment. However, they had proactively and voluntarily decided to do so on the Regia Consultation Hub. They confirmed that when it is available, the relevant person would be notified in the same manner as everyone else.
2295	6327	The relevant person asked for confirmation about the intended timing of the seismic blasting project	Event ID 6320 - stated the window of April/May/June had been chosen as offers most minimal impacts, following assessment and identification of cause-effect pathways
2296	6327	The relevant person sought clarification about what the recipient means by avoiding the "prime" egg laying or chick raising time.	Event ID 6320 - Explained that the timing of lifecycle events like nesting and chick rearing can vary due to numerous factors and differs between colonies and years. Long-term studies and their averages are the best way to understand reproductive timing. Scheduling the MSS in April/May/June avoids the core egg-laying and chick-rearing periods, making it the most effective mitigation strategy tool.
2297	6327	The relevant person asked if the Regia team would consider starting the seismic free time in May to be on the safe side, or if they would communicate with various organizations and researchers to find out when the penguins' egg laying season begins.	Event ID 6320 - Team highlighted their assessment of the minimal predicted overlap with the outer limits of the core foraging area, which was based on a review of all available literature.

2298	6328	The relevant person requested information about when the public will have access to CGG's EP Rev 3 and if there are any obligations regarding this and the 30 day assessment period.	Event ID 6319 - The Regia team responded that there is no obligation for CGG (nor NOPSEMA) to publish the latest version of the EP. However, they stated they had made commitment to publish the resubmitted EP as soon as possible on the Regia MSS website. The relevant person would receive notice of the EP being published along with everyone else as part of the project update.
2299	6329	The relevant person requested a discussion on how the Regia EP deals with potential impacts to plankton.	Event ID 6321 - The Regia team provided a summary of their assessment of zooplankton and measures adopted to assuage concerns of stakeholders. They extended an offer to discuss their work with the relevant person further if required.
2300	6329	The relevant person asked if the Regia Marine Seismic Survey presents an opportunity for the organisation to further their undersanding on the potential impacts of seismic on plankton.	Event ID 6321 - The Regia team responded that whilst further research is something they had considered, the already significant analysis of the effect of sound on krill, additional assessment work completed by Regia marine scientists on the significance of the Bonney Upwelling, and the measures put into place, means that the Regia team did not see the case for any additional research on this topic.
2301	6330	The relevant person asked if Regia team would like to provide a summary document to be distributed as part of Engagement Agreement.	Event ID 6322 - The Regia team provided the information sheet in PDF for distribution to members.
2302	6333	The relevant person requested confirmation about the assessment period.	Event ID 6626 - The Regia team responded that they were yet to receive a decision from NOPSEMA.
2303	6334	The relevant person requested a meeting with the Regia MSS team.	Event ID 6321 - The Regia team provided a summary of their assessment of zooplankton and measures adopted to assuage concerns of stakeholders. They extended an offer to discuss their work with the relevant person further if required.
2306	6338	The relevant person asked for the date the status of the EP changed from Under assessment (with Titleholder), to Under assessment (with NOPSEMA).	Event ID 6316 - The Regia team responded that CGG resubmitted the EP on Tuesday 12th November 2024 and that they did not know when NOPSEMA updated their website.
2307	6338	The relevant person was seeking clarification if the EP has been resubmitted to NOPSEMA for assessment and when.	Event ID 6316 - The Regia team responded that CGG resubmitted the EP on Tuesday 12th November 2024.
2308	6338	The relevant person requested a timeline on when the updated EP will be available.	Event ID 6316 - The Regia team responded that they were working on the Regia Consultation Hub updates and the associated project update for all relevant persons. They stated that they would provide the information as soon as possible with a webinar to follow.
2309	6341	Requested information on whether the recipient can meet with GMTOAC and Gunditjmara native title holders to discuss the Consultation Plan.	Event ID 6430 - The Regia team confirmed that CGG would make themselves available to meet with the organisation in February 2025 and requested the exact dates for meeting.

2310	6341	Requested information of impacts and risks associated with greenhouse has emissions and climate change impacts, sensitive ecosystems, protected areas, sites of national envrionmental significance, culturally important animal and plant species, noise and light pollution, unplanned activity events and cumulative impacts of the activities.	Event ID 6430 - The Regia team responded that CGG had already provided this information to GMTOAC as outlined in previous correspondence to the organisation. They stated that the information remained available in the Document Library on the Consultation Hub at www.regiamss.com.au. This included the presentation provided at the February 2024 Information Session, summarised information about impacts and risks of the activity, detail assessments of impacts and risks, the proposed management and mitigation measures to protect the environment, and other relevant information.
2311	6410	The sender is looking forward to receiving clarification on what the proposed timeframes for surveys are	Event ID 6529 - Following the stakeholders statement that timelines were inconsistent, referring to comments on the interactive map, the Regia team confirmed that the proposed timelines can be found in Appendix A2.
2312	6411	Request for response to the concerns raised about the potential impacts of the proposed survey on Southern Rock Lobster, Pale Octopus, and Giant Crab.	Event ID 6820 - The Regia team provided the requested information: For Southern Rock Lobster, the Regia team stated that while larvae may be present in the survey area, the species is highly resilient due to its well-connected, genetically homogenous stock. They asserted that any impacts on individual larvae would be negligible relative to natural mortality rates and broader population dynamics. Regarding Pale Octopus, the Regia team acknowledged findings from the Day et al. (2023) study indicating potential neurological impacts from seismic activity but emphasized that the study found no significant long-term damage or impairment at the population level. They maintained that while some effects were observed in individual octopuses, they were not of a scale likely to influence population health. For Giant Crab, the Regia team referred to their environmental assessment, which concluded that seismic effects on crustaceans, particularly adults, are minimal and that any mortality observed in studies occurred only at very close proximity to the sound source. They reiterated that climate change and fishing pressure remain the primary threats to Giant Crab populations, not seismic activity.
2313	6416	The relevant person requested for KMZ files instead of shapefiles.	Event ID 6423 - The Regia team responded that the requested format is now in the file location to which they provided a link.
2314	6416	The relevant person requested for all data sets from the project	Event ID 6423 - The Regia team responded that they had included the Marine Park files but they are not property of, created, or maintained by the Regia team and therefore they could not take responsibility. They stated that it is the Federal Governmnets responsibility to maintain the datasets and they may change from time to time.
2315	6419	The relevant person requested an information sheet to include in their organisation member update communication.	Event ID 6425 - The Regia team attached correspondence for distribution to the organisation members as requested.

2316	6420	The relevant person requested to look at specific assumptions around both theirs the Regia team's position on krill.	Event ID 6414 - Regia Team member agreed with stakeholder to hold meeting (Event ID 6890) with the Regia marine science team to discuss matters further. Also attached: Skartaesterhagen et al 2024 Ecosystem effects of underwater noise in the Nordic seas, and provided a link: https://www.waterquality.gov.au/anz-guidelines/your-location/australia-marine-IMCRA.
2317	6421	Request for GIS data related to CGG's Otway Basin, environments that might be affected, and regulated areas.	Event ID 6428 - The Regia team provided link to the requested shapefiles for CGG's petrolem title areas, project areas, operational areas, environments that might be affected, including all biologically important areas for threatened and endangered species. The Regia team outlined that information relating to IPA's, Commonwealth and/or State marine parks, and any other regulated areas are better accessed directly from the owners/creators' websites.
2318	6432	requests that active current monitoring be independently evaluated for reasonableness and implemented if the benefit outweighs the costs or efforts involved.	Event ID 6874 - Regia team discussed relevant persons existing concerns on zooplankton and agreed to follow up with email and meeting with experts. Event ID 6414 - The Regia team thanked the relevant person for their time on a recent call and suggested that a meeting with their marine research scientists would be the best way to further discuss concerns. They noted that since the Regia MSS Environmental Plan (EP) would remain under assessment well into the New Year, there was no urgency to schedule the discussion before Christmas. Event ID 6890 - Online meeting to discuss stakeholders submission; a model of the effect of ocean currents on impacts to krill from seismic. The meeting focused on discussing the stakeholders modelling work regarding the potential impacts of seismic surveys on krill and how this would impact the blue whale's food source. The discussion involved reviewing figures in the EP Appendix E2, and the scientific literature where the stakeholder argued that the current evidence was insufficient to rule out potential impacts on the whale's food source. Regia's marine scientists challenged the assumptions, stating that the natural variation in the ecosystem was much larger than the potential impacts their model suggested. They also pointed out that the literature did not support the stakeholder's model and that there was no evidence of a population collapse or catastrophic effects on krill from seismic activity. The stakeholder was encouraged to refine his work, particularly regarding the historical effects of seismic surveys, and consider the scale and natural variability of the ecosystem. The Regia team agreed to review their figures in Appendix E2 and provide comprehensive written feedback on the stakeholder's work.

2319	6432	requests that the recipient consider the references included in this response as evidence that relevant peer-reviewed papers have been considered when developing the current model and this response.	Event ID 6874 - Regia team discussed relevant persons existing concerns on zooplankton and agreed to follow up with email and meeting with experts. Event ID 6414 - The Regia team thanked the relevant person for their time on a recent call and suggested that a meeting with their marine research scientists would be the best way to further discuss concerns. They noted that since the Regia MSS Environmental Plan (EP) would remain under assessment well into the New Year, there was no urgency to schedule the discussion before Christmas. Event ID 6890 - Online meeting to discuss stakeholders submission; a model of the effect of ocean currents on impacts to krill from seismic. The meeting focused on discussing the stakeholders modelling work regarding the potential impacts of seismic surveys on krill and how this would impact the blue whale's food source. The discussion involved reviewing figures in the EP Appendix E2, and the scientific literature where the stakeholder argued that the current evidence was insufficient to rule out potential impacts on the whale's food source. Regia's marine scientists challenged the assumptions, stating that the natural variation in the ecosystem was much larger than the potential impacts their model suggested. They also pointed out that the literature did not support the stakeholder's model and that there was no evidence of a population collapse or catastrophic effects on krill from seismic activity. The stakeholder was encouraged to refine his work, particularly regarding the historical effects of seismic surveys, and consider the scale and natural variability of the ecosystem. The Regia team agreed to review their figures in Appendix E2 and provide comprehensive written feedback on the stakeholder's work.

2320	6432	requests that CGG should also attempt to detect and avoid concentrations of adult krill and develop strategies around achieving this.	Event ID 6874 - Regia team discussed relevant persons existing concerns on zooplankton and agreed to follow up with email and meeting with experts. Event ID 6414 - The Regia team thanked the relevant person for their time on a recent call and suggested that a meeting with their marine research scientists would be the best way to further discuss concerns. They noted that since the Regia MSS Environmental Plan (EP) would remain under assessment well into the New Year, there was no urgency to schedule the discussion before Christmas. Event ID 6890 - Online meeting to discuss stakeholders submission; a model of the effect of ocean currents on impacts to krill from seismic. The meeting focused on discussing the stakeholders modelling work regarding the potential impacts of seismic surveys on krill and how this would impact the blue whale's food source. The discussion involved reviewing figures in the EP Appendix E2, and the scientific literature where the stakeholder argued that the current evidence was insufficient to rule out potential impacts on the whale's food source. Regia's marine scientists challenged the assumptions, stating that the natural variation in the ecosystem was much larger than the potential impacts their model suggested. They also pointed out that the literature did not support the stakeholder's model and that there was no evidence of a population collapse or catastrophic effects on krill from seismic activity. The stakeholder was encouraged to refine his work, particularly regarding the historical effects of seismic surveys, and consider the scale and natural variability of the ecosystem. The Regia team agreed to review their figures in Appendix E2 and provide comprehensive written feedback on the stakeholder's work.

2321	6432	requests that the months of November to April should be excluded from consideration by CGG to conduct seismic acquisition.	Event ID 6874 - Regia team discussed relevant persons existing concerns on zooplankton and agreed to follow up with email and meeting with experts. Event ID 6414 - The Regia team thanked the relevant person for their time on a recent call and suggested that a meeting with their marine research scientists would be the best way to further discuss concerns. They noted that since the Regia MSS Environmental Plan (EP) would remain under assessment well into the New Year, there was no urgency to schedule the discussion before Christmas. Event ID 6890 - Online meeting to discuss stakeholders submission; a model of the effect of ocean currents on impacts to krill from seismic. The meeting focused on discussing the stakeholders modelling work regarding the potential impacts of seismic surveys on krill and how this would impact the blue whale's food source. The discussion involved reviewing figures in the EP Appendix E2, and the scientific literature where the stakeholder argued that the current evidence was insufficient to rule out potential impacts on the whale's food source. Regia's marine scientists challenged the assumptions, stating that the natural variation in the ecosystem was much larger than the potential impacts their model suggested. They also pointed out that the literature did not support the stakeholder's model and that there was no evidence of a population collapse or catastrophic effects on krill from seismic activity. The stakeholder was encouraged to refine his work, particularly regarding the historical effects of seismic surveys, and consider the scale and natural variability of the ecosystem. The Regia team agreed to review their figures in Appendix E2 and provide comprehensive written feedback on the stakeholder's work.

2322	6432	requests that krill swarm detection mechanisms should be assessed by the proponent.	Event ID 6874 - Regia team discussed relevant persons existing concerns on zooplankton and agreed to follow up with email and meeting with experts. Event ID 6414 - The Regia team thanked the relevant person for their time on a recent call and suggested that a meeting with their marine research scientists would be the best way to further discuss concerns. They noted that since the Regia MSS Environmental Plan (EP) would remain under assessment well into the New Year, there was no urgency to schedule the discussion before Christmas. Event ID 6890 - Online meeting to discuss stakeholders submission; a model of the effect of ocean currents on impacts to krill from seismic. The meeting focused on discussing the stakeholders modelling work regarding the potential impacts of seismic surveys on krill and how this would impact the blue whale's food source. The discussion involved reviewing figures in the EP Appendix E2, and the scientific literature where the stakeholder argued that the current evidence was insufficient to rule out potential impacts on the whale's food source. Regia's marine scientists challenged the assumptions, stating that the natural variation in the ecosystem was much larger than the potential impacts their model suggested. They also pointed out that the literature did not support the stakeholder's model and that there was no evidence of a population collapse or catastrophic effects on krill from seismic activity. The stakeholder was encouraged to refine his work, particularly regarding the historical effects of seismic surveys, and consider the scale and natural variability of the ecosystem. The Regia team agreed to review their figures in Appendix E2 and provide comprehensive written feedback on the stakeholder's work.
2323	6505	The relevant person asked what the action items were following their meeting with the Regia team.	Event ID 6815 - The Regia team responding to a document submitted regarding the potential impact of the Regia Marine Seismic Survey (MSS) on the Bonney Upwelling system and its marine ecosystem. The document in question claimed that the MSS would cause significant krill mortality and critiqued the Regia Environmental Plan (EP) as scientifically flawed. They strongly rejects these claims, asserting that the EP is a robust scientific assessment, developed with peer-reviewed literature and extensive expert experience. In contrast, the submitted model is criticized for lacking transparency, validation, and alignment with real-world conditions.

2324	6505	The relevant person asked the Regia team to explain their reasoning about why any level of krill mortality as a consequence of Regia MSS will have no serious impact on Blue Whale food source	Event ID 6815 - The Regia team responding to a document submitted regarding the potential impact of the Regia Marine Seismic Survey (MSS) on the Bonney Upwelling system and its marine ecosystem. The document in question claimed that the MSS would cause significant krill mortality and critiqued the Regia Environmental Plan (EP) as scientifically flawed. They strongly rejects these claims, asserting that the EP is a robust scientific assessment, developed with peer-reviewed literature and extensive expert experience. In contrast, the submitted model is criticized for lacking transparency, validation, and alignment with real-world conditions.
2325	6505	The relevant person asked the Regia team to let them know if they are wrong about not referencing Teng et al (2014).	Event ID 6815 - The Regia team responding to a document submitted regarding the potential impact of the Regia Marine Seismic Survey (MSS) on the Bonney Upwelling system and its marine ecosystem. The document in question claimed that the MSS would cause significant krill mortality and critiqued the Regia Environmental Plan (EP) as scientifically flawed. They strongly rejects these claims, asserting that the EP is a robust scientific assessment, developed with peer-reviewed literature and extensive expert experience. In contrast, the submitted model is criticized for lacking transparency, validation, and alignment with real-world conditions.
2326	6506	The relevant organisation asked for confirmation by close of business Monday 20 January whether the proposed date change suits CGG.	Event ID 6522 - The Regia team responded that CGG welcomed the change in meeting date and confirmed that it is a suitable date and time.
2327	6506	The relevant organisation requested notification if there were any issues with providing a response to the proposed meeting change by Monday.	Event ID 6522 - The Regia team responded that CGG welcomed the change in meeting date and confirmed that it is a suitable date and time.
2328	6507	The relevant person requested confirmation on their interpretation: that no level of harm to krill within the ASA warrants mitigation, as the EP concludes that regional impacts are insufficient to trigger mitigation measures.	Event ID 6414 - In the email following a phone call (Event ID 6874) the Regia Team member states the best spatial scale for considering the impacts on krill larvae populations, as discussed on the call, and the IMRCA bioregions have been chosen as the appropriate scale for assessing such impacts on plankton populations, including krill. The Regia team member agreed to hold a meeting with the Regia marine science team to discuss matters further and provided a relevant paper and link to the IMCRA: Skartaesterhagen et al 2024 Ecosystem effects of underwater noise in the Nordic seas.
2329	6507	The relevant person requested a short monthly Zoom meeting with their core group of NGOs.	This was a request directed at NOPSEMA
2330	6508	The relevant organisation requested dedicated slides for the agreed agenda items, including: previous information provided about consultation, the Sea	Event ID 6618 - The Regia team responded that as agenda items, they had assumed these were topics for discussion and not things they would be expected to present on. The Regia team requested further instruction on this matter.

		Country Protection Program and views on the other agenda items.	
2331	6508	The relevant organisation requested that the Regia team reduce the amount of text per slide.	Event ID 6618 - The Regia team responded that they understoof the request to reduce the text on the slides and would undertake this task.
2332	6511	The relevant person requested clarification on how they are wrong if the Regia team did not agree with their suggestions regarding plankton/krill.	Event ID 6516 - The Regia team responded that the relevant person had not understood CGG's position correctly. They provided an outline of their reasoning that the relevant person's modelling is insufficient to understand its utility and plausibility due to its failure to consider a borad basis of literature to support the model, failure to provide assumptions or the method used to generate the modelled result, and a failure to provide the underlying data for the model.
2333	6519	The relevant organisation made a request for information about the missing documents in the folder that was supposed to be sent.	Event ID 6522 - The Regia team apologised and confirmed that they had re-uploaded the documents. The Regia team provided a screenshot of the uploaded files and requested to know if the relevant person had any issues accessing the files.
2334	6524	Requests core logic as discussed - the cumulative % impacts that lead t othe negligible conclusion with regard to krill impacts.	Event ID 6514 - The Regia team responded that they were trying to demonstrate that even if they were to use the logic from the relevant person's paper i.e. that there were 100% mortality to all exposed plankton (which is not supported by the literature), the effects would be immeasurably small. The Regia team confirmed that they had not used this logic in their demonstration of why there are acceptable levels of impact from their sound emissions. The Regia team outlined their case for acceptability: that it is not based on calculated levels of mortality and recoverability. The case is that given the enormity of the ecosystem and the dynamics at play, that the effects are such that they are totally subsumed by natural variation and dynamics and as such are immeasurable (i.e. that there is no calculation that could even be made). This case is supported in the context that the survey avoids peak upwelling times which are when population levels are expected to be at their most productive. This is also the justification when considering cumulative impacts, i.e. that despite any additional mortality suffered, the natural variation and ecosystem dynamics in this region are such that the effects are completely subsumed, likely within days after the survey.

2335	6525	The relevant person requested an outline of the chain of % calculation which results in no measurable impact of seismic activity on N. australis.	Event ID 6514 - The Regia team responded that they were trying to demonstrate that even if they were to use the logic from the relevant person's paper i.e. that there were 100% mortality to all exposed plankton (which is not supported by the literature), the effects would be immeasurably small. The Regia team confirmed that they had not used this logic in their demonstration of why there are acceptable levels of impact from their sound emissions. The Regia team outlined their case for acceptability: that it is not based on calculated levels of mortality and recoverability. The case is that given the enormity of the ecosystem and the dynamics at play, that the effects are such that they are totally subsumed by natural variation and dynamics and as such are immeasurable (i.e. that there is no calculation that could even be made). This case is supported in the context that the survey avoids peak upwelling times which are when population levels are expected to be at their most productive. This is also the justification when considering cumulative impacts, i.e. that despite any additional mortality suffered, the natural variation and ecosystem dynamics in this region are such that the effects are completely subsumed, likely within days after the survey.
2336	6526	Request for PowerPoint presentation covering previously identified topics to include images and visual aids that clearly convey information requested alongside limited text per slide.	Event ID 6521 - The Regia team confirmed that they had provided the requested material via a share folder link. They clarified that this information had been previously provided to the organisation or had been available online since September 2023. They also stated that CGG had repeatedly offered tailored and bespoke communications, including numerous requests to meet with the organisation to discuss their needs. The requested material was re-uploaded in Event 6522.
2337	6526	Requested plain English information sheets on various matters related to the project.	Event ID 6521 - The Regia team confirmed that they had provided the requested material via a share folder link. They clarified that this information had been previously provided to the organisation or had been available online since September 2023. They also stated that CGG had repeatedly offered tailored and bespoke communications, including numerous requests to meet with the organisation to discuss their needs. The requested material was re-uploaded in Event 6522.
2338	6526	Requested amendments to the proposed meeting agenda for 15 February 2024.	Event ID 6528 - The Regia team responded that they accept the proposed additions to the agenda for the meeting to be held on 15 February 2024.
2339	6526	Requested the recently updated EP including identification of changes made in response to NOPSEMA's RFWI's and copy correspondence from NOPSEMA to CGG.	Event ID 6521 - The Regia team provided the requested EP via a share folder link. The material was re-uploaded in Event 6522.
2340	6526	Asked how is the Regia MSS EP consistent with r 4 of the Regulations, that is, to ensure that any petroleum activity or greenhouse gas	Event ID 6521 - The Regia team provided a tailored information sheet to the relevant person about greenhouse gas emissions and climate change impacts.

		activity carried out in an offshore area is carried out in a manner consistent with the principles of ecologically sustainable development set out in section 3A of the EPBC Act.	
2341	6526	Asked how is the Regia MSS EP consistent with r 4 of the Regulations, that is, to ensure that any petroleum activity or greenhouse gas activity carried out in an offshore area is carried out in a manner by which the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable.	Event ID 6859 - The Regia team provided Annexure A in addition to correspondence and outlined the three stages of the Environmental Assessment Process as well as clarifying the difference between potential and predicted impacts.
2342	6526	Asked how is the Regia MSS EP consistent with r 4 of the Regulations, that is, to ensure that any petroleum activity or greenhouse gas activity carried out in an offshore area is carried out in a manner by which the environmental impacts and risks of the activity will be of an acceptable level.	Event ID 6859 - The Regia team provided Annexure A in addition to correspondence and advised that assessments were undertaken in three stages to identify cause-effect pathways and ensure these were appropriately managed, stepping through the process and providing examples held within the EP.
2343	6526	Asked in what ways and by what measures does the Regia MSS EP respond to and address the principles of ecologically sustainable development under section 3A of the Environment Protection and Biodiversity Conservation Act 1999 (Cth), including that decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.	Event ID 6521 - The Regia team provided a tailored information sheet to the relevant person about greenhouse gas emissions and climate change impacts.
2344	6526	Asked in what ways and by what measures does the Regia MSS EP respond to and address the principles of ecologically sustainable development under section 3A of the Environment Protection and Biodiversity Conservation Act 1999 (Cth)	The ways in which the titleholder adheres to the principles of ESD were discussed in the in-person meeting (Event ID 6880). Materials were provided prior to the meeting, and again post meeting in Event 6859.
2345	6526	Asked further to s 3A of the EPBC Act and the Gunditjmara Nyamat Mirring Plan 2023-2033, how are the proposed activities within the Regia MSS EP (and the consequences of same) consistent with the best available scientific data and internationally agreed goal of a safe climate by	Event ID 6521 - The Regia team provided a tailored information sheet to the relevant person about greenhouse gas emissions and climate change impacts.

		reducing greenhouse gas emissions?	
2346	6526	Asked how and in what manner have the threats identified in the Gunditjmara Nyamat Mirring Plan, including but not limited to Table 1, page 22 "Existing or future threats to Nyamat Mirring – Climate Change" been addressed and mitigated?	As per the presentation for the in person meeting (Event ID 6880), this is also addressed in Information Sheet 1, provided in Event ID 6521 and confimed received in Event ID 6508
2347	6526	Asked how and in what manner has the Regia MSS EP accounted for and described Gunditjmara rights, functions, interests and values in relation to the "environment" (as broadly defined under r 5 of the Regulations) in relation to ecosystems, natural and physical resources, qualities and characteristics of locations, heritage value of places.	Event ID 6521 - the Regia team provided a tailored information sheet to the relevant person about cultural features.
2348	6526	Asked how does CGG consider the social, economic and cultural features of ecosystems, natural and physical resources, qualities and characteristics of locations, heritage value of places, including Gunditjmara law/lore, custom and knowledge?	Event ID 6859 - The Regia team responded that assessment of species and places of cultural significance could be located in Appendix F3, Section 3.16 Cultural Features of the Environment Plan. Additionally, in event ID 6521, the Regia team provided a tailored information sheet to the relevant person about cultural features.
2349	6526	Asked what, if anything, does CGG require from the relevant person in order to more accurately describe the "environment" as defined under the Regulations?	As per the presentation for the in person meeting (Event ID 6880), this was provided in the powerpoint send in Event ID 6521 and confimed received in Event ID 6508
2350	6526	Asked how and in what manner do the proposed activities within the Regia MSS EP, including associated risks and impacts to the environment, ensure that no adverse action, interference, and/or inconsistency (to the extent permitted) arises in connection with Gunditjmara people, communities, heritage, and/or social, economic and cultural interests?	Event ID 6859 - The Regia team respodned that following consultation with relevant persons, and completion of the environmental assessments, activity limitations have been adopted (see following slide). These activity limitations have been referred to throughout the environmental assessment, consultation, and public comment processes.

2351	6526	Asked where impacts are identified, on what basis does CGG justify that these impacts are of an acceptable level? Similarly, on what basis does CGG conclude that these impacts are mitigated to as low as reasonably practicable?	Event ID 6859 - The Regia team responded an outline of the framework for defining acceptable levels for the Regia MSS can be found in Appendix F4.The acceptable levels defined by CGG for all relevant receptors including marine mammals were assembled using scientific rigor, which included the analysis of peer-reviewed and unbiased literature to predict impacts to relevant species, while also ensuring their consistency with species' recovery and conservation management plans. CGG has also engaged in extensive consultation efforts to learn and gain as much knowledge as possible around the cultural significance of marine species during this process and continues to welcome additional relevant information and knowledge that could further benefit the protection of the marine environment, including culturally significant species. Also noted : CGG's first draft of defined acceptable levels were published in May 2023 on the Consultation Hub alongside our environmental assessment process to provide an opportunity to the community and relevant persons to understand the assessment process and influence the criteria used in the assessment process. The opportunity to comment was open for 60 days.
2352	6526	Asked how has CGG demonstrated to NOPSEMA, being a relevant Commonwealth agency, that its proposed activities are not inconsistent with and/or do not contravene any recovery plans under the EPBC Act, per s 268 of that Act, including but not limited to the recovery plans for the Southern Right Whale and the Blue Whale?	Event ID 6859 - The Regia team responded that as per EP Appendix E7, CGG will ensure there are no behavioural impacts to Blue Whales, as the seismic source will be shut down within 10km of a blue whale. This is based on the underwater sound modelling commissioned by CGG where behavorial impacts to blue whales was predicted to occur within 9.83km of the sound source.
2353	6526	Asked how and in what manner do the proposed activities within the Regia MSS EP, including associated risks and impacts of same, ensure that no adverse action, interference, and/or inconsistency arises in connection with recovery actions and/or implementations of the above-mentioned SRW recovery plans?	Event ID 6859 - The Regia team responded that as per E7 Appendix 7, There are only 3 BIAs associated with whales that are relevant to the Regia MSS, the Southern Right Whales Reproductive and Migration BIA, and the Blue Whale Foraging BIA. The sound source will be operated within the Southern Right Whale Reproductive BIA at any time. CGG will ensure the seismic source will only not be operated within the pygmy blue whale foraging BIA if there are low numbers of blue whales present. CGG will use a whale expert panel to help define 'low numbers' CGG will also shut down if a blue whale is detected within 10km of the seismic source. This 10km will ensure there are no behavioural impacts which may displace whales from their foraging BIASs. CGG will shut down the sound source if a blue whale remains resident in the 23 km ensonified area for more than 12 hours, this will ensure blue whales will not experience TTS (temporary auditory injury).

2354	6526	Asked how does the Regia MSS EP propose to avoid key feeding, breeding/ calving and transits to and from biologically important areas for key whale species?	As per the presentation for the in person meeting (Event ID 6880), this was provided in the powerpoint send in Event ID 6521 and confimed received in Event ID 6508. Further information was also provided in Event ID 6859.
2355	6526	Asked what mitigation measures are proposed to avoid impacts and how are any impacts justified and on what basis are any such impacts mitigated to the legal standard required?	Event ID 6859 - The Regia team provided Annexure A in addition to correspondence and advised that assessments were undertaken in three stages to identify cause-effect pathways and ensure these were appropriately managed, stepping through the process and providing examples held within the EP.
2356	6526	Asked how has CGG considered the impact on Kooyang?	Event ID 6859 - The Regia team responded that the noise modelling conducted by CGG assessed the impacts from sound to fish under three subcategories. These include fish with a swim bladder, fish without a swim bladder, and fish eggs and larvae. Fish susceptibility to injury from noise exposure varies depending on the species and the presence and possible role of a swim bladder in hearing. Thus, different thresholds were proposed for fish without a swim bladder, fish with a swim bladder not used for hearing, and fish that use their swim bladders for hearing. The latter two categories representing a further level of complexity applied to the modelling categories for fish. For context, CGG has grouped kooyang with fish containing swim bladders when assessing seismic effect studies. Therefore, CGG does not agree that the results from the noise modelling were necessarily a “broad evaluation”, but an appropriately categorised one. Standard modelling methodology models for receptors based on hearing group, not species. As this relates to fish, the presence/absence of a swim bladder remains the most suitable parameter for grouping fish in modelling for impacts from sound, therefore justifying CGGs reasoning behind not conducting species-specific modelling for kooyang, nor any other fish, bird, marine mammal, or turtle species.
2357	6526	Asked to what extent has the Regia MSS EP considered potential impacts to the Outstanding International Values of the Budj Bim Cultural Landscape, including the integrity of threatened Kooyang populations (and Kooyang husbandry and associated native title rights and interests concerning aquaculture)?	Event ID 6859 - The Regia team provided Annexure A in additiona to correspondence that outlined that Biosis Pty Ltd (Biosis) was commissioned by ConocoPhillips to undertake a cultural heritage desktop assessment (Appendix B10) for proposed resource exploration in Bass Strait. ConocoPhillips and Biosis gave permission for CGG to utilise this report given the overlap of the study area with the Regia MSS. The report supported the foundation of knowledge for the cultural heritage parts of the overall assessment. Cultural values are included in the impact assessments, for example, in Appendix E3 Impact Assessment Underwater Sound: Fish, Section 4.1.6 Eels, there is a section entitled ‘First Nations Connection to Eels’. Appendix F3 Further Assessment of Key Values and Sensitivities, Section 3.16 further assesses environmental values and sensitivities that were identified as culturally important features of the environment that may be affected by the Regia MSS. Included in this are Karntubul, Kooyang, and the Bonney Upwelling.

2358	6526	Asked how will any identified impacts to Kooyang be mitigated to the legal standard required?	Event ID 6859 - The Regia team responded that the modelling methodology (explained and justified above) is an industry-standard practise that applies the most appropriate and up-to-date scientific and peer-reviewed literature to best-assess the potential impacts from sound to fish, including kooyang.
2359	6526	Asked what is CGG's response to relevant actions, including in respect of Kooyang, within the Budj Bim Indigenous Protected Area Plan of Management 2022-2027 (for example only, see sections 5.5.2-5.5.7, Actions 29-31, 43)?	Event ID 6859 - The regia team provided Annexure A in addition to correspondence and advised that the noise modelling conducted by CGG assessed the impacts from sound to fish under three subcategories. These include fish with a swim bladder, fish without a swim bladder, and fish eggs and larvae. Fish susceptibility to injury from noise exposure varies depending on the species and the presence and possible role of a swim bladder in hearing. Thus, different thresholds were proposed for fish without a swim bladder, fish with a swim bladder not used for hearing, and fish that use their swim bladders for hearing. The latter two categories representing a further level of complexity applied to the modelling categories for fish. For context, CGG has grouped kooyang with fish containing swim bladders when assessing seismic effect studies. Therefore, CGG does not agree that the results from the noise modelling were necessarily a "broad evaluation", but an appropriately categorised one. Standard modelling methodology models for receptors based on hearing group, not species. As this relates to fish, the presence/absence of a swim bladder remains the most suitable parameter for grouping fish in modelling for impacts from sound, therefore justifying CGGs reasoning behind not conducting species-specific modelling for kooyang, nor any other fish, bird, marine mammal, or turtle species.
2360	6526	Asked what research has been commissioned or conducted in relation to the lifecycle of the Kooyang and its migration through the EMBA and/or Operational Area for the proposed activities?	Event ID 6859 - The Regia team provided Annexure A in addition to correspondence and advised that no life-cycle stages of kooyang that occur in the Budj Bim Cultural Landscape are predicted to be impacted from the Regia MSS, nor are any population-level impacts predicted for kooyang that would potentially impact the landscape. As a World Heritage Listed environmental value it was important for CGG to thoroughly assess the Outstanding Universal Value of the Budj Bim site. The assessment of the Budj Bim Cultural Landscape (available to view in Appendix F3) has found no threat to the values of the site from the proposed activity.

2361	6526	Asked what steps has CGG taken to avoid impacts from the proposed activities on the Bonney Coast Upwelling and to address key receptors, including the critical cultural heritage values associated with this Upwelling?	Event ID 6859 - The Regia team provided Annexure A in addition to correspondence and advised that the Precautionary Principle is utilised when there is uncertainty. Further assessment of Plankton Communities and the Bonney Upwelling System, in Section 3.13 in Appendix F3 Further Assessment of Key Values and Sensitivities, assesses potential impacts on plankton in further detail. Multiple studies on the effects of seismic activity on plankton, especially fish larvae, show harmful impacts, but the extent of these effects varies by species and proximity to seismic sources. Impacts to zooplankton and the Bonney Coast Upwelling and the role they both play in ecosystem function and productivity, are not predicted as: • Impacts to phytoplankton are not predicted. • Mortality or injury effects to zooplankton will be well within natural mortality rates. Upwelling systems in the region are highly dynamic with large variations in biomass a normal process. Zooplankton communities demonstrate high rates of turnover and will be constantly replenishing even as the seismic survey occurs. • Mortality or mortal injury effects to zooplankton, including krill, do not impact on marine fauna being able to feed on them as they will still be available within the water column.
2362	6526	Asked how and in what ways do measures within the Regia MSS EP address and respond to cumulative risks and impacts (both direct and indirect) reasonably associated with the proposed activities, in light of the other activities, be that past, current (both temporally and spatially) or anticipated, in the Otway Basin.	Event ID 6859 - The Regia team responded that as summarised in EP Section 10.1, Cumulative impacts were inherently considered in Stage 2 of the environmental assessments by virtue of considering the existing environment as a dynamic place inclusive of other natural and anthropogenic pressures. Specifically, the effects of past projects and activities, and currently operating projects, are captured when describing the existing condition of environmental values and sensitivities, inclusive of any pressure or threats affecting that value or sensitivity. Reasonably foreseeable further projects and activities within the spatial and temporal extent of the assessment includes the proposed Calico seismic survey. Additionally, in Event ID 6521, the Regia team provided a tailored information sheet to the relevant person about cumulative impacts.
2363	6526	Asked how and in what ways do measures within the Regia MSS EP address and respond to cumulative risks and impacts (both direct and indirect) reasonably associated with the proposed activities, in light of the best available scientific literature and practice in the design of cumulative impact assessments?	Event ID 6859 - The Regia team responded that as summarised in EP Section 10.1, Cumulative impacts were inherently considered in Stage 2 of the environmental assessments by virtue of considering the existing environment as a dynamic place inclusive of other natural and anthropogenic pressures. Specifically, the effects of past projects and activities, and currently operating projects, are captured when describing the existing condition of environmental values and sensitivities, inclusive of any pressure or threats affecting that value or sensitivity. Reasonably foreseeable further projects and activities within the spatial and temporal extent of the assessment includes the proposed Calico seismic survey. Additionally, in Event ID 6521, the Regia team provided a tailored information sheet to the relevant person about cumulative impacts.

2364	6526	Asked has CGG considered the risk of hydrocarbon or other vessel spills and/or collisions in their proposed activities, including from routine vessel traffic and/or rig operations, particularly in the overlapping areas with ConocoPhillips proposed activities? If so, how have any such environmental impacts been assessed and mitigated?	Event ID 6521 - The Regia team provided a tailored information sheet to the relevant person on unplanned events, including the accidental release of fuel, introduction of marine pests, accidental release of materials or waste overboard and collisions with marine fauna.
2365	6526	Asked how and in what manner have all environmental factors within the environment (as defined under r 5) been considered in cumulative impact assessments?	Event ID 6859 - The Regia team responded that as summarised in EP Section 10.1, Cumulative impacts were inherently considered in Stage 2 of the environmental assessments by virtue of considering the existing environment as a dynamic place inclusive of other natural and anthropogenic pressures. Specifically, the effects of past projects and activities, and currently operating projects, are captured when describing the existing condition of environmental values and sensitivities, inclusive of any pressure or threats affecting that value or sensitivity. Reasonably foreseeable further projects and activities within the spatial and temporal extent of the assessment includes the proposed Calico seismic survey. Additionally, in Event ID 6521, the Regia team provided a tailored information sheet to the relevant person about cumulative impacts.
2366	6526	Asked how and to what extent have acoustic impacts (including, for example, potential fatalaties to zooplankton and other fish species; injury and/or serious harm to mammal species; and other impacts to the broader ecosystem) considered in cumulative impact assessments, including cumulative impact assessments of the cultural environment?	Event ID 6859 - The Regia team responded that as summarised in EP Section 10.1, Cumulative impacts were inherently considered in Stage 2 of the environmental assessments by virtue of considering the existing environment as a dynamic place inclusive of other natural and anthropogenic pressures. Specifically, the effects of past projects and activities, and currently operating projects, are captured when describing the existing condition of environmental values and sensitivities, inclusive of any pressure or threats affecting that value or sensitivity. Reasonably foreseeable further projects and activities within the spatial and temporal extent of the assessment includes the proposed Calico seismic survey. Additionally, in Event ID 6521, the Regia team provided a tailored information sheet to the relevant person about cumulative impacts.

2367	6526	Asked on what basis does CGG determine, conclude or justify that any impacts or harms from seismic activity, surveys and/or blasting have been reduced to an acceptable level and/or to as low as reasonably practicable?	Event ID 6859 - The Regian team provided Annexure A that outlined that as per EP Section 2 Environmental Assessment Process, the EP undertook the environment assessment process in three stages:Stage 1: Preliminary Environmental Impact and Risk Assessment. This first stage of the assessment focused on the activity as a whole. Information was collated on the proposed activity, including setting an initial geographical area of investigation, and gathering environmental knowledge of the area. The preliminary assessment established the cause-effect pathways between the proposed activity and the environment to determine the environmental aspects of the activity to be managed.Stage 2: Detailed Environmental Assessments. The second assessment was undertaken at the aspect level. This approach was taken because the conclusion of this stage of the assessment process was to set Environmental Performance Outcomes (EPO), which are about the management of environmental aspects of the activity. The assessments primarily focus on demonstrating that the impacts and risks of the activity are of an acceptable level. This is because CGG applies this criterion before it attempts to further reduce impacts and risks through the ALARP assessment process. This assessment built on the content and context of the first assessment and included consideration of additional content (gathered from literature reviews, modelling reports, and other expert reports etc.) before then undertaking each impact and risk assessment in respect of the environmental aspects arising from the proposed activity.Stage 3: Further Assessment and Acceptance Criteria. The third assessment was undertaken at the impact/risk level. This is because the acceptance criteria focus on the demonstration that environmental impacts and risks will be of an acceptable level and reduced to as low as reasonably practicable (ALARP).
2368	6623	Requested that CGG respond to questions provided in 28 days.	Event ID 6859 - The Regia team responded to questions provided by the organisation as requested.

2369	6623	Requested information on how procedures requiring observation of karntubul for 12 hours prior to shutdown of CGG's proposed activities practically provide protection for karntubul? For example, how do these procedures specifically protect karntubul, where marine mammal observation is complicated by the following non-exhaustive list of factors such as low-light, poor visibility, high seas and variable weather, the need for karntubul to be close to the water's surface to be readily detected by marine mammal observers and the impact of backgrounf noise and karntubil that are not vocalising on passive acousic monitoring.	Event ID 6859 - The Regia team responded that as per their tailored information sheet, EP Appendix E7, and G2, CGG will use multiples lines of evidence when detecting whales. The Regia MSS will utilise a range of whale detections methods such as Marine Mammal Observers (MMOs) (and an additional MMO on board the support vessel), Aerial surveys, and Passive Acoustic Monitoring (PAM) technology. CGG has also committed to trialling an additional PAM system and if successful 3 more PAM detection buoys will be added to the suite of detection methods. During low-light and poor visibility/weather PAM technology will be the main method used for whale detection, CGG will use two different types of PAM technology to monitor whales. If whales are close to the waters surface, MMOs and aerial surveys will have the ability to monitor them. Ambient noise levels will be taken into account prior to the survey. It should be noted, it is only low frequency cetaceans (baleen whales) that if detected, need to be monitored for 12 hours. Additionally, in Event ID 6521, the Regia team provided a tailored information sheet to the relevant person about Karntubul species.
2370	6623	Asked how will CGG reasonably determine that an individual karntubul has been present within the ensonified area for more than 12 hours?	Event ID 6859 - The Regia team responded that as per their tailored information sheet, EP Appendix E7, and G2, CGG will use multiples lines of evidence when detecting whales. The Regia MSS will utilise a range of whale detections methods such as MMOs (and an additional MMO on board the support vessel), Aerial surveys, and PAM technology. CGG has also committed to trialling an additional PAM system and if successful 3 more PAM detection buoys will be added to the suite of detection methods. CGG will be relying on a suite of detection methods to enhance detections of whales. These techniques along with input and advice from a whale expert panel, will be used to monitor detections of whales for 12 hours. It should be noted, it is only low frequency cetaceans (baleen whales) that if detected, need to be monitored for 12 hours. Additionally, in Event ID 6521, the Regia team provided a tailored information sheet to the relevant person about Karntubul species.
2371	6623	Asked what training, skills and experience will the "CGG Site Representative" have in ensuring mammal observation duties are conducted to an acceptable level (when the marine mammal observer is unavailable)?	Event ID 6859 - The Regia team responded that as per EP Appendix G2, the CGG Site Representative is responsible for the implementation of the Fauna Management Plan and provides training and activity specific inductions to the Survey Environment Advisor. The CGG Site Representative does not make any decisions regarding marine mammal observations. Additionally, in Event ID 6521, the Regia team provided a tailored information sheet to the relevant person about Karntubul species and measures in place to protect marine mammals.

2372	6623	Asked if CGG could explain the conflicting shut-down measures that it proposes in the EP? For example, how does CGG conclude that a 500 m shutdown measure is sufficiently protective of low-frequency cetaceans, when a 2 km shutdown zone was considered in the impact analysis in the EP? Also, is the "moderate" conclusion reached therein still accurate in the absence of a 2 km shutdown shut down within 500measure.	Event ID 6859 - The Regia team responded that it is not conflicting. The 2km refers to a previous version of the EP, prior to our latest submission (a version prior to November 2024). The EP is a live document, it is important to always ensure you are reading the most up to date version. The most up to date control measures whales can be found in EP Appendix E7 and G1. These include: - Shut down within 500m of sound source to ensure thresholds from PTS per pulse are not reached for any low-frequency (LF) cetacean. - Shut down the sound source for any LF cetacean observed within 5 km of the sound source for more than 12 hours to ensure PTS cumulative 24h is not reached. - Shut down the sound source if a blue whale remains resident in the 23 km ensonified area for more than 12 hours, or move away from the area, to ensure TTS cumulative 24h is not reached. - Shut down the sound source if a blue whale is observed within 10 km from the sound source or move away from the area to ensure behavioural thresholds per pulse are not reached. - Shut down the sound source if a SRW remains resident in the 15 km ensonified area for more than 12 hours or move away from the area to ensure TTS cumulative 24h is not reached. - Shut down the sound source if a SRW cow and calf pair are observed within 10 km from the sound source or move away from the area to ensure TTS cumulative 24h for SRW calf cow pair is not reached.
2373	6623	Asked how does CGG conclude that seismic activity within the foraging BIA of the karntubul species Pygmy Blue Whale is consistent with the recovery plan under the EPBC Act for that species?	Event ID 6859 - The Regia team responded that as per EP Appendix E7, CGG will ensure there are no behavioural impacts to Blue Whales, as the seismic source will be shut down within 10km of a blue whale. This is based on the underwater sound modelling commissioned by CGG where behavorial impacts to blue whales was predicted to occur within 9.83km of the sound source.
2374	6623	Asked on what basis has CGG concluded that a Pygmy Blue Whale will not be injured, disrupted from foraging, or displaced?	Event ID 6859 - The Regia team responded that as per EP Appendix E7, CGG has ensured the Regia MSS will not be taking place during the peak upwelling months associated with the Bonney . The most likely window now will be September. Along with shut downs for blue whales mentioned previously, CGG will ensure the seismic source will only not be operated within the pygmy blue whale foraging BIA if there are low numbers of blue whales present. CGG will use a whale expert panel to help define 'low numbers' CGG will also shut down if a blue whale is detected within 10km of the seismic source. This 10km will ensure there are no behavioural impacts which may displace whales from their foraging BIASs. CGG will shut down the sound source if a blue whale remains resident in the 23 km ensonified area for more than 12 hours, this will ensure blue whales will not experience TTS (temporary auditory injury).

2375	6623	Asked what are the predicted impacts when seismic survey blasting takes place inside of a BIA with karntubul present?	Event ID 6859 - The Regia team responded that as per E7 Appendix 7, There are only 3 BIAs associated with whales that are relevant to the Regia MSS, the Southern Right Whales Reproductive and Migration BIA, and the Blue Whale Foraging BIA. The sound source will be operated within the Southern Right Whale Reproductive BIA at any time. CGG will ensure the seismic source will only not be operated within the pygmy blue whale foraging BIA if there are low numbers of blue whales present. CGG will use a whale expert panel to help define 'low numbers' CGG will also shut down if a blue whale is detected within 10km of the seismic source. This 10km will ensure there are no behavioural impacts which may displace whales from their foraging BIASs. CGG will shut down the sound source if a blue whale remains resident in the 23 km ensonified area for more than 12 hours, this will ensure blue whales will not experience TTS (temporary auditory injury).
2376	6623	Asked how has CGG concluded that impacts to culturally significant marine mammals like karntubul and sea lions are “individual”, “temporary”, “recoverable” or “small scale” without meaningful engagement with Gunditjmara to determine what, if any, harms and impacts are acceptable for culturally significant species?	Event ID 6859 - The Regia team responded that an outline of the framework for defining acceptable levels for the Regia MSS can be found in Appendix F4.The acceptable levels defined by CGG for all relevant receptors including marine mammals were assembled using scientific rigor, which included the analysis of peer-reviewed and unbiased literature to predict impacts to relevant species, while also ensuring their consistency with species’ recovery and conservation management plans. CGG has also engaged in extensive consultation efforts to learn and gain as much knowledge as possible around the cultural significance of marine species during this process and continues to welcome additional relevant information and knowledge that could further benefit the protection of the marine environment, including culturally significant species. Also to noted: CGG’s first draft of defined acceptable levels were published in May 2023 on the Consultation Hub alongside our environmental assessment process to provide an opportunity to the community and relevant persons to understand the assessment process and influence the criteria used in the assessment process. The opportunity to comment was open for 60 days.
2377	6623	Asked how has CGG concluded that the Regia MSS will not result in population-level impacts given that studies have suggested impacts on individual marine mammals can aggregate into population-level disturbances?	Event ID 6859 - The Regia team sought clarification if this question related to whales or marine mammals as a whole? As per E7 Appendix 7, CGG has assessed underwater sound impacts to marine mammals. The reference provided discussed impacts to beaked whales which are not baleen whales. Impacts to whales have been categorised into hearing groups. CGG considered numerous scientific studies, conservation management plans, recovery plans, and conservation advice when assessing impacts to marine mammals. CGG will be implementing shut-downs for whales to ensure impacts are minimised, therefore impacts at a population level are not expected.

2378	6623	Asked how has CGG ensured compliance with the Objects of the Regulations (and section 3A of the EPBC Act) in employing the precautionary principle in concluding the matters identified relating to Karntubul.	Event ID 6859 - The Regia team responded that application of the precautionary principle is required when there are threats of serious or irreversible environmental damage and a lack of full scientific certainty. There are examples in CGGs analysis where a lack of full scientific uncertainty was identified, however, there were no instances where threats to environmental values and sensitivities were serious or irreversible. Despite this CGG routinely applied precaution in its assessment; selecting conservative effect thresholds for sound, adjusting the activity design to avoid sound discharge during particularly sensitive periods, to avoid overlap with sensitive species protected areas (e.g. KEFs), and implementing buffers around marine protected areas.
2379	6623	Asked if CGG could explain why it adopted a 160 dB threshold for behavioural impacts to marine mammals when a 140 dB or 120 dB threshold would appear to better reflect both scientific uncertainty and the findings presented in Appendix B8 of the EP?	Event ID 6859 - The Regia team responded that the noise criteria for the acoustic modelling study were chosen because they include standard thresholds and thresholds suggested by the best available science. The chosen marine mammal behavioural threshold is based on the current US National Oceanic and Atmospheric Administration (NOAA 2019) criterion for marine mammals of 160 dB re 1 µPa (SPL; Lp) for impulsive sound sources. Changing this industry standard methodology to include a lower threshold (140 dB or 120 dB) would require substantial new scientific evidence to justify it that is not currently available, nor is it currently believed to be relevant based on the justifications for using the 160dB threshold.
2380	6623	Asked if CGG could explain and justify why this higher dB threshold is also being applied to endangered, vulnerable, and culturally significant species?	Event ID 6859 - The Regia team responded that the noise criteria for the acoustic modelling study were chosen because they include standard thresholds and thresholds suggested by the best available science. The chosen marine mammal behavioural threshold is based on the current US National Oceanic and Atmospheric Administration (NOAA 2019) criterion for marine mammals of 160 dB re 1 µPa (SPL; Lp) for impulsive sound sources. Changing this industry standard methodology to include a lower threshold (140 dB or 120 dB) would require substantial new scientific evidence to justify it that is not currently available, nor is it currently believed to be relevant based on the justifications for using the 160dB threshold.
2381	6623	Asked why CGG had two different buffer zones (18km and 17km) for Deen Maar?	Event ID 6859 - The Regia team responded that the EP states 17 km. The draft presentation slides provided prior to the February 14th 2025, meeting incorrectly stated 18 km, this had been corrected prior to presentation.
2382	6623	Asked how will the Deen Maar buffer zone be enforced and why has this area not been excised from the title area?	Event ID 6859 - The Regia team responded that a petroleum title area is the geographical boundary of a petroleum title, which is defined by the government. The survey design has been updated, acquisition lines will adhere to this.

2383	6623	Asked why is the buffer zone around Deen Maar less than the area for which CGG has found elevated noise levels (20km)?	Event ID 6859 - The Regia team responded that 11.8 km is the furthest distance to sound effect criteria for pinnipeds (seals and sea lions). The increased protections afforded through the 17 km buffer are considered highly conservative to minimise disturbance of breeding seals in recognition that this is the largest Australian Fur Seal breeding colony in Australia.
2384	6623	Asked given the significant uncertainty characterising the issue of plankton mortality caused by seismic activity, particularly in the context of the culturally and biologically significant Bonney Upwelling, why has CGG not employed the precautionary principle in its assessment of impacts on plankton and other culturally significant species?	Event ID 6859 - The Regia team responded that the Precautionary Principle is utilised when there is uncertainty. Further assessment of Plankton Communities and the Bonney Upwelling System, in Section 3.13 in Appendix F3 Further Assessment of Key Values and Sensitivities, assesses potential impacts on plankton in further detail. Multiple studies on the effects of seismic activity on plankton, especially fish larvae, show harmful impacts, but the extent of these effects varies by species and proximity to seismic sources. In general, the closer the plankton are to seismic sources, the greater the impact, though some studies, like McCauley et al. (2017), challenge this distance-effect relationship. Richardson et al. (2017) called for more research into McCauley's findings, particularly regarding the lack of attenuation with distance. Experimental methods have varied widely, often not replicating real-life conditions, highlighting the need for further focused studies. McCauley's work has spurred additional research, including Norway's ZoopSeis project, which investigates seismic effects on zooplankton under realistic conditions. This work is designed to investigate effects under realistic seismic survey conditions and finished at the end of 2023. Peer-reviewed papers of the research are being completed, with the first publication now available. Mortality rates and reduced growth of copepod larvae of Acartia spp were found to be high in the vicinity of the airgun discharges however the actual rates were significantly lower than normal population mortality rates and hence would likely not be detected (Vereide et al. 2023). They did not test for the effects of distance-from-seismic in this work, but their results remain consistent with most of the other research already published in this area. A second publication from the ZoopSeis research (Vereide et al., 2024a) found that while seismic discharges caused significant damage close to the sources, mortality did not extend extensively beyond 1 km, as suggested by McCauley et al. (2017). The mortality rates were lower than natural mortality and thus difficult to distinguish from background mortality. A review (Vereide et al., 2024b) highlighted the challenge of applying experimental results to real-life scenarios. While seismic surveys can cover vast areas and last for weeks, the plankton's exposure is not continuous and typically lasts only 3-4 days in studies, which may not accurately reflect real-world conditions due to migration and advection. Zooplankton will experience varying exposure to seismic discharges depending on factors like time, sound levels, and seasonal or species-specific distribution changes. Studies like Dongen-Vogels et al. (2011) show significant local variations in plankton abundance due to physical events like upwelling or water column stratification. Additionally, a study off Florida (Robinson et al., 2021) showed that planktonic

			assemblages exhibit multi-scale patchiness. While effects of seismic will be felt by plankton assemblages at localised scales the highly dynamic nature of populations in space and time will ensure there are no population level effects hence the magnitude of any effects will be minor. Impacts to zooplankton and the Bonney Coast Upwelling and the role they both play in ecosystem function and productivity, are not predicted as: • Impacts to phytoplankton are not predicted. • Mortality or injury effects to zooplankton will be well within natural mortality rates. Upwelling systems in the region are highly dynamic with large variations in biomass a normal process. Zooplankton communities demonstrate high rates of turnover and will be constantly replenishing even as the seismic survey occurs. • Mortality or mortal injury effects to zooplankton, including krill, do not impact on marine fauna being able to feed on them as they will still be available within the water column.
2385	6623	Asked for more information on how the EP discusses modern cultural values associated with particular species or environmental features.	Event ID 6859 - The Regia team responded that Biosis Pty Ltd (Biosis) was commissioned by ConocoPhillips to undertake a cultural heritage desktop assessment (Appendix B10) for proposed resource exploration in Bass Strait. ConocoPhillips and Biosis gave permission for CGG to utilise this report given the overlap of the study area with the Regia MSS. The report supported the foundation of knowledge for the cultural heritage parts of the overall assessment. Cultural values are included in the impact assessments, for example, in Appendix E3 Impact Assessment Underwater Sound: Fish, Section 4.1.6 Eels, there is a section entitled 'First Nations Connection to Eels'. Appendix F3 Further Assessment of Key Values and Sensitivities, Section 3.16 further assesses environmental values and sensitivities that were identified as culturally important features of the environment that may be affected by the Regia MSS. Included in this are Karntubul, Kooyang, and the Bonney Upwelling.

2386	6623	Asked how was the Biosis desktop review used to inform CGG's analysis of impacts?	Event ID 6859 - The Regia team responded that Appendix B10, the Cultural Heritage Review, is a report that supported the foundation of knowledge for the cultural heritage parts of the overall assessment. It informed the description of the environment that may be affected, which could be found in the relevant impact/risk assessment.
2387	6623	Asked if CGG considered or conducted an analysis of modern cultural values and if so, where has it gathered information on those modern cultural values?	Event ID 6859 - The Regia team responded that they used information provided through consultation, relevant literature, case law and desktop research.
2388	6623	Asked how does CGG ensure that the harms are fully considered and mitigated for culturally significant features?	Event ID 6859 - The Regia team responded that following consultation with relevant persons, and completion of the environmental assessments, activity limitations had been adopted. The Regia team provided a list of the activity limitations relevant to protecting environmental values and sensitivities, relevant to protected area, relevant to cultural sensitivities, relevant to compliance and relevant to protecting other marine users. They explained that these activity limitations had been referred to throughout the environmental assessment, consultation, and public comment processes.
2389	6623	Asked how and where does the November EP assess species and places of cultural significance holistically?	Event ID 6859 - The Regia team responded that assessment of species and places of cultural significance could be located in Appendix F3, Section 3.16 Cultural Features of the Environment Plan.

2390	6623	The Acceptable Levels Assessment (Appendix F4) concludes that "impacts to cultural features are not predicted" for invertebrates, turtles, and marine mammals, and birds. However, the November EP describes numerous impacts to these animal groups, many of which hold cultural importance to Gunditjmara. Notwithstanding this, the EP reaches the conclusion, culturally, that the species will not be impacted by underwater noise. What is CGG's response?	Event ID 6859 - The Regia team responded that there seems to have been a misreading of the EP, with confusion around 'potential' (cause-effect pathways) and 'predicted' (impacts given the measures in place). As per EP Section 2 Environmental Assessment Process, the EP undertook the environment assessment process in three stages: Stage 1: Preliminary Environmental Impact and Risk Assessment. This first stage of the assessment focused on the activity as a whole. Information was collated on the proposed activity, including setting an initial geographical area of investigation, and gathering environmental knowledge of the area. The preliminary assessment established the cause-effect pathways between the proposed activity and the environment to determine the environmental aspects of the activity to be managed. Stage 2: Detailed Environmental Assessments. The second assessment was undertaken at the aspect level. This approach was taken because the conclusion of this stage of the assessment process was to set Environmental Performance Outcomes (EPO), which are about the management of environmental aspects of the activity. The assessments primarily focus on demonstrating that the impacts and risks of the activity are of an acceptable level. This is because CGG applies this criterion before it attempts to further reduce impacts and risks through the ALARP assessment process. This assessment built on the content and context of the first assessment and included consideration of additional content (gathered from literature reviews, modelling reports, and other expert reports etc.) before then undertaking each impact and risk assessment in respect of the environmental aspects arising from the proposed activity. Stage 3: Further Assessment and Acceptance Criteria. The third assessment was undertaken at the impact/risk level. This is because the acceptance criteria focus on the demonstration that environmental impacts and risks will be of an acceptable level and reduced to as low as reasonably practicable (ALARP).
2391	6623	Asked why does the November EP evaluate cultural impacts differently?	Event ID 6859 - The Regia team responded that following feedback from NOPSEMA, the presentation and organisation of the EP and Appendices were changed, rather than underlying methodology. Appendix A3, B1, B9, F1, and G5 were removed from the November submission, with relevant content moved into other parts of the EP. The original Appendix F1 has been replaced with an EP Summary document. The Cumulative Impact Assessment (previously Appendix E10 has been updated and renamed F1 to better reflect its place in the assessment process.
2392	6623	How and where does CGG assess impacts on species and places of cultural significance holistically, at	Event ID 6859 - The Regia team responded that both direct and indirect cause-effect pathways were identified and assessed. Appendix F3, Section 3.16 Cultural Features of the Environment

		the individual, population and ecosystem level?	
2393	6623	Asked how is CGG able to confidently conclude that there are no long term, serious or irreversible threats from the Regia MSS?	Event ID 6859 - The Regia team responded that in Appendix F4, CGG has put forward its case that the environmental impacts and risks of the activity are of an acceptable level because: 1. All environmental impacts and risks have been identified and assessed. 2. Lower order impacts and risks have been screened and eliminated or managed. 3. Higher order impacts and risks have been assessed by: a. Gathering knowledge about relevant environmental values and sensitivities, including through extensive consultation. b. Defining acceptable levels for the activity and, more specifically, for environmental values and sensitivities. c. Predicting the levels of impact and risk. d. Evaluating the effectiveness of measures that protect the environment. 4. Predicted impacts and risks of the activity have been compared to acceptable levels of impact. 5. The titleholder has considered predictive uncertainty in the environmental assessments. 6. The environmental assessments are appropriate to the nature and scale of the activity. 7. Once managed, no pathways to unacceptable impacts were identified. 8. The proposed activity will comply with the requirements of the EPBC Act. 9. The proposed activity is consistent with the principles of ecologically sustainable development. Each of these reasons is explained, in detail, in Appendix F4. They demonstrate that environmental impacts and risks arising from the activity are of an acceptable level.
2394	6623	Asked if CGG could clarify whether it plans to acquire the seismic survey in a single phase or in multiple phases over the estimated four-year duration of the activity?	Event ID 6859 - The Regia team responded that the activity is a single phase of a maximum of 90 days of operations, with a maximum of 60 of those days being acquisition, during which the sound is emitted.
2395	6623	Asked if the 60 days of survey activity be spread out over the 5-year acquisition period or will CGG be surveying 60 days per year? Is a different proposed phase of acquisition contemplated by CGG?	Event ID 6859 - The Regia team responded that if the EP gains acceptance, the activity would occur once, anytime (excluding January, February or March) between acceptance and 2028.
2396	6623	Asked what is the maximum number of days that seismic surveying	Event ID 6859 - The Regia team responded that there would be 90 days of operations, with 60 of those days being acquisition.

		could occur over the project's duration?	
2397	6623	Asked if CGG could confirm that the sound source will not be active (even at low levels or for testing) outside of the active source area?	Event ID 6859 - The Regia team responded that the survey is designed with progressively smaller areas within the activity planning area, these areas have designated activities assigned to them: Operation Area (OA): an area within the Activity Planning Area in which survey vessel activities occur including equipment maintenance and deployment/recovery, crew change and resupply. The sound source cannot be active in the operational area, outside of the active source area. Active Source Area (ASA): an area within the Operational Area in which the sound source can be active. Line runouts and run-ins occur within this area and outside of the survey acquisition area. The sound source cannot be discharged at full power within the activity source area and outside of the survey acquisition area. Survey Acquisition Area (SAA): the primary target area for the survey and the area in which seismic data will be recorded, and the sound source can be discharged at full power.
2398	6623	Asked if CGG could confirm whether underwater acoustic modelling limited itself to the active source area or source acquisition area?	Event ID 6859 - The Regia team responded that Two sound modelling reports were undertaken: - Appendix B7a - Modelling Report on Sound Emissions: Regia Marine Seismic Survey by JASCO Applied Sciences - Appendix B7b - Regia Marine Seismic Survey: Acoustic and Animat Modelling for Assessing Marine Fauna Sound Exposures (Document 03301, Version 2.0) CGG commissioned the initial underwater sound modelling prior to the decision regarding the location of the operational area and active source area. This was to ensure CGG could make an informed decision regarding sound levels within the area of interest. This is why the modelling does not include an Operational Area and an Active Source Area. Provided sound modelling map images and clarified that they were produced to demonstrate the relevance of the modelling in relation to the proposed survey acquisition area. They stated that a further description of the Appendices can be found in the EP, Section 7.3.1.
2399	6623	Can CGG provide a single map including the boundaries of all three areas of the operational	Event ID 6859 - The Regia team provided the requested map.

		area, the active source area, and acquisition area?	
2400	6623	Asked why are vessel activities outside the operational area not included as "petroleum activities" within the scope of the EP? How would they contribute to noise emissions, ship strikes, and other impacts and risks (including cumulative impacts) if they were included?	Event ID 6859 - The Regia team responded that the scope of the EP does not include the periods when the seismic vessel or support vessels are not within the OA, such as during maintenance activities outside of the OA, port calls, crew changes, inclement weather avoidance, or vessel mobilisation/demobilisation to/from the OA. During these periods the project vessels are deemed to be operating under the Commonwealth Navigation Act 2012 and are not managed within this EP.
2401	6623	Asked how has CGG ensured that the best available information was incorporated into the EP's assessment of environmental impacts, given it seems underlying searches and reports have not been updated since May 2024?	Event ID 6859 - The Regia team responded that multiple searches and reports, such as the Protected Matters Search Tool (PMST), were undertaken in the preparation of the EP, including in May 2024 prior to submission to ensure any changes to species or listings were identified to cater for the passage of time. These searches will be re-run prior to the activity commencing to help determine any changes to environmental knowledge underpinning this EP.
2402	6623	Asked how did CGG ensure that the November EP did not ignore or downplay environmental harms, as it focused its analysis on why the project is acceptable?	Event ID 6859 - The Regia team responded that assessments were undertaken in three stages to identify cause-effect pathways and ensure these were appropriately managed. Within these documents potential direct and indirect cause-effect pathways, impacts and risks, along with the predicted level of risk are identified and comprehensively described. The stage two assessments primarily focus on demonstrating that the impacts and risks of the activity are of an acceptable level. This is because CGG applies this criterion before it attempts to further reduce impacts and risks through the ALARP assessment process. This assessment built on the content and context of the first assessment and included consideration of additional content (gathered from literature reviews, modelling reports, and other expert reports etc.) before then undertaking each impact and risk assessment in respect of the environmental aspects arising from the proposed activity.
2403	6623	Asked why did CGG choose not to revise its underwater noise models despite the flaws found by NOPSEMA in its Request for Further Information, dated 28 August 2024?	Event ID 6859 - The Regia team responded that the issue raised by NOPSEMA in the Request for Further Written Information (RFFWI) were concerning how CGG had demonstrated that the sound modelling reports are commensurate with the nature and scale of the activity and the severity of individual impacts and risks. CGG addressed this by updating the EP to provide clarification to the queries raised. This included new maps, explanation of the two modelling reports and their utility in the impact assessments. Further description of the Appendices can be found in the EP, Section 7.3.1, and Appendix B7a and B7b.

2404	6623	Asked how can CGG ensure that the oil spill model, based on a literature review, is realistic and relatable to this project?	Event ID 6859 - The Regia team responded that CGG commissioned a detail analysis of all the oil spill models completed in the Otway region since the integration of environmental functions into NOPSEMA. For a spill model to be considered relevant to the activity it had to meet the following requirements: • Surface release of marine diesel oil. • Modelling thresholds align with those in the NOPSEMA Oil Spill Modelling Environment Bulletin April 2019. • Modelling was used in an environment plan available on the NOSPEMA website. • Modelled location is within the Regia MSS Activity Planning Area or > 20 km of the Regia MSS Activity Planning Area where the metocean conditions would be similar. Twelve suitable models were analysed with all but one having a greater spill volume than is applicable to the proposed Regia MSS. The review found that the EPA set for the activity was suitable for the consideration of the extent of the risk (consequence) that may arise from the activity. The full report has been included in the EP as Appendix B11.
2405	6623	Asked is it contemplated by CGG that multiple seismic surveys may proceed in the Otway Basin at the same time or in near succession? If this is the case, how has impact for concurrent and consecutive seismic surveys on species and ecosystems been accounted for in the EP?	Event ID 6859 - The Regia team responded that as summarised in EP Section 10.1, Cumulative impacts were inherently considered in Stage 2 of the environmental assessments by virtue of considering the existing environment as a dynamic place inclusive of other natural and anthropogenic pressures. Specifically, the effects of past projects and activities, and currently operating projects, are captured when describing the existing condition of environmental values and sensitivities, inclusive of any pressure or threats affecting that value or sensitivity. Reasonably foreseeable further projects and activities within the spatial and temporal extent of the assessment includes the proposed Calico seismic survey.
2406	6623	Asked how will CGG address cumulative impacts from anthropogenic noise generally and specifically from consecutive and concurrent seismic surveys?	Event ID 6859 - The Regia team responded that cumulative impacts were considered in the environmental assessments.

2407	6623	Asked why CGG's EP does not consider how elevated noise levels over long durations and distances can affect marine mammal behaviour and physiology, particularly beyond a 24 hour period.	Event ID 6859 - The Regia team responded that information provided in this statement is unweighted and lacking scientific evidence to support this claim about how sound will propagate through the water in the region of the proposed Regia MSS. The 24-hour duration applied to the cumulative noise exposure is an industry-standard method based on the unlikelihood that a highly mobile animal such as a marine mammal would remain static in an area for long enough to be exposed to cumulative noise exposure. Particularly due to the behavioural response threshold criteria being below those associated with TTS and PTS. Therefore a 24 hour duration is likely a conservative approach when being applied to cumulative noise exposure relating to marine mammals. CGG acknowledges that an assessment of the ambient noise in the proposed region of the Regia MSS may be required to provide sufficient context that informs the impact assessment of underwater sound on relevant receptors. CGG will be providing additional information in the EP on ambient noise in the Otway region.
2408	6623	Asked why CGG does not appear to evaluate the impacts of noise on kooyang specifically, instead relying on a broad evaluation of noise impacts to fish, generally.	Event ID 6859 - The Regia team responded that noise modelling conducted by CGG assessed the impacts from sound to fish under three subcategories. These include fish with a swim bladder, fish without a swim bladder, and fish eggs and larvae. Fish susceptibility to injury from noise exposure varies depending on the species and the presence and possible role of a swim bladder in hearing. Thus, different thresholds were proposed for fish without a swim bladder, fish with a swim bladder not used for hearing, and fish that use their swim bladders for hearing. The latter two categories representing a further level of complexity applied to the modelling categories for fish. For context, CGG has grouped kooyang with fish containing swim bladders when assessing seismic effect studies. Therefore, CGG does not agree that the results from the noise modelling were necessarily a “broad evaluation”, but an appropriately categorised one. Standard modelling methodology models for receptors based on hearing group, not species. As this relates to fish, the presence/absence of a swim bladder remains the most suitable parameter for grouping fish in modelling for impacts from sound, therefore justifying CGGs reasoning behind not conducting species-specific modelling for kooyang, nor any other fish, bird, marine mammal, or turtle species.
2409	6623	Asked if CGG did not model noise impacts on kooyang specifically, how can it then make conclusions required under the Regulations (including those in relation to reducing impacts to ALARP and an acceptable level) about the impact of the seismic survey on this species?	Event ID 6859 - The Regia team responded that the modelling methodology (explained and justified above) is an industry-standard practise that applies the most appropriate and up-to-date scientific and peer-reviewed literature to best-assess the potential impacts from sound to fish, including kooyang

2410	6623	Asked how were conclusions drawn that prospective effects on kooyang would not effect the Budj Bim Cultural Landscape, which depends on the life cycle of kooyang for its Outstanding Universal Value and World Heritage Property listing?	Event ID 6859 - The Regia team responded that no life-cycle stages of kooyang that occur in the Budj Bim Cultural Landscape are predicted to be impacted from the Regia MSS, nor are any population-level impacts predicted for kooyang that would potentially impact the landscape. As a World Heritage Listed environmental value it was important for CGG to thoroughly assess the Outstanding Universal Value of the Budj Bim site. The assessment of the Budj Bim Cultural Landscape (available to view in Appendix F3) has found no threat to the values of the site from the proposed activity.
2411	6623	Asked how has CGG specifically considered the relevant cultural environment, including: Gunditjmara views, concerns, and objections in relation to potential harm to kooyang, and Potential impacts from the proposed activities on Gunditjmara's native title rights and interests in relation to the aquaculture systems of the Budj Bim Cultural Landscape?	Event ID 6859 - The Regia team responded that CGG acknowledges Gunditjmara views, concerns, and objections in relation to potential harm of kooyang, and believes that the information provided by CGG can assist in the understanding of CGG's predicted impacts on these species, which have been rigorously and thoroughly assessed to the best of their ability using industry-standard practices, and robust scientific methods. CGG acknowledges that the integrity and authenticity of the site are maintained through the intact and operational nature of the aquaculture systems, the ongoing connection of the Gunditjmara to their land, and the continuation of cultural practices. The landscape is managed to respect the rights and obligations of the Gunditjmara Traditional Owners, ensuring the preservation of its cultural and natural values, by the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan (2015). Whilst there are no direct effects, and immeasurable indirect effects, from the Regia MSS on the World Heritage Values of Budj Bim, CGG recognises that there may be other indirect effects to spiritual values held by the Gunditjmara people and that this information may be sensitive such that it cannot be shared. In acknowledgement of the ongoing sovereignty of the Gunditjmara people, and CGG's willingness to find ways to protect cultural heritage, a Sea Country Protection Program will be implemented that aims to facilitate the co-design and co-implementation of initiatives to mitigate indirect effects from the Regia MSS if they are evident.

2412	6623	Asked why did CGG not model noise impacts on kooyang, specifically? Requested that CGG add this specific analysis to its noise and seismic studies reports in the EP and provide it to them for further consideration at a consultation meeting.	Event ID 6859 - The Regia team responded that the noise modelling conducted by CGG assessed the impacts from sound to fish under three subcategories. These include fish with a swim bladder, fish without a swim bladder, and fish eggs and larvae. Fish susceptibility to injury from noise exposure varies depending on the species and the presence and possible role of a swim bladder in hearing. Thus, different thresholds were proposed for fish without a swim bladder, fish with a swim bladder not used for hearing, and fish that use their swim bladders for hearing. The latter two categories representing a further level of complexity applied to the modelling categories for fish. For context, CGG has grouped kooyang with fish containing swim bladders when assessing seismic effect studies. Therefore, CGG does not agree that the results from the noise modelling were necessarily a "broad evaluation", but an appropriately categorised one. Standard modelling methodology models for receptors based on hearing group, not species. As this relates to fish, the presence/absence of a swim bladder remains the most suitable parameter for grouping fish in modelling for impacts from sound, therefore justifying CGGs reasoning behind not conducting species-specific modelling for kooyang, nor any other fish, bird, marine mammal, or turtle species.
2413	6623	Asked if CGG assessed whether adult and juvenile kooyang would be able to move away from the sound of the seismic survey with sufficient speed to mitigate potential harms?	Event ID 6859 - The Regia team responded that CGG has considered a study by Koster et al. (2021). Adult Short-finned Eels tagged and released from Hopkins River Mouth, Killarney Beach and Warrnambool Harbour, locations in shore of the Operational Area showed that they migrated to access deep water via two main routes: directly east via Bass Strait or southeast around Tasmania (Koster et al 2021). While migrating through the shelf area where the Operational Area is located adult eels achieved an average speed of 30.8 ± 7.3 km/day with one eel swimming at 80 km/day so it is feasible that they can swim away from a sound source (Koster et al 2021). CGGs implementation of the Fauna Management System requires the seismic source to be slowly ramped up to full power over 30 minutes. This would allow eels to move away from the source before it is at full power, and once the source passes, animals will be free to move back into the habitat that they departed from. Thus, injury impacts that may occur if the seismic array commences at full power adjacent to migrating eels has been mitigated for.
2414	6623	Does CGG account for the difference in size and speed of adult and juvenile (for example, glass eels) kooyang in this analysis?	Event ID 6859 - The Regia team responded that this point had been addressed in Appendix E3, where the following information can be found: "Glass eels, which are between 50-60 mm in length, actively swim toward and into the embayments and estuaries of the eastern Australian continent (VFA 2017). Though they are unlikely to achieve speeds reached be adult eels they can actively swim away from the sound source."

2415	6623	Does CGG contemplate whether the sound from the seismic survey could itself affect kooyang swimming speeds (for example if the noise stuns, injures or confuses kooyang so they are unable to swim away)?	Event ID 6859 - The Regia team responded that the following predicted impact has been included in Appendix E3 by CGG: "Injury impacts may occur if the seismic array commences at full power adjacent to migrating eels. However, the implementation of the Fauna Management System requires the seismic source to be slowly ramped up to full power over 30 minutes. This would allow eels to move away from the source before it is at full power." Therefore, CGG predicts that this control measure will provide kooyang with an opportunity to actively move away from the sound source prior to exposure levels that could result in injury.
2416	6623	Does CGG assess the individual and population level impacts of the predicted behavioural change of kooyang swimming away from the sound source, particularly given that the sound source is proposed to occur in an area of the Otway Basin where kooyang migrate through as part of their life cycle. This includes how impacts to kooyang migration (via behavioural changes) as a result of the seismic survey could affect their reproduction and population. How does the predicted behavioural change of swimming away from the seismic survey sound mitigate harm from the seismic survey?	Event ID 6859 - The Regia team responded that the predicted level of impact to kooyang can be found in Appendix E3.The predicted effect level to these species is assessed as minor as impacts are predicted to have some effect on eels, but the effect is not considered significant or at a level to affect the population. CGG's intention to implement the Fauna Management Plan, including the slow ramp-up of the sound source, is based on CGG's prediction that this measure would result in eels moving away from the source to avoid injury. However, once the source passes, animals will be free to move back into the habitat that they departed from. Therefore, due to the temporary nature of the sound source, and the robust abilities of eels to migrate such extensive distances as part of their life cycle, neither the effects of the sound source, nor any temporary displacement of these species, have considered to be significant. Given the extended and volatile timing of migration from estuaries and the high mobility of individual animals CGG does not anticipate any critical effects to the local populations of eels from the Regia MSS. The predicted behavioural change of swimming away from the seismic survey sound is expected to mitigate potential injury to kooyang from the sound source, because increasing distance reduces exposure to more intense sound pressure levels closer to the source that are consistent with potential injury.
2417	6623	Given that CGG appears to recommend that its seismic survey should occur during the period when kooyang are returning to river systems, why has CGG not incorporated an analysis of the impacts of the seismic survey on glass eels and larvae in the EP?	Event ID 6859 - The Regia team responded that CGG has conducted a further assessment on Glass Eels in Appendix F3 – "Further Assessment of Key Values and Sensitivities" which assesses kooyang both during its larval and glass eel life cycle stages. The outcome of this further assessment concluded that CGG is satisfied through implementation of mitigation measures, impacts have been reduced to below acceptable levels and no further assessment or mitigation is recommended.

2418	6623	Asked how can the sound modelling within the EP show potential significant impacts and the Acceptable Levels Assessment show no population level impacts and otherwise reversible, small-scale, or recoverable impacts given these significantly elevated noise levels?	Event ID 6859 - The Regia team responded that the acoustic modelling study on underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) was conducted to assist in understanding the potential acoustic impacts on key regional receptors including marine mammals. The potential impacts presented in these studies do not incorporate/consider any mitigation/control measures in the methodology, therefore presenting the predicted impacts associated with behavioural response, TTS and PTS without mitigation. These acoustic modelling studies therefore served as a tool to assist CGG in designing and setting baseline parameters associated with the Regia MSS, including highlighting the most sensitive marine receptors and setting minimum shutdown distances. The results of the Acceptable Levels Assessment are as such, because of activity limitations and some additional management measures CGG has committed to implementing where required. Without mitigation, predicted impacts to some marine mammals from the Regia MSS would not be below the defined acceptable levels.
2419	6623	Asked for clarification about the discrepancy in model results between CGG and another titleholder?	Event ID 6859 - CGG does not believe it is appropriate to comment on the aspects of another titleholders EP as it relates to the Regia MSS. Input parameters other than location, such as information relating to bathymetry, sound speed profiling, and geoacoustics being some of the many required as part of the methodology associated with acoustic modelling, with levels of complexity exceeding those capable for simplification and explanation in plain language. The acoustic modelling reports were commissioned by CGG and conducted by an independent third party who CGG are confident provided industry-standard, reliable, and accurate acoustic modelling services. The TGS survey was much larger than the Regia survey and going to be undertaken in deeper waters with different bathymetry and substrate which may lead to different TTS distances, thus the TGS and Regia modelling reports are not comparable.
2420	6623	Asked in circumstances where seismic survey blasts occur every 6-20 seconds continuously, why does the EP not analyse the increase in ambient noise in the area nor the effects from chronic noise exposure?	Event ID 6859 - The Regia team responded that CGG acknowledges that an assessment of the ambient noise in the proposed region of the Regia MSS may be required to provide sufficient context that informs the impact assessment of underwater sound on relevant receptors. CGG will be providing additional information in the EP on ambient noise in the Otway region.
2421	6623	Asked if CGG estimated changes to ambient noise levels as part of its analysis? If it did, why have chronic noise impacts been ignored within the Environmental Planning Area and beyond, given the duration of the project?	Event ID 6859 - The Regia team responded that CGG would be providing additional information in the EP on ambient noise in the Otway region.

2422	6541	The relevant person asked if the Regia team had access to the articles/reports related to Middle Island little penguins populations.	Event ID 6538 - The Regia team responded that they had accessed the latest reports from the Middle Island project and contacted various organisations involved with the Victorian colonies.
2423	6880	The relevant person asked what the consultation process was after the 14/02/25 meeting with the Regia team.	Event ID 6880 - The Regia team responded in-meeting and discussed co-design for the ongoing consultation process and stated they were happy to be guided on the relevant person's preferred method of consultation.
2424	6880	The relevant person asked what are the improved outcomes regarding blue whales and southern right whales.	Event ID 6880 -The Regia team responded in-meeting that they were looking at technology advancements regarding detection. Explained that previously, there were plane surveys, marine fauna observers on the seismic vessel and a separate detection vessel dedicated to whales. In relation to improvements, the Regia team explained they had developed a new PAMS technology. Discussed tethered buoys and their purpose to detect whales. Explained that they were running an experiment prior to the survey with the test buoy. Explained that it detects underwater sound and can hear 24 hours a day and, if successful, they had committed to deploying more during the survey.
2425	6880	The relevant person asked who the Regia team are getting advice from regarding where to deploy PAMS technology.	Event ID 6880 -The Regia team responded in-meeting that they would seek advice from whale experts and people from university's who study SRW.
2426	6880	The relevant person requested clarification regarding the 90 days of the activity and the 2025-2028 dates.	Event ID 6880 -The Regia team responded in-meeting that once the vessel arrived, it must leave at the end of the 90 day period.
2427	6880	The relevant person asked if they could be notified when the vessel arrived to carry out the activity.	Event ID 6880 -The Regia team responded in-meeting that they were happy to notify the relevant person.
2428	6880	The relevant person asked if the Regia team would observe animals before, during and after the activity and if they would be notified about the health of the animals.	Event ID 6880 -The Regia team responded in-meeting that when they are talking about seismic, there is a 60-day limitation. It is also intermittent as there are many factors meaning that they would have to stop. In relation to observations, tje Regia team stated that they had committed to pre-start observations and would also have spotter vessels moving ahead of the seismic vessel prior to the activity. They said that if the relevant person wanted notification of the data/images, all they needed to do is ask as the Regia team were happy to share.
2429	6880	The relevant person asked who the Regia team were asking for permissions and licensing from.	Event ID 6880 -The Regia team responded in-meeting that they have to prepare the EP and send to a federal government regulator – NOPSEMA. Explained regulation process and stated they were in the middle of that process and had just received an RFWI request from NOPSEMA.
2430	6880	The relevant person asked if the Regia team would be going out on the seismic vessels and, if not, could they rely on the feedback?	Event ID 6880 - The Regia team responded that it is possible that team members would go out on a vessel. They explained that they could guarantee the on-vessel feedback and that they have several communication arrangements for operation, safety and the environment.

2431	6880	The relevant person asked if the Regia team could provide a video demonstration of seismic.	Event ID 6880 - The Regia team responded in-meeting that they would send video clips. Committed to sending a video of an experiment conducted in the North on snapper. In Event ID 6859, the Regia team provided links: - Geoscience Australia - Marine seismic surveys and the environment: https://www.youtube.com/watch?v=TlyzHW5x1HE&t=5s - Marine acoustic source: https://www.youtube.com/watch?v=s68vb0TQxK8 - Australian Insitute of Marine Science - Marine Noise - Northwest Shoals to Shore Research Program: https://www.youtube.com/watch?v=D0uLK_m57VY
2432	6880	The relevant person asked about impulse sound if the Regia team had a legal requirement to know what was going on inside and outside the areas.	Event ID 6880 - The Regia team explained the amount of sound created and the received levels to the species. Stated that it is how each species receives sound.
2433	6880	The relevant person asked who are CGG funding and who are the interests going to.	Event ID 6880 - The Regia team responded in-meeting with an explanation of who CGG are, what they do, and that they are in discussions with ConocoPhillips and the provisions of data. Clarified that CGG and ConocoPhillips activities are not contingent on each other. Discussed confidentiality and intellectual property requirements. Explained sensitive information requirement and our obligation to make it private. Explained we have to submit it to regulator but it will fall under the SIR. We do not know what is sensitive until we are told. Explained the EP is published and made publicly available. If the information is reasonably publicly known, that information would be made public.
2434	6880	The relevant person asked who gets the bill for consultations.	Event ID 6880 - The Regia team responded in-meeting that CGG receive the bill. Explained there was a public comment period and the NOPSEMA assessment process.
2435	6880	The relevant person asked if the Regia team could provide information to the Gunditjmara people prior to future meetings.	Event ID 6880 - The Reiga team responded that they had been working with the organisation to prepare the materials and that the request for information prior to meetings would not be a problem. Explained consultation with the organisation and explained what CGG had done to gather information on Sea Country.
2436	6880	The relevant person asked what the Sea Country Protection Plan protects against?	Event ID 6880 - The Regia team responded in-meeting that the SCPP protects against impacts and risks that arise from the proposed activity.
2437	6880	The relevant person asked about the previous surveys in the region.	Event ID 6880 - The Regia team responded in-meeting and discussed the historical surveys in the Otway Region.
2438	6880	The relevant person asked if the health of the Otway region had been researched.	Event ID 6880 - The Regia team confirmed in-meeting that the Otway region had been studied and researched.

2439	6880	The relevant person asked if the Regia team had already developed the EP.	Event ID 6880 - The Regia team responded in-meeting that they had developed the EP but that it was not a static document. They discussed getting more input into the process to improve the quality oif the document. Explained that the Regia team had previously attempted consultation with the organisation and that they were looking to improve the protections already in there with consultation.
2440	6880	The relevant person asked if the EP had been accepted by NOPSEMA.	Event ID 6880 - The Regia team responded in-meeting that the Regia team had written an EP but NOPSEMA had not accepted it yet. Explained that the EP was with NOPSEMA for assessment.
2441	6880	The relevant person asked if consultation with their organisation change the document?	Event ID 6880 - The Regia team responded in-meeting that the NOPSEMA assessment is a point in time assessment. Explained that the nature of the environment and environmental mansgement is that things always change and that this was reflected in the document.
2442	6880	The relevant person asked about data sharing, IP rights, and if CGG could profit from their information.	Event ID 6880 - The Regia team explained in-meeting that if the relevant person tells them the information they provide is sensitive, CGG and NOPSEMA are not allowed to publish it. The Regia team stated that the data licensed by CGG is only sub-surface data/scientific data from the survey.
2443	6880	The relevant person asked if CGG would pay their organisation funds to have dedicated resources devoted to consultation work.	Event ID 6880 - The Regia team responded in-meeting that they would look into it but could not make any commitments.
2444	6880	The relevant person asked if the EP had come back from NOPSEMA.	Event ID 6880 - The Regia team responded that the EP had come back from NOPSEMA with a letter to modify and re-submit. They explained that the team needed to redact the letter but that it would soon be published.
2445	6880	The relevant person asked if there would be compensations in place for the coercive and predicative conditions and if there were CGG share options abvailable.	Event ID 6880 - The Regia team responded in-meeting that this was a topic of discussion within future consultation with the organisation.
2446	6880	The relevant person asked if they could see the results from the previous surveys in the area.	Event ID 6880 - The Regia team responded in-meeting that they could. They explained a multi-climate and proprietary survey and the timeframes for data release.
2447	6880	The relevant person asked what reasonable consultation looks like for CGG.	Event ID 6880 - The Regia team responded in-meeting that they approach consultation with an open mind and that it is never assumed how somebody can be affected. They stated that they want to ensure there is a back and forth conversation and that they should er on the side of transparency.
2448	6880	The relevant person asked about the SCPP.	Event ID 6880 - The Regia team responded in-meeting with an outine of the proposed SCPP and provided key features that could be put in place i.e MFO training, pre-survey ceremony. Asked for feedback and that it is to be an initiative led by TO's and facilitate partnership. Explained that if the relevant person does not want SCPP, they can suggest something else.

2449	6580	The relevant person requested the Regia team call them to arrange a meeting time.	Event ID 6799 - The Regia team responded during an incoming telephone call. The relevant person explained that they do not think they are a relevant person anymore to the project and did not have time to meet. The Regia team explained they would like to keep in touch to develop SIMOPs with rec divers.
2450	6624	The relevant person asked if the seismic survey had been approved and, if so, whether there are any restrictions in regardings to timing that will mitigate impacts to Kontapool.	Event ID 6878 - The Regia team provided an overview of the Regia seismic survey and timings ,and that they were notional dates as there are criteria for whale detections. Explained that there were multiple lines of evidence approach in relation to fauna management. Also discussed the tethered buoy expriment and that they were taking advice for the best location to maximise results.
2451	6867	The relevant person asked the Regia team to advise on the status of the NOPSEMA decision and if they were working towards a new decision date for the project.	Event ID 6626 - The Regia team responded they they were yet to receive a decision from NOPSEMA and were expecting a letter later that day.
2452	6631	The relevant person requested that the Regia team inform them when requested documents had been added to share folder.	Event ID 6634 - The Regia team apologised for uploading issues and confirmed the requested documents had been uploaded. They provided a screenshot of the requested documents within the sharefolder.
2453	6630	Requested that materials provided to date should be updated to allow for each meeting agenda item having at least one dedicated slide.	Event ID 6625 - The Regia team proposed that CGG provide a project update before the previously agreed items to ensure that all attendees have the latest information about the project. On the assumption that the organisation would agree to this practical amendment the Regia team made the associated changes in slide order. CGG made the amendments to the presentation as requested, offered a preliminary view on certain agenda items, with the summary information provided. They stated that the brevity necessary to condense their view into text on a slide risks misinterpretation and missing nuance that a meaningful discussion might reveal.
2454	6630	Requested information on CGG's views and response to the Protocols vis-à-vis the Consultation Framework workflow/document.	Event ID 6625 - The Regia team responded that CGG had made the amendments to the presentation as requested and offered a preliminary view on certain agenda items, with the summary information provided. They stated that the brevity necessary to condense their view into text on a slide risks misinterpretation and missing nuance that a meaningful discussion might reveal.
2455	6630	Requested information on how CGG wished to co-design the consultation process, including timeframes, milestones, and views on the proposed strategic regional environmental and cultural assessment.	Event ID 6625 - The Regia team responded that CGG had made the amendments to the presentation as requested and offered a preliminary view on certain agenda items, with the summary information provided. They stated that the brevity necessary to condense their view into text on a slide risks misinterpretation and missing nuance that a meaningful discussion might reveal.

2456	6630	Requested iinformation on the SCPP.	Event ID 6625 - The Regia team responded that CGG had made the amendments to the presentation as requested and offered a preliminary view on certain agenda items, with the summary information provided. They stated that the brevity necessary to condense their view into text on a slide risks misinterpretation and missing nuance that a meaningful discussion might reveal.
2457	6630	Requested information on CGG's legal obligations in relation to intellectual property and company policy in respect of dealing with sensitive information in Environment Plans.	Event ID 6625 - The Regia team responded that CGG had prepared the PowerPoint slide deck in such a way that the slide content, when printed, would form the requested information sheet.
2458	6630	Requested that information sheets be provided as soon as possible	Event ID 6625 - The Regia team responded that CGG had made the amendments to the presentation as requested and offered a preliminary view on certain agenda items, with the summary information provided. They stated that the brevity necessary to condense their view into text on a slide risks misinterpretation and missing nuance that a meaningful discussion might reveal.
2459	6630	Requested for 50 copies of the consultation material provided for attended meeting.	Event ID 6625 - The Regia team responded that CGG would print and have available 50 copies of the documents as requested.
2460	6870	Requested information on the tethered buoy whale monistoring testing activity.	Event ID 6861 - The Regia team responded that the initial stage would be the deployment of two buoys, with attached hydrophones, in the area adjacent to VIC/P44, for a maximum of 90 days. This would hopefully be around late April to late June. They said that they hoped that the test shows that blue whale calls can be recorded and identified, meaning that we can detect blue whale before they have entered an operational area. They would then want to use them for our proposed marine seismic survey (Regia). To detect whales before they enter the operational area, the buoys would potentially need to be deployed outside of the survey area.
2461	6870	Asked what the proposed tethered buoy activity involves.	Event ID 6862 - The Regia team responded that the proposed activity involves deployment of two buoys, with attached hydrophones.
2462	6870	Asked for information about the scale of the proposed tethered buoy activity.	Event ID 6862 - The Regia team responded that there would be 2 buoys.
2463	6870	Asked what the objective of the proposed tethered buoy activity is.	Event ID 6862 - The Regia team responded that the objective of the proposed activity is to record whale calls in order to identify blue whales.
2464	6870	Asked when the tethered buoy activity is proposed to occur and its duration.	Event ID 6862 - The Regia team responded that testing would begin in late April 2025 to June 2025 for a maximum of 90 days.
2465	6870	Asked if there are existing petroleum or greenhouse gas titles over the area of the proposed tethered buoy activity.	Event ID 6862 - The Regia team responded that there are no petroleum or greenhouse gas titles over the area of the proposed activity, but it is adjacent to VIC/P44.
2466	6871	Requested answer to questions sent in previous	Event ID 6862 - The Regia team provided answers to questions previously raised by the relevant person as requested.

		correspondence about the tethered buoy activity.	
2467	6839	Requested CGG's invoicing information for its attendance at the native title meeting.	Event ID 6838 - The Regia team provided their updated invoicing information as requested.
2468	6690	Requested that the Regia team share the feedback provided by NOPSEMA regarding the proposed environment plan.	Event ID 6794 - The Regia team responded that at the start of consultation on the Regia MSS, CGG recognised the need for transparency in order to build trust with relevant persons. One aspect of this has been to publish the NOPSEMA assessment letters, which they had done on the web site and notified relevant persons via a project update. They stated that as this is not something that other titleholders do, and as the letter is essentially private correspondence meant for the addressee (CGG) only, there is a process that has to be undertaken before we publish the correspondence.Once the correspondence was ready to be published, the Regia team would notify relevant persons via a project update, as they had done previously.
2469	6879	Asked if the Regia team were looking to present to the council again?	Event ID 6879 - The Regia team responded in-meeting that they were happy to present again if the council would allow. Extended offer to present in person or onling.
2470	6879	Asked for information about plankton and their role in the activity.	Event ID 6879 - The Regia team responded in-meeting that plankton are the foundation of the food well. Discussed the Bonney Upwelling.
2471	6879	Requested to continue to receive project updates and add another council member to correspondence.	Event ID 6879 - The Regia team responded in-meeting that they would continue to receive project updates.
2472	6878	Question regarding calving interval stretching and that papers regarding reproduction rate need to be revisted.	Event ID 6878 - The Regia team responded in meeting sharing information being built from other proponents ongoing aerial surveillance programs and shared speculation about movement along Tasmania as a migration corridor.
2473	6878	Questioned the uncertainty around the SRW migratory corridor and timing of the Regia survey.	Event ID 6878 - The Regia team responded in-meeting and explained observations in previous surveys and discussed migratory routes along Tasmania. They also explained that there were multiple lines of evidence approach in relation to fauna management. Discussed that the Regia team were doing the most any titleholder had previously done for a seismic survey. Stated that there would be at least one aerial flight survey and that there would be a secondary spotter vessel. Discussed the tethered buoy experiment and that the Regia team were taking advice on what the best location would be to maximise results.
2474	6878	Question about the importance of surveying SRW's from the air.	Event ID 6878 - The Regia team responded in-meeting and explained that they were completing aerial surveys. They also stated that they had satellite mapping which could provide SRW locations.

2475	6878	Asked how the Regia team were completing whale detections. Provided example of aerial surveys?	Event ID 6878 - The Regia team explained in-meeting that there were multiple lines of evidence approach in relation to fauna management. Discussed that the Regia team were doing the most any titleholder had previously done for a seismic survey. Stated that there would be at least one aerial flight survey and that there would be a secondary spotter vessel. Discussed the tethered buoy experiment and that the Regia team were taking advice on what the best location would be to maximise results.
2476	6878	Asked if the secondary spotter vessel moved in front of the seismic vessel?	Event ID 6878 - The Regia team responded in-meeting that the secondary spotter vessel would move in front of the seismic vessel but that pre-start tasking may be different.
2477	6878	Asked how far the survey was from Warrnambool?	Event ID 6878 - The Regia team responded in-meeting that the survey was 20km from the nearest point.
2478	6878	Asked for information about noise modelling.	Event ID 6878 - The Regia team responded in-meeting with a discussion about TTS and PTS. Stated that the main issue being managed was migration. Discussed that there would be a whale expert panel and data could be made available.
2479	6890	Provide a written response to stakeholders' work	Event ID 6815 - provided comprehensive review of stakeholders work
2480	6886	Relevant person requested results of PAM system being trialled by the Regia team	Event ID 6897 - The Regia team committed to sharing some data after the PAM buoy trial when it becomes available. Explained that they were optimistic they would detect whales and that the buoy had been specificlly altered to detect blue whale and SRW calls.
2494	6748	Relevant person requested response to initial enquiry	Event 6722 - Responded to relevant person clarifying the commitment to investigate the matter and advised the work on this was still ongoing a nd requested patience. Provided brief update on search for additional research that supports the FRDC findings and requested if the relevant person was able to access/ provide any other peer reviewed literature to support the claim
2495	6875	Requested information on why fisheries would not answer questions about long-term catchability when the data is available.	Event iD 6875 - The Regia team responded in-meeting that the issue was not resolved but that they were only presenting an interpretation of the data set. The Regia team offered to re-run their analysis based on new data provided by fishers.
2496	6876	Relevant person requested information about the Regia activity maps.	Event ID 6876 - The Regia team responded in-meeting and explained that there was a buffer around Deen Maar for sea lion protection and traditional owner values.
2497	6876	Relevant person asked about operation during poor weather conditions.	Event ID 6876 - The Regia team responded in-meeting and stated that they would not be able to operate in +5m swells. Also explained that they could bring in other vessels to negotiate poor weather conditions.

2498	6876	Requested information on what the Regia team heard during consultation on the adjustment protocol.	Event ID 6876 - The Regia team responded in-meeting and discussed the main concerns raised during consultation: : long term catchability, displacement, claim process, further information and socio-economic. Discussed displacement and communications protocols in place to avoid displacement. Provided details of where to locate claims form and the updated adjustment protocol. Explained that there is currently a test claim form that fishers can use. Explained that a fisher can delegate to a titleholder representative and via a nominated claims assessor.
2499	6876	Requested details about what data was used by the Regia team in their long-term catchability analysis.	Event ID 6876 - The Regia team responded in-meeting and went through their box plot analysis. Explained that the data used was landed catch data each month from 2016 - 2023. Also went through CPUE data set and stated that the analysis showed although landed catch was lower, CPUE was still in range in 2020.
2500	6876	Relevant person asked where the Environment Plan information comes from?	Event ID 6876 - The Regia team responded in-meeting that EP information comes from peer review, scientific literature.
2501	6876	Requested information about what happens 5-7 years after a seismic activity to lobster populations.	Event ID 6876 - The Regia team responded in-meeting and discussed seagrass and adult lobster populations. Explained that there were too many variables in the marine evironment.
2502	6876	Relevant person asked why they had lost quota.	Event ID 6876 - The Regia team responded in-meeting that larvae are coming in from South Australia. Explained that egg production was probably getting sucked into the Bass Straight.
2503	6876	Relevant person asked about short-term catchability assessment on Western Rock Lobster in WA.	Event ID 6876 - The Regia team responded in-meeting that the assessment showed a short-term effect over 30 days in the study. Explained that fishers can make a CPUE claim 30 days after the survey.
2504	6876	Asked about the level of damage of a seismic survey on rock lobsters.	Event ID 6876 - The Regia team responded in-meeting that seismic activity can cause a delayed righting reflex.
2505	6876	Asked for information about the effect of the proposed seismic survey on crab.	Event ID 6876 - The Regia team responded in-meeting that seismic can cause a physiological reaction in crab - delayed righting. Discussed that they will only go to 200m.
2506	6876	Asked about the number of blasts during the activity.	Event ID 6876 - The Regia team responded in-meeting that there will be 1 every 18 seconds. Explained that they had made allowance for 60 days of activity.
2507	6876	Asked what would happen if they went out, dropped a pot and did not catch any lobster.	Event ID 6876 - The Regia team responded in-meeting that the fisher could apply for a CPUE adjustment and explained that they will be paid compensation based on gaps in their fishing data under normal fishing operations.
2508	6876	Asked how the Regia team landed on the compensation protocol?	Event ID 6786 - The Regia team responded in-meeting and stated they had spoken with SIV and explained why retirement of quota is not the right way to pay compensation. Explained that the quota holder is not always the fisher and that it was the Regia team's position that the person on the water should be compensated. The Regia team also discussed anti-rivalry laws.

2509	6876	Relevant person requested their copy consultation records.	This was supplied to the stakeholder in Event ID 7025
2510	6876	Fisher requested information about fishers who are displaced by the drilling activity and the indirect impact this displacement has on other fishers operating in the same area.	Event ID 6786 - The Regia team responded in-meeting that compensation can be claimed via the OMICC Adjustment Protocol for the displacement of the displaced fisher and, if a indirectly affected fisher believes they have a CPUE claim, their claim can be affected on a case-by case basis. It was stated that the OMICC Adjustment Protocol will be updated to reflect this feedback
2511	6876	Fisher asked what happens if someone without a history of fishing offshore? Would they receive the same compensation as other fishers? How do they demonstrate a loss of catch?	Event ID 6786 - The Regia team responded in-meeting that the OMICC protocol has a case-by-case provision.
2512	6876	Fisher asked about the potential of oil spills.	Event ID 6786 - The Regia team responded in-meeting that CGG had commissioned a detail analysis of all the oil spill models completed in the Otway region and and stated that an oil spill was unlikely.
2514	6970	Asked how to make a claim for King George Whiting impacts?	Event ID 6989 - Titleholder responded that they had produced a presentation which showed how to make a claim and provided a link to the OMICC website (https://www.klarite.online/omicc/otway-adjustment-protocol). Also stated that they could offer support in submitting a claim as captured in the protocol.
2515	6988	Requested help with online test claim form.	Event ID 6990 - Titleholder responded with a copy adjustment protocol which had hard copy claim forms attached. The Titleholder also provided the stakeholder with login details to access the online test claim form and supplied a step-by-step screenshot guide for how to log in.
2516	6966	Requested a response to matters raised in their letter within 21 day time frame provided by relevant person.	Titleholder responded within timeframe (Event ID 7022)
2517	6966	Requested that materials provided by CGG are translated into plain non-technical language and that text is condenced without losing key messaging.	CGG requested further clarity from GMTOAC regarding the format and expectations for future responses, particularly when technical questions are involved. CGG also noted its efforts to balance brevity and substance in the information sheets, aiming to be respectful while avoiding oversimplification that could appear dismissive. CGG asked for confirmation on the intended audience and purpose of the materials to tailor future content accordingly (Event ID 7022)

2518	6966	Requested that responses to requests for information prepared by CGG are turned into a PowerPoint presentation or transferred to information sheets.	CGG clarified that Annexure A contained direct responses, with references provided due to the technical nature of the queries. CGG requested further clarity from GMTOAC regarding the format and expectations for future responses, particularly when technical questions are involved. CGG also noted its efforts to balance brevity and substance in the information sheets, aiming to be respectful while avoiding oversimplification that could appear dismissive. CGG asked for confirmation on the intended audience and purpose of the materials to tailor future content accordingly (Event ID 7022)
2519	6892	Regia team to provide additional written information on the tethered buoy activities and dataset usage, along with their position considering section 19.	In Event ID 7029, CGG clarified the spatial scope of the Regia Marine Seismic Survey (MSS), stating the defined petroleum activity area aligns with the petroleum title and the seismic source discharge zone, encompassing all operations under existing and future titles. Two supporting operations outside this boundary—a marine fauna spotter vessel and acoustic monitoring buoys—are included in the Environment Plan (EP) as essential control measures to mitigate environmental impact. These do not require separate titles and are not for exploration purposes, so they fall outside the extended meaning of “explore” under the OPGGS Act. Additionally, a separate technology trial will occur independently of the Regia MSS. It is unrelated to any petroleum title or the MSS and is not exploration-related. Therefore, it is not considered a petroleum activity and is being managed separately from the EP.

Annex 7 - Information available on the Regia MSS website up to Public Comment

Table C1-7 - Information available on the Regia MSS website up to Public Comment

Documents Published	EP Ref	Date First Published	Description
Preparatory Information			
CGG Environmental Policy	A1	1 February 2023	This policy applies to CGG in all its operations as well as contractors and site visitors within CGG's prevailing influence.
Description of Activity	A2	31 March 2023	This document outlines the proposed activity and was updated over time.
Community Consultation and Engagement Plan	A3	1 February 2023	This document explains how we intend on seeking community input into our environmental assessments.
Establishing Context			
Decision-Making Criteria	B1	31 March 2023	This document proposes the acceptable levels of impact and risk for consultation.
Requirements that Apply	B2	31 March 2023	This document captures the legislative and other requirements that will apply to the activity.
Implementation Strategy	B3	6 April 2023	This document describes our management systems along with our monitoring and review processes.
Preliminary Environmental Impact and Risk Assessment	B4	31 March 2023	This document provides an overview of the types of environmental impacts and risks CGG have to manage.
Commercial Fisheries Analysis Report	B6	9 August 2023	This Environmental Impact Assessment focusses on Commercial Fisheries Analysis Report.
Modelling Report – Sound Emissions	B7	6 June 2023	This Environmental Impact Assessment focusses on Sound Emissions.
Seismic Sound Studies Report	B8	6 June 2023	Comprehensive description of the effects from seismic on marine flora and fauna.
Environmental Assessment Method	B9	4 April 2023	This document explains how we will assess the predicted levels of impact and risk.
Risk Assessments			
Accidental Release of Waste Overboard	D1	11 September 2023	This Environmental Risk Assessments focuses on the accidental release of waste overboard.
Fauna Interactions	D2	11 September 2023	This Environmental Risk Assessments focus on fauna interactions.
Invasive Marine Species	D3	11 September 2023	This Environmental Risk Assessments focuses on invasive marine species.
Oil Pollution	D4	11 September 2023	This Environmental Risk Assessments focuses on oil spill risks.

Documents Published	EP Ref	Date First Published	Description
Impact Analyses			
Physical Presence	E1	22 September 2023	This Environmental Impact Assessment focusses on Vessel Physical Presence.
Underwater Sound - Plankton	E2	22 September 2023	This Environmental Impact Assessment focusses on the effects of underwater sound on Plankton.

REGIA
Marine Seismic Survey

Risk Assessment
Accidental Release of Materials or Waste Overboard

Appendix D1: REG-EP-016-D1

Rev 5

December 2025

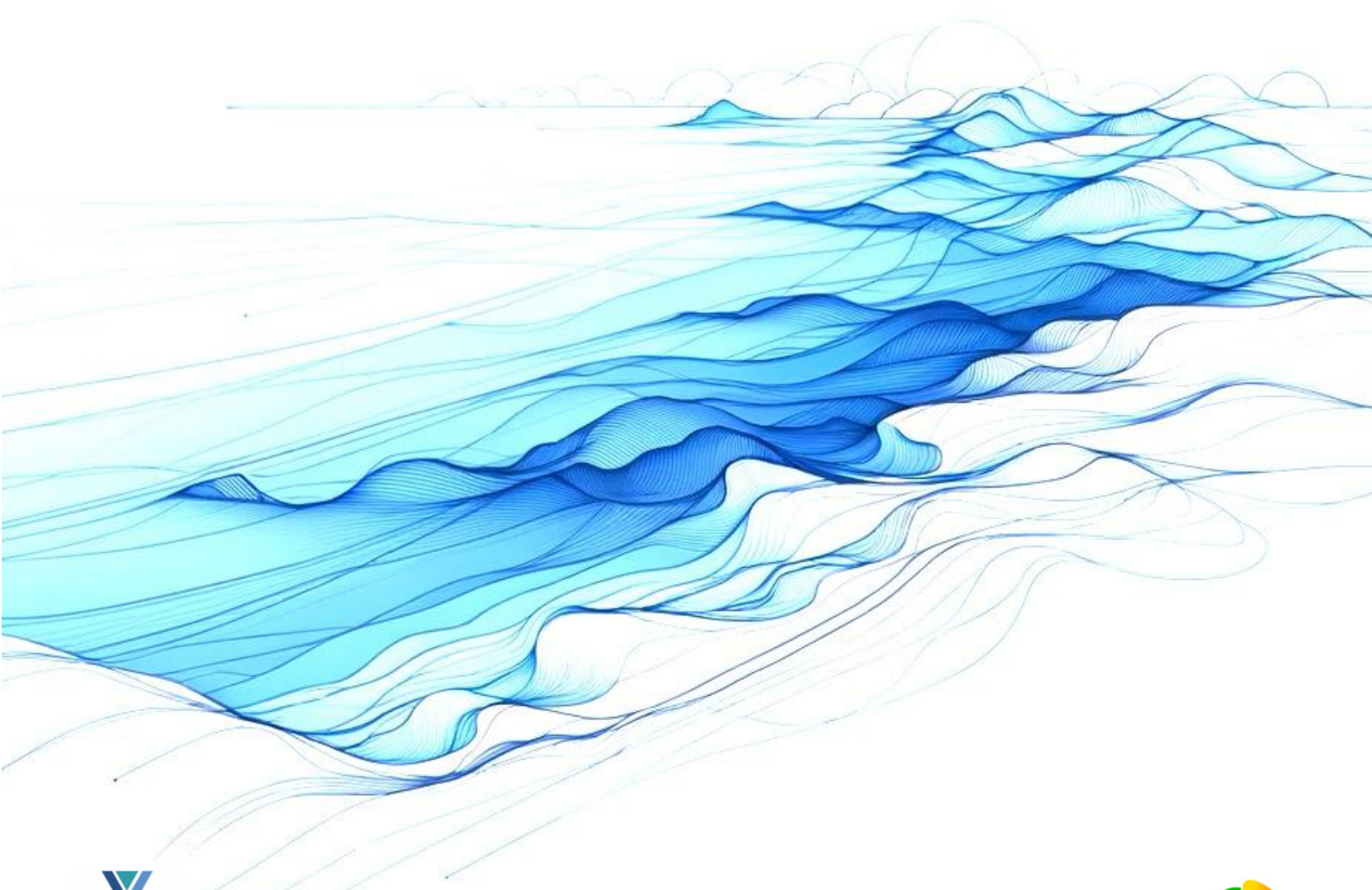

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Table of Contents

1 Introduction 4
1.1 Purpose and Scope 4
1.2 Consultation in Preparation of the EP 4
2 Aspect – Accidental Release of Materials or Waste Overboard 5
2.1 How the Aspect Occurs 5
2.2 Extent and Duration of the Aspect 5
3 Cause-Effect Pathway 6
4 Description of the Existing Environment that May be Affected by the Activity 7
4.1 Birds 7
4.2 Pinnipeds 8
4.3 Sharks 9
4.4 Turtles 9
4.5 Dolphins and Whales 9
4.6 Coastal Developments 11
4.7 Commercial Fishing and Aquaculture 11
4.8 People and Communities 13
4.9 Marine Protected Areas 14
4.10 Marine Industries 14
5 Relevant Legislative and Other Requirements 15
6 Defining Acceptable Levels of Risk 16
7 Consultation Input 18
8 Minimisation of Risks Through Activity Design 19
8.1 Elimination 19
8.2 Substitution 19
9 Predicted Levels of Risk 20
9.1 Change to physical condition 20
9.2 Changes to the functions, interests, or activities of other users 20
9.3 Change in aesthetic, social and cultural value 21
9.4 Measures Adopted to Manage Environmental Risks 21
10 Demonstration Risks Will Be of an Acceptable Level 23
10.1 Discussion on Principles of ESD 23
10.2 Biological and Ecological Categories 23
10.3 Discussion on Economic, Cultural and Social Categories 23
10.4 Discussion on Consistency with Company Processes 23

11 Environmental Performance Outcomes 25
12 Recommendations 26
13 Document Control 27
14 References 28
Annex 1 32
Public Comment 32
Annex 2 33
Objections and Claims Raised from Consultation 33
Annex 3 45
EPBC Act Listed Species within the Operational Area Relevant to Release of Materials or Waste Overboard 45

1 Introduction

Accidental release of material and waste overboard was identified through the Preliminary Environmental Impact and Risk Assessment (**PEIRA**) (Appendix B4) as an aspect needing further assessment. Hence, this document presents a detailed examination of **Accidental Release of Materials and Waste Overboard** as a risk pathway between the Regia Marine Seismic Survey (**Regia MSS**) and the existing environment that may be affected by that aspect.

1.1 Purpose and Scope

The purpose of this document is to assess all relevant sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

Any measures adopted, either through consultation or because of the assessment will be carried through to stage three of the overall process when the ALARP assessment occurs. Recommendations will be made if there is any further assessment required in the third stage.

1.2 Consultation in Preparation of the EP

This document was first published in draft form to the Document Library of the Regia MSS Consultation Hub on 11 September 2023. This was done to acknowledge that the final full Environment Plan (EP) can be a large document that is difficult for readers to digest in the 30-day public comment period. As such, the public and relevant persons were invited to comment on the document with an explicit request for readers to provide feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

2 Aspect – Accidental Release of Materials or Waste Overboard

2.1 How the Aspect Occurs

An accidental release of materials or waste may occur from the seismic and support vessels.

No materials or solid wastes will be disposed at sea from vessels undertaking the Regia MSS.

2.2 Extent and Duration of the Aspect

Duration: 90 days

Extent: Operational Area

The extent of the area where the risk of an accidental release of materials or waste may occur is within the Operational Area and the risk could occur while the activity is undertaken.

3 Cause-Effect Pathway

The PEIRA (Appendix B4) identified a cause-effect pathway for an accidental release of materials or waste for the following environmental components and their social, cultural, and economic features:

- Water quality
- Benthic assemblages
- Birds
- Sharks
- Marine reptiles
- Marine mammals
- Coastal developments
- Commercial fishing and aquaculture
- People and communities
- Marine protected areas
- Marine industries

The PEIRA identified that risk of an accidental release of materials or waste to the following environment components was ranked as having a negligible level of effect and are not assessed further in this section:

- Water quality
- Benthic assemblages

There is the potential for materials or waste to be accidentally released overboard due to open bins, crane operator error or improper storage or handling. Materials or wastes that could potentially be released overboard are typically inert such as paper, cardboard, foam (earplugs) and plastics (wrapping material, hard hats). These materials or waste could pose a risk marine fauna via ingestion or entanglement. They may also result in visual pollution in the ocean and on shorelines impacting the values of coastal developments, indigenous culture, and marine protected areas.

Larger dropped objects may also occur such as loss of towed equipment (streamers, acoustic sources, paravanes for streamer steering) and sea containers. These may pose a navigational or entanglement hazard to commercial fishers and other marine users.

4 Description of the Existing Environment that May be Affected by the Activity

As detailed in Section 2.2, the Operational Area has been adopted as the extent of the area wherein an accidental release of materials or waste may occur.

To identify the presence of those species that may be at risk of ingestion or entanglement with materials or waste accidentally released overboard (birds, dolphins, pinnipeds, sharks, turtles, whales) a Protected Matters Search (PMST) was undertaken for the Operational Area with the report available in Appendix B5. Annex 3 details those species identified, any biologically important areas and conservation advice or management plans.

PMST searches were run again prior to resubmission to ensure any changes to species or listings were identified to control for passage of time. Conservation Advice has also been updated for several species and subsequent changes throughout the EP have been made to account for these updates. Changes relevant to the assessment of an accidental release of material or waste include:

- Changes to EPBC Act status of several bird species
  - Red Knot is listed as Vulnerable (previously Endangered)
  - Sharp-tailed Sandpiper is listed as Vulnerable (previously not listed as threatened)
  - Sooty Shearwater is listed as Vulnerable (previously not listed as threatened)
- Updates to conservation advice for several bird species
  - Conservation Advice for *Calidris canutus* (Red Knot) (DCCEEW 2024)
  - Conservation Advice for *Calidris acuminata* (Sharp-tailed Sandpiper) (DCCEEW 2024a)
  - Conservation Advice for *Ardenna grisea* (Sooty Shearwater) (DCCEEW 2023i)
  - Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DCCEEW 2023m)
  - Conservation Advice for *Numenius madagascariensis* (Far Eastern Curlew) (DCCEEW 2023n)

These changes have been incorporated throughout the EP and the risk assessment has been revised accordingly. [Section added in response to Matters: I16 and I17]

Information is provided for those species undertaking biologically important behaviour within the Operational Area as these species are more likely to be at risk from ingestion or entanglement with materials or waste accidentally released overboard.

4.1 Birds

The PMST Report identified multiple bird species or species habitat within the Operational Area. provides a summary of the PMST Report. Several of these bird species were identified to be undertaking biologically important behaviours and/or have BIAs within the Operational Area. No habitats critical to the survival of the bird species were identified within the Operational Area.

The orange-bellied parrot, which is critically endangered is likely to migrate through the Operational Area, however, it does not land at sea or use coastal areas as habitat so risks to this species are not predicted from marine debris.

Seabirds that forage at sea are more likely to encounter marine debris and hence are discussed further in this section.

Several albatross species were identified as foraging behaviour likely within the Operational Area with the White-capped Albatross identified as foraging behaviour known to occur. In addition, the following albatross species have foraging BIAs within the Operational Area:

- Antipodean (*Diomedea antipodensis*) – Appendix B12 MAP-REG-EPM-059
- Black-browed (*Thalassarche melanophris*) - Appendix B12 MAP-REG-EPM-060
- Buller's (*Thalassarche bulleri*) - Appendix B12 MAP-REG-EPM-071
- Campbell (*Thalassarche impavida*) - Appendix B12 MAP-REG-EPM-061
- Indian Yellow-nosed (*Thalassarche carteri*) - Appendix B12 MAP-REG-EPM-063
- Shy (*Thalassarche cauta*) - Appendix B12 MAP-REG-EPM-066
- Wandering (*Diomedea exulans*) - Appendix B12 MAP-REG-EPM-072

These BIAs cover either most or all the South-east Marine Region (CoA 2015a).

Albatrosses and petrels are among the most oceanic of all seabirds and seldom come to land unless breeding (CoA 2022). Albatross and petrel species exhibit a broad range of diets and foraging behaviours, and hence at-sea distributions are diverse. Combined with their ability to cover vast oceanic distances, all waters within Australian jurisdiction can be considered foraging habitat, however the most critical foraging habitat is those waters south of 25° where many species spend most of their foraging time (CoA 2022).

Albatrosses have a widespread distribution throughout the southern hemisphere. They feed mainly on cephalopods, fish and crustaceans, using surface feeding or plunge diving to seize their prey (ACAP 2020). Albatrosses are colonial, usually nesting on isolated islands and foraging across oceans in the winter months with most observations along the edge of the continental shelf (CoA 2022).

The Flesh-footed Shearwater and Northern Giant Petrel were also identified as foraging behaviour likely within the Operational Area. No BIAs for these species occur within the Operational Area. The Common Diving-petrel (Appendix B12 MAP-REG-EPM-062), Short Tailed Shearwater (Appendix B12 MAP-REG-EPM-065) and Wedge-tailed Shearwater (Appendix B12 MAP-REG-EPM-067) were identified as having foraging BIAs within the Operational Area.

Petrels are oceanic and have a widespread distribution throughout the southern hemisphere. They are colonial and breed on sub-Antarctic and Antarctic islands in a circumpolar band generally between 40°S and 60°S. Petrel species feed on small fish, cephalopods (octopus, squid and cuttlefish) and crustaceans along the edge of the continental shelf and open waters (CoA 2022).

The Australasian Gannet was also identified as having a foraging BIA within the Operational Area (Appendix B12 MAP-REG-EPM-073). The Australasian Gannet generally feeds over the continental shelf or inshore waters. Their diet is comprised mainly of pelagic fish, but also squid and garfish. Prey is caught mainly by plunge-diving, but it is also seen regularly attending trawlers (CoA 2015a).

Several shorebirds were identified from the PMST Report as being present in the Operational Area with the Australian Fairy Tern and White-fronted Tern identified as foraging behaviour likely within the Operational Area. Threatened shorebirds that may occur within the Operational Area are the Australian Fairy Tern, Curlew Sandpiper, Eastern Curlew, Red Knot and Sharp-tailed Sandpiper. These species are commonly found on coastal shores including beaches and rocky shores and either feed at low tide on worms, crustaceans and molluscs or fish species or feed on aquatic biota. Many of the wader species are migratory travelling from the Northern Hemisphere in non-breeding months. Most inhabit intertidal mudflats, rocky islets, sand beaches, mangroves, rocky coastline, and coral reefs. Roosting occurs in similar habitats and species are found feeding on fish, crustaceans, aquatic insects, as well as plants and seeds (Higgins & Davies 1996).

4.2 Pinnipeds

The PMST Report identified the Australian Fur-seal (*Arctocephalus pusillus*) as likely to occur within the Operational Area, while the Australian Sea-lion (*Neophoca cinerea*) and the New Zealand Fur-seal (*Arctocephalus forsteri*) may occur. No biologically important behaviours or BIAs were identified within the Operational Area for these species.

4.3 Sharks

The PMST Report identified five shark species, that may (School - *Galeorhinus galeus*), are likely (Porbeagle - *Lamna nasus*, Mako - *Isurus oxyrinchus*, Little Gulper - *Centrophorus uyato*) or are known (White - *Carcharodon carcharias*) to occur within the Operational Area. A foraging BIA was identified for the White Shark only (Appendix B12 MAP-REG-EPM-027).

The White Shark is listed as Vulnerable. White Sharks are long-lived, living for 30 years or more (Bruce and Bradford 2008), and are found throughout temperate and sub-tropical regions in the northern and southern hemispheres (Last & Stephens 2009). The species is also commonly found in inshore waters in the vicinity of islands, and often near seal colonies (Malcolm et al. 2001). The foraging BIA that is within the Operational Area is centred on Lady Julia Percy Island which is a known seal breeding colony.

4.4 Turtles

The PMST Report identified three turtle species, that may (*Chelonia mydas* - green) or are likely (*Dermochelys coriacea* - leatherback and *Caretta caretta* - loggerhead) to occur within the Operational Area. No BIAs or habitat critical to the survival of the species were identified.

4.5 Dolphins and Whales

The PMST Report identified several dolphin and whale species that are known, likely or may occur within the Operational Area. Table D1-1 details those species that have biologically important areas or biologically important behaviours identified within the Operational Area.

Table D1-1: Cetacean Species Biologically Important Behaviours and/or BIAs within the Operational Area

Receptor	Biologically Important Behaviour
Blue Whale	Foraging, feeding or related behaviour known to occur within area
	Foraging (annual high use area) BIA (Appendix B12 MAP-REG-EPM-016)
Fin Whale	Foraging, feeding or related behaviour known to occur within area
Pygmy Right Whale	Foraging, feeding or related behaviour likely to occur within area
Sei Whale	Foraging, feeding or related behaviour known to occur within area
Southern Right Whale	Breeding known to occur within area
	Migration BIA (Appendix B12 MAP-REG-EPM-085)

4.5.1 Blue whale

The Blue Whale (*Balaenoptera musculus*) is listed as an endangered species under the EPBC Act. There are two subspecies of blue whales that use Australian waters (including Australian Antarctic waters), the Pygmy Blue Whale (*B. m. brevicauda*) and the Antarctic Blue Whale (*B. m. intermedia*). The Otway region, where the Operational Area is located, is an important migratory and foraging area for Blue Whales, as shown by passive acoustic monitoring and aerial surveys (Gavrilov 2012, McCauley et al. 2018, Gill et al. 2011). Underwater acoustic monitoring programs have detected Antarctic and Pygmy Blue Whale calls in the Otway Region (McCauley et al. 2018).

Important foraging grounds for Blue Whales include the Great Australian Bight, South Australia, and off Portland Victoria. Research to date has found that Pygmy Blue Whales occupy the western area of the Bonney Upwelling system in the Eastern Great Australian Bight and adjacent to the Kangaroo Island canyons from November and December (DoE 2015c). Pygmy Blue Whales then move south-east to the Bonney Upwelling system off eastern South Australia and Victoria (e.g., between Robe, SA and Cape Otway, Vic). This occurs predominately between January to April (DoE 2015c).

The Blue Whale was extremely abundant until the early 20th century when they were hunted to near extinction. Approximately 341,830 Blue Whale takes were recorded by commercial whaling in the

Antarctic and sub-Antarctic in the 20th century, of which 12,618 were identified as Pygmy Blue Whales (Branch et al. 2004). The current global population of Blue Whales is uncertain but is plausibly in the range of 10,000 to 25,000, corresponding to about 3-11% of the 1911 estimated population size (Reilly et al. 2008).

The Operational Area is within the foraging (annual high use) BIA where Pygmy Blue Whales predominately occur between January to April (DoE 2015c) (Appendix B12 MAP-REG-EPM-068).

4.5.2 Fin whale

The Fin Whale (*Balaenoptera physalus*) is a cosmopolitan migratory species that is listed as vulnerable and occurs from polar to tropical waters but is rarely sighted in inshore waters. Fin Whales show well defined migratory movements between polar, temperate, and tropical waters which are essentially north–south with little longitudinal dispersion.

While Australian Antarctic waters are important feeding grounds for Fin Whales, the species also feeds in the Bonney Upwelling during summer/autumn sometimes in the company of Blue and Sei Whales (DCCEEW 2023b). Areas of upwelling and interfaces with mixed and stratified waters may be an important feature of Fin Whale feeding habitat with the species feeding on planktonic crustacea, krill, some fish, and cephalopods (DCCEEW 2023b). Fin Whales frequently lunge or skim feed at or near the surface and they are known to dive to 230 m to feed.

There are no BIAs for the Fin Whale within Australian waters. Fin Whales are likely to be foraging in the Operational Area at similar time as Blue Whales, predominately occur between January to April.

4.5.3 Pygmy Right Whale

The Pygmy Right Whale (*Caperea marginata*) is a little-studied baleen whale species that is found in temperate and sub-Antarctic waters in oceanic and inshore locations. No population estimates are available for Pygmy Right Whales globally, or in Australian waters (DCCEEW 2023p). The species has never been hunted commercially and is listed as a migratory species under the EPBC Act.

Species distribution in Australia is found close to coastal upwellings and the Subtropical Convergence may be important for regulating distribution (Bannister et al. 1996). Key locations include south-east Tasmania, Kangaroo Island (SA) and southern Eyre Peninsula (SA) close to upwelling habitats rich in marine life and zooplankton upon which it feeds (Bannister et al. 1996).

There are no BIAs for the Pygmy Right Whale within Australian waters. Pygmy Right Whales are likely to be foraging in the Operational Area at similar time as Blue Whales, predominately occur between January to April.

4.5.4 Sei Whale

The Sei Whale (*Balaenoptera borealis*) is listed as vulnerable under the EPBC Act. Sei Whales are considered a cosmopolitan species, ranging from polar to tropical waters, but tend to be found more offshore than other species of large whales. Sei Whales move between Australian waters and Antarctic feeding areas; subantarctic feeding areas (e.g. Subtropical Front); and tropical and subtropical breeding areas. The proportion of the global population in Australian waters is unknown as there are no estimates for Sei Whales in Australian waters.

In Australia, Sei Whales occur within Australian Antarctic Territory waters and Commonwealth waters, and have been infrequently recorded off Tasmania, NSW, Queensland, the Great Australian Bight, Northern Territory and Western Australia (Parker 1978, Bannister et al. 1996, Thiele et al. 2000, Chatto and Warneke 2000, Bannister 2008).

Sightings of Sei Whales within Australian waters includes areas such as the Bonney coast upwelling (Miller et al. 2012), where opportunistic feeding has been observed between November and May (Gill et al. 2015).

There are no BIAs for the Sei Whale within Australian waters. Sei Whales are likely to be foraging in the Operational Area at similar time as Blue Whales, predominately occur between January to April.

4.5.5 Southern Right Whale

The Southern Right Whale (*Eubalaena australis*) is listed as endangered under the EPBC Act. Southern Right Whales were depleted to less than 300 individuals globally due to commercial whaling in the 19th and 20th centuries (Tormosov et al. 1998). They were protected from whaling in 1935 however, due to illegal whaling in the 1970s and because Southern Right Whales have a slow rate of increase (7% per annum) compared to other marine mammals, their numbers remain low (IWC 2013). Global abundance estimates are 13,000 for the species, across key wintering grounds in South Africa, Argentina, Australia, and New Zealand.

Southern Right Whales are distributed in the Southern Hemisphere with a circumpolar distribution between latitudes of 16°S and at least 65°S. They migrate from southern feeding grounds in sub-Antarctic waters to Australia in between May and November to calve, mate and rest (Bannister et al. 1996, DCCEEW 2022). In Australian coastal waters, they occur along the southern coastline of the mainland and Tasmania and generally extend as far north as Sydney on the east coast and Perth on the west coast (CoA 2012). There are occasional sightings further north, with the extremities of their range recorded at Hervey Bay and Exmouth (CoA 2012).

The largest established calving areas in Australia include Head of Bight in SA, and Doubtful Island Bay and Israelite Bay in WA. Smaller but established aggregation areas regularly occupied by Southern Right Whales include Yokinup Bay in WA, Fowlers Bay in SA and the Warrnambool and Portland in Victoria. Emerging aggregation areas include Flinders Bay, Hassell Beach, Cheyne/Wray Bays, and Twilight Cove in WA, and sporadically occupied areas include Encounter Bay in SA. Southern Right Whales generally occupy shallow sheltered bays within 2 km of shore and within water depths of less than 20 m (Charlton et al. 2017).

The Operational Area overlaps the Southern Right Whale Migration BIA where the whales are present between April and October (AMSIS 2025, formerly National Conservation Values Atlas (NCVA)) (Appendix B12 MAP-REG-EPM-085).

4.6 Coastal Developments

No coastal developments are within the Operational Area. The closest coastal developments to the Operational Area are the towns of Port Campbell, Port Fairy, and Warrnambool. The Great Ocean Road, a major tourist draw card is popular for its pristine beaches. The nearest coastline is ~ 7 km from the Operational Area.

4.7 Commercial Fishing and Aquaculture

No aquaculture is undertaken within the Operational Area.

Based on the Commercial Fisheries Analysis report (Appendix B6), the Operational Area overlaps the following commercial fisheries that have catch effort:

- Commonwealth
    - Southern and Eastern Scalefish and Shark Fishery following sectors:
    - Shark Gillnet sector
    - Trawl – otter board
    - Southern Squid Jig Fishery
- Victorian:
    - Giant Crab
    - Multi-species Ocean

- Octopus
- Southern Rock Lobster
- Wrasse

4.7.1 Commonwealth Fisheries

4.7.1.1 Southern and Eastern Scalefish and Shark Fishery (SESSF)

The Southern and Eastern Scalefish and Shark Fishery (SESSF) stretches south from Fraser Island in southern Queensland, around Tasmania, to Cape Leeuwin in southern Western Australia. Information on the Shark Gillnet Sector and Commonwealth Trawl Sector are from the Fishery Status Reports (Patterson et al. 2022).

The Shark Gillnet Sector is part of the Gillnet, Hook and Trap Sector of the SESSF. Most fishing in the sector using nets occurs in Bass Strait targeting Elephantfish, Gummy Shark, Sawsharks and School Shark. Fishing is generally concentrated east of King Island. In the 2021-22 fishing season there were 32 active trawl vessels.

The Commonwealth Trawl Sector of the SESSF extends south from Barrenjoey Point in northern New South Wales to east of Kangaroo Island off South Australia. The Commonwealth Trawl Sector is a multispecies fishery, targeting a variety of fish and shark species. Effort in the fishery is widely distributed. However, since 2007 – after the closure to trawling of most SESSF waters deeper than 700 m – effort has become increasingly concentrated on the shelf (to 200 m) rather than on the slope. In the 2021-22 fishing season there were 27 active gillnet vessels.

4.7.1.2 Southern Squid Jig Fishery

A single species fishery targeting Gould's Squid (*Nototodarus gouldi*) that operates year-round. Portland and Queenscliff are the major Victorian landing ports. Jigging typically occurs midwater at depths between 50 and 100 m at night using large lights that illuminate the waters around a boat. In 2021 there were eight active vessels in the fishery with the landing ports being Triabunna (Tasmania); Queenscliff and Apollo Bay (Victoria) (Patterson et al. 2022).

4.7.2 Victorian Fisheries

4.7.2.1 Giant Crab

A small fishery operating in western Victoria and closely linked with the Rock Lobster Fishery. Most vessels are used primarily for rock lobster fishing with giant crab taken as by-product. Fishing effort is concentrated on continental shelf edge (~200 m deep). Giant crabs (*Pseudocarcinus gigas*) inhabit the continental slope at approximately 200 m depth and are most abundant along the narrow band of the shelf edge. Closed seasons operate for male (15 September to 15 November) and female (1 June to 15 November) giant crabs. Data for 2020/21 is not available due to insufficient data to report because there are less than five licence holders (policy requirement to protect commercial confidentiality of data) (VFA 2021).

4.7.2.2 Multi-species Ocean

The wrasse, inshore trawl, southern rock lobster and giant crab Victorian fisheries can catch gummy shark and school sharks as part of their fishery. Snapper is caught using lines, nets and haul seine. Over 90% of the catch is from Port Phillip Bay, and around 5% from coastal waters. In 2020/21, 45 tonnes were landed but a value could not be provided as there is insufficient data to report because there are less than five licence holders (policy requirement to protect commercial confidentiality of data) (VFA 2021).

4.7.2.3 Octopus

The octopus fishery is a new fishery harvesting mainly pale octopus (*Octopus pallidus*) in East Gippsland. The fishery may also catch maori octopus (*Macroctopus maorum*) and gloomy octopus (*Octopus tetricus*). Octopus are caught using purpose-built unbaited traps. The fishery commenced on 1st August 2020. Three zones have been established for the management of commercial octopus fishing in Victoria. Octopus Fishery Access Licences authorise commercial take of octopus from the

eastern octopus zone where the majority of commercial octopus fishing in Victoria has occurred to date (VFA 2023). The Operational Area is within the western zone where fishing is less established and being managed by the Victorian Fishing Authority through exploratory, temporary permits.

4.7.2.4 Southern Rock Lobster

Victoria's second most valuable fishery with a production value of A$13.6 million in 2020/21 (VFA 2021). Since 2009/10, annual quotas for the western zone that overlaps the Operational Area have been set at between 230 and 260 tonnes and have been fully caught each year (VFA 2023a). In the western zone, most catch is landed through Portland, Port Fairy, Warrnambool, Port Campbell and Apollo Bay. Closed seasons operate for male (15 September to 15 November) and female (1 June to 15 November) lobsters. Southern rock lobsters (*Jasus edwardsii*) are found to depths of 150 m, with most of the catch coming from inshore waters less than 100 m deep (VFA 2023a).

4.7.2.5 Wrasse

The fishery extends the length of the Victorian coastline from high tide mark to 20 nm offshore (VFA 2023b). Fishers mostly use hook and line. Limited entry fishery with 22 current licences. Total annual catch in 2019/20 was 21.5 tonnes (VFA 2023b).

4.8 People and Communities

4.8.1 Social and Economic Features

During consultation, as presented in Annex 2, objections and claims were raised regarding concerns of increased rubbish washing up on local beaches, impacts on commercial fishing and the ecosystem in general, which may impact tourism and local enjoyment of the area.

4.8.2 Cultural Features

Native Title (see Appendix F3, section 3.16) has not been identified to occur within the Operational Area. However, the Operational Area is adjacent to Eastern Maar and Gunditjmara Native Title determinations, including Deen Maar (Appendix B12 MAP-REG-EPM-076) and the currently under consultation Nyamat Mirring IPA (GMTOAC, 2023). Deen Maar is culturally significant to both the Gunditjmara and Eastern Maar (Appendix F3, Section 3.16.1). For the Gunditjmara people, Native Title also includes culturally significant sites such as the 'Convincing Ground' (Appendix F3, Section 3.16.1). The Registered Aboriginal Parties (RAPs) with overlap within the Environmental Planning Area are Bunurong Land Council Aboriginal Corporation and Wadawurrung Traditional Owners Aboriginal Corporation.

On its northeastern side, the Environmental Planning Area overlaps the tip of the Mornington Peninsula. The peninsula, particularly Point Nepean located at the tip, holds cultural values for the Bunurong people, including story and song (Appendix F3, Section 3.16.1).

Short-tailed shearwaters (mutton birds) are identified as being culturally significant to the Gunditjmara People and are used in harvesting practice (GMTOAC, 2023). Shearwaters are also identified as culturally significant species to the Eastern Maar people, along with gannets and Little Penguins (Appendix F3, Section 3.16.1).

During consultation, the cultural significance of marine flora and fauna, such as the Southern Right Whale, Blue Whale, Killer Whale, dolphins, seals, sea lions and kelp, were highlighted, with connections to songlines, totemic value and kinship, and cultural practices. Other coastal resources, such as shell middens, along with waterways, including estuaries, also hold cultural significance. (Appendix F3, Section 3.16.1). The Bonney Upwelling was also identified as having cultural significance with its current bringing cold nutrient-rich waters that support marine species such as phytoplankton, fish, squid, seals, dolphins, whales, penguins, gannets and other sea birds (GMTOAC, 2023).

The National Recovery Plan for the Southern Right Whale (DCCEEW 2024) provides information on the cultural significance of southern right whales to Indigenous Australians. The plan details:

In Victoria, Koontapool (southern right whales) occur along the coastlines of south-west Victoria in Gunditjmara Sea Country to feed and birth. These Koontapool Woorrkngan Yakeen (Whale Birthing Dreaming Sites), are in coastal bay areas from Port Campbell to Portland, including Warrnambool. These places on Gunditjmara Country are known resting and feeding sites for mothers and calves and are directly related to Gunditjmara Neeyn (midwives), explaining why Gunditjmara is a Matrilineal Nation.

4.9 Marine Protected Areas

No marine protected areas are within the Operational Area (Appendix B12 MAP-REG-EPM-078 and MAP-REG-EPM-079).

The closest Australian Marine Parks (AMPs) are the Zeehan Marine Park which is ~49 km and the Apollo Marine Park which is ~36 km from the Operational Area (Appendix B12 MAP-REG-EPM-078).

The Operational Area is ~6 km from the Victorian Twelve Apostles Marine National Park (Appendix B12 MAP-REG-EPM-079). The Twelve Apostles Marine Park is managed in conjunction with the Arches Marine Sanctuary under the Management Plan for Twelve Apostles Marine National Park and The Arches Marine Sanctuary (Parks Victoria 2006b) and is classified as IUCN II. The Plan describes the key environmental, cultural, and social values as:

- Unique limestone rock formations, including the Twelve Apostles.
- Range of marine habitats representative of the Otway marine bioregion.
- Indigenous culture based on spiritual connection to sea country and a history of marine resource use.
- Wreck of the Loch Ard (shipwreck).
- Underwater limestone formations of arches and canyons.
- Diverse range of encrusting invertebrates.
- Spectacular dive site.

4.10 Marine Industries

Marine industries within the Operational Area that could be impacted by an accidental release of materials or waste are the offshore energy and shipping.

4.10.1 Offshore Energy

Within the Operational Area is the Beach Energy Otway Development consisting of subsea infrastructure and the Thylacine-A unmanned platform and the Cooper Energy Casino Henry Netherby Development consisting of subsea infrastructure. During the Regia MSS design envelope (1 November 2023 to 31 December 2028) there is the potential for exploration and development activities such as infrastructure inspection, maintenance and repairs campaigns, seabed surveys, seismic surveys, drilling, and infrastructure installation to be undertaken with vessels and drill rigs to support the ongoing energy supply of oil and gas and potentially renewables within the Otway Basin.

4.10.2 Shipping

The South East Marine Region is one of the busiest shipping regions in Australia and Bass Strait is one of Australia's busiest shipping routes. Commercial vessels use the route when transiting between ports on the east, south and west coasts of Australia, and there are regular passenger and cargo services between mainland Australia and Tasmania. Ports Australia provide statistics for port operations throughout Australia's main commercial ports. Based on the latest information (2021) the majority of commercial shipping traffic transiting to and from Victorian ports were container (3,682), general cargo (2,663), bulk liquid carriers (2,019), dry bulk (1,715), car carrier (1,342), bulk gas (220), other cargo (47) and livestock (9).

5 Relevant Legislative and Other Requirements

CGG has considered all the relevant legislative requirements, conservation management and recovery plans that apply to an accidental release of materials or waste, (see Appendix B2).

Measures that will be adopted to demonstrate how these requirements will be met are as follows:

- CGG Marine Assurance System to ensure no waste material is disposed of overboard and that vessels meet all legislative requirements including the International Convention for the Prevention of Pollution from Ships.
- CGG Marine Assurance System to ensure no waste material is disposed of overboard and that vessels have a Garbage Management Plans and Garbage Record Book.
- CGG Marine Assurance System to ensure that in the event of an accidental release of materials or waste the support vessels will search for and retrieve the material or waste where possible and safe to do so
- CGG Marine Assurance System to ensure no waste material is disposed of overboard and that vessels have a Garbage Management Plan and Garbage Record Book, and covered containers for waste that has the potential to be blown overboard.

6 Defining Acceptable Levels of Risk

CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that assessment specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, Table D1-2 shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding assessment specific defined acceptable levels established for this assessment. This enables more relevant and targeted comparisons later in this assessment.

Table D1-2 - General and Aspect Specific Defined Acceptable Levels

Category	Defined Acceptable Level (General)	Defined Acceptable Levels (Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	Prevent any accidental release of materials or waste overboard. Recover any accidental release of materials or waste overboard.	This acceptable level will ensure no accidental release of waste or materials will also ensure CGG is compliant with the relevant legislation regarding waste management.
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		In the unlikely event of an accidental release of materials or waste overboard plans and measures are in place to prevent any injury or death to threatened species and will also ensure CGG is compliant with the relevant legislation regarding waste management.
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		

Category	Defined Acceptable Level (General)	Defined Acceptable Levels (Specific)	Rationale
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	For species and sensitivities with social, cultural and/or economic values, if the potential ecological impact or risk is deemed acceptable, it is likely that the corresponding impact on social, cultural and/or economic values will also be considered acceptable, as the physical presence and health of these species are key for maintaining their social, economic and cultural roles. Predicted levels of impact for species that have social, cultural and economic values will be assessed on a receptor level.
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons. The views of public have been considered in the impact and risk assessment.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	
Company	All reasonably practicable measures have been adopted to reduce environmental impacts and risks. Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below. The implementation strategy includes specific measures to ensure that measures adopted continue to be effective in managing the impact or risk.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Risks Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of risk could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of release of materials or waste overboard, elimination involves removing or reducing the factors that could lead to this loss of materials or waste. No elimination-based activity limitations were required in this case, as other measures applied were sufficient to reduce the identified risk to an acceptable level.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the risk. No substitution-based activity limitations were required in this case, as other measures applied were sufficient to reduce the identified risk to an acceptable level. One measure was explored as a preventive approach but was not adopted:

Use of biodegradable materials for consumables used offshore

This would reduce long-term harm in the event of accidental loss. However, the feasibility depends on supply chain availability and compatibility with operational requirements. This substitution was not adopted at this time due to uncertainty about its effectiveness and readiness across all vessel types. Biodegradability may help reduce the consequences and it is better to focus efforts on prevention.

9 Predicted Levels of Risk

9.1 Change to physical condition

An accidental release of materials or waste may pose a risk to marine fauna through ingestion and entanglement. Marine fauna such as birds, pinnipeds, sharks, turtles, dolphins and whales can be severely injured or die from entanglement in marine debris, causing restricted mobility, starvation, infection, amputation, drowning and smothering (DoEE 2018). Seabirds entangled in plastic packing straps or other marine debris may lose their ability to move quickly through the water, reducing their ability to catch prey and avoid predators, or they may suffer constricted circulation, leading to asphyxiation and death. In marine mammals and turtles, this debris may lead to infection or the amputation of flippers, tails, or flukes (DoEE 2018).

Fishing gear (ropes and nets made from synthetic fibres), balloons and plastic bags are the biggest entanglement threat to marine fauna, and plastic bags and utensils are the biggest ingestion risk for seabirds, turtles, and marine mammals (Wilcox et al. 2016). Studies published between 1985 and 2012 identified general plastic as the main debris ingested by marine turtles, followed by soft plastic, rope and styrofoam (Schuyler et al. 2014).

Australia is party to Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL), which regulates garbage pollution from ships. The discharge of plastic into the sea has been prohibited under MARPOL Annex V since 1988; the discharge of all types of garbage into the sea, with very limited exceptions (not related to plastics), has been prohibited since 2013. All vessels used for the Regia MSS will comply with the MARPOL requirements with no discharge of solid waste to the marine environment (CGG Marine Assurance System). In addition, waste with the potential to be windblown shall be stored in covered containers (CGG Marine Assurance System) reducing the potential for solid waste to be lost overboard.

If a loss of equipment or streamer occurred, they would not result in an entanglement risk to fauna as they are not flexible enough for fauna to become entangled.

The predicted level of consequence to marine fauna from an accidental release of materials or waste is assessed as minor (consequence may occur to an individual but is unlikely to affect species, populations, or ecosystems) with a likelihood of unlikely (event is possible but not expected to occur under normal circumstances) and the predicted level of risk is assessed as medium.

9.2 Changes to the functions, interests, or activities of other users

In the event of an accidental release of equipment or a streamer which cannot be recovered, if the object was buoyant, it may present a navigation or entanglement hazard to commercial fishers and other marine users. In addition, buoyant objects may become non-buoyant overtime and sink to the seabed, where it may present a snagging hazard for commercial trawling activities and create a potential risk to vessel safety and damage fishing equipment or may require commercial fishers to avoid a localised area for a period to avoid interaction.

Shipments to and from the survey vessel will be stored in containers (~ 10ft). These will be lifted onboard the seismic vessel, emptied, and returned to supply vessel. All containers will be secured on deck. In the unlikely event these are lost overboard, closed container will typically float while open top containers will sink. The loss of equipment or streamers could result in entanglement with other marine user's infrastructure or equipment (i.e., fishing gear, propellers) or damage to fishing, shipping, or other marine industry vessels if hit.

In the event of an accidental release of equipment or a streamer which cannot be recovered, the vessel would notify any known vessels in the area and notify Australian Safety Marine Authority who would provide any navigation warnings if required.

Historically there has been a report that a seismic streamer contacted a production platform. This occurred during extreme weather conditions and the vessel was not undertaking acquisition at the

time. As detailed in the Section 4.10.1: Offshore Energy, the Beach Energy Thylacine-A unmanned platform is within the Operational Area. The platform has a 500 m Petroleum Safety Zone which unauthorised vessels cannot enter. In addition, if due to acquisition requirements any equipment is required to enter the 500 m Petroleum Safety Zone a Simultaneous Operations Plan will be implemented.

The predicted level of consequence to the functions, interests, or activities of other users from an accidental release of materials or waste is assessed as minor (consequences would be minor and temporary (days) but vessels or fishing gear may require some level of repair or replacement) with a likelihood of unlikely (event is possible but not expected to occur under normal circumstances) and the predicted level of risk is assessed as medium.

9.3 Change in aesthetic, social and cultural value

An accidental release of materials or waste may result in visual pollution changing the aesthetic, social and cultural values of coastal developments, marine protected areas such as marine parks, Native Title determined areas and sea country. As detailed in the existing environment though there are no coastal developments or marine protected areas within the Operational Area, materials or waste could move from the offshore area to coastal areas or marine protected areas via wind and currents. The Great Ocean Road, Victorian Twelve Apostles Marine National Park and the towns of Port Campbell, Port Fairy and Warrnambool are along the coast adjacent to the Operational Area. These areas are major tourist draw cards and known for their pristine beaches. Adjacent to the operational area are Native Title determinations for Eastern Maar and Gunditjmara. Native title rights and interests include the non-exclusive rights to access, enter and remain on the land and waters, to camp on areas above the high-water mark, to use and enjoy the land and waters, to protect culturally important places, and to take resources from the land and waters. Bunurong Land Council Aboriginal Corporation is the Registered Aboriginal Party (RAP) for Point Nepean and the Mornington Peninsula, located in the northeastern extent of the Environmental Planning Area. Wadawurrung Traditional Owners Aboriginal Corporation is the Registered Aboriginal Party (RAP) for Wadawurrung Traditional Owners, whose RAP area includes the coastal area from Aireys Inlet to Queenscliff, overlapping with the northeastern extent of the Environmental Planning Area.

As detailed in the assessment of an accidental release of materials or waste to fauna, Australia is party to Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL), which regulates garbage pollution from ships. The discharge of plastic into the sea has been prohibited under MARPOL Annex V since 1988; the discharge of all types of garbage into the sea, with very limited exceptions (not related to plastics), has been prohibited since 2013. All vessels used for the Regia MSS will comply with the MARPOL requirements with no discharge of solid waste to the marine environment (CGG Marine Assurance System). In addition, waste with the potential to be windblown shall be stored in covered containers reducing the potential for solid waste to be lost overboard.

It is unlikely that an accidental release of materials or waste would occur and if it did occur it would be a one-off event that is not predicted to pose a risk to the values of the coastal developments, tourism, marine protected areas, Native Title rights and interests, RAP area or sea country.

9.4 Measures Adopted to Manage Environmental Risks

The following measures have been adopted to ensure that the risks associated with potential release of materials or waste overboard from the survey and support vessels will be of an acceptable level.

These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

Measure	Measure Type	Details and Justification
CGG Marine Assurance System	System	The CGG Marine Assurance System ensure compliance of contract vessels with legislative requirements including the Navigation Act, MARPOL, COLREGS and Marine Orders.
Garbage Management System	System	Australia is party to Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL), which regulates garbage pollution from ships. The discharge of plastic into the sea has been prohibited under MARPOL Annex V since 1988; the discharge of all types of garbage into the sea, with very limited exceptions (not related to plastics), has been prohibited since 2013.
Garbage Management Plan	Resource	Vessels 100 gross tonnes (or certified for 15 persons on-board) will have a Garbage Management Plan.
Garbage Record Book	Resource	Vessels ≥400 gross tonnes (or certified for 15 persons on-board) will have a garbage record book.
Support Vessel	Item of Equipment	Throughout the seismic survey, at least one support vessel will be in constant attendance. When safe, assist in the recovery of lost equipment or unintentional garbage discharges.
Streamer Recovery Units	Item of Equipment	Streamers will have recovery units fitted to prevent benthic disturbance and injury to marine fauna in the event of loss.
Consultation Management System	System	If any waste or materials are lost overboard then other marine users should be notified.
Petroleum SIMOPS Plan	Resource	A simultaneous operations plan will be developed if the seismic vessels or any equipment will enter the 500 m Petroleum Safety Zone of the Thylacine-A platform.
OVID Style Inspection	Practice	OVID-Style inspections confirm that the seismic vessel has procedures for streamer inspection, maintenance, deployment, and retrieval.

10 Demonstration Risks Will Be of an Acceptable Level

10.1 Discussion on Principles of ESD

Temporary, Reversible, Small Scale and Natural variation

The risk of accidental release of materials or waste overboard from the petroleum activity is mitigated through stringent industry best practices, such as spill response plans, waste management protocols, and containment procedures. Any accidental release would be managed promptly and effectively, ensuring that the environmental impact remains temporary, reversible, small-scale, and low intensity. This aligns with the principle that the activity will not cause lasting environmental harm.

Based on sufficient information

The impact and risk assessment process is informed by relevant industry guidelines, historical data, and scientific studies on material and waste handling at sea. The process ensures that there is a clear understanding of potential risks and that unplanned releases will be addressed in a timely manner. The precautionary principle is applied where uncertainty exists, ensuring that environmental harm is minimised.

Activity not inconsistent with EPBC Act

The risk management strategies implemented by the petroleum activity comply with the Environmental Protection and Biodiversity Conservation (EPBC) Act and its recovery plans for marine environments. The activity's spill response plans and waste management procedures are aligned with these national frameworks, ensuring that no inconsistency arises between the activity and the EPBC Act.

10.2 Biological and Ecological Categories

The release of materials or waste overboard could have potential biological impacts on marine species and ecosystems, such as contamination or disruption of habitat. However, the risk is considered low due to the proactive measures in place to prevent or mitigate such releases. Should an accidental release occur, it is anticipated to cause only temporary and reversible damage at the population level, with no significant disruption to biodiversity or ecosystem health. The containment and recovery protocols will ensure that the environmental impact is small-scale and recoverable.

10.3 Discussion on Economic, Cultural and Social Categories

The accidental release of materials or waste overboard could impact industries reliant on clean marine environments, such as commercial fisheries, aquaculture, and tourism. However, the likelihood of such releases is minimized by robust waste management practices. Furthermore, any potential impacts are expected to be temporary, and mitigation measures ensure that industries, livelihoods, and cultural practices continue without significant disruption. For species with cultural, social, or economic value, the potential impacts of the release are considered low, with no long-term harm anticipated to these key resources or their associated industries.

10.4 Discussion on Consistency with Company Processes

The environmental management strategies adopted by CGG are consistent with the company's internal impact and risk assessment processes. The company has a strong operational history of managing environmental risks, including those related to waste releases. Spill response plans and waste management practices are aligned with national and international standards, ensuring minimal impact on the marine environment. The application of CGG's impact and risk matrix provides a conservative and reliable evaluation of potential risks, ensuring that any risks associated with accidental releases are kept to an acceptable level. The effectiveness of these strategies will continue to be monitored and adjusted to ensure that they remain effective in managing the risks associated with waste disposal.

This risk assessment has demonstrated that an accidental release of materials or waste causing a change to marine fauna and functions, interests, or activities of other users has a:

- **Predicted level of consequence is minor (2).**
- **Likelihood of an event is unlikely (2).**
- **Predicted level of risk is medium (4).**

11 Environmental Performance Outcomes

Defined Acceptable Level (From Section 6)	Environmental Performance Outcome	Rationale
Prevent any accidental release of materials or waste overboard.	No loss of materials or wastes overboard.	Robust waste management protocols and containment procedures reduce the likelihood of any waste entering the marine environment. In the unlikely event of a release, these controls ensure that it is detected and prevented from spreading, thereby avoiding environmental contamination.
Recover any accidental release of materials or waste overboard	No death or injury to fauna, including listed threatened or migratory species, from the activity.	Prompt and effective recovery actions following an accidental release minimise exposure of marine fauna to harmful substances. These measures protect the health and safety of marine species, reducing the potential for physical harm, ingestion, or habitat disruption, particularly for sensitive or threatened species.
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	Social, cultural, and economic features are protected, sustaining their value for people and communities.	Effective control and management of waste releases helps maintain healthy marine ecosystems, which are essential to supporting economic activities, cultural practices, and public use of marine areas.
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		

12 Recommendations

The predicted level of risk is medium and below pre-defined acceptable levels. The mitigation and management measures in place provide a reliable prevention mechanism to ensure confidence in the predicted likelihood levels, thus there are no further recommendations.

13 Document Control

Date	Revision	Update
6 July 2023	A	Draft prepared for initial comment
23 August 2023	B	Update based on comments and relevant person feedback
11 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
14 May 2024	2	Updated following public comment and rerun of the PMST search.
31 October 2024	3	Updated following NOPSEMA assessment.
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
5 December	5	Updated following NOPSEMA OMR 2 Letter

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table D1-3 shows how this feedback has been incorporated into the environmental assessments.

Table D1-3 - Public comment input since the beginning of the public comment period starting 25 January 2024.

Matter	Matter ID	Changes made arising from public comment
Matter: Geographic range and all species need to be defined and considered	I16	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table D1-4. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table D1-4 – Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4043	Concern about increased rubbish washing up on beaches due to activities at sea.	This risk has been thoroughly assessed in D1 and determined to be of a medium risk. There are a number of measures in place to retain garage onboard and crew training in place to lessen the likelihood of waste being accidentally lost overboard.	832
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4103	Expresses strong opposition to the proposed plans for potential oil spills, highlighting significant concern for environmental risks in the area. The individual identifies as a local resident.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. This includes an assessment of all risks associated with marine spills. There is a comprehensive Oil Pollution Emergency Plan and management and mitigation plans for accidental release of materials or waste overboard.	1022
4104	Feedback expresses that the proposed drilling is close to a marine park, threatening this area. An oil spill could cause irreversible damage, similar to the harm already experienced along much of the coast.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. This includes an assessment of all risks associated with marine spills. There is a comprehensive Oil Pollution Emergency Plan and management, and mitigation plans for accidental release of materials or waste overboard. Regia MSS is a seismic program not a drilling one.	1022
4128	Lack of adequate monitoring of species present or likely to be impacted.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions regarding species that may be affected by the Regia MSS. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	3237
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4166	Risk to the marine environment with the plan.	Titleholder has conducted a series of thorough risk assessments including the following aspects: Accidentl release of waste (D1), Fauna Interactions (D2), Invasive Marine Species (D3) and Accidental release of fuel (D4), wherin which relevant receptors have been assessed.	2677
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	3343

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	3343
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2963
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1659
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1665
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments is covered below in response to concern 6.	2886
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049
4253	The possible effects to marine life and ecosystems is my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publically responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4291	The stakeholder raised a significant concern regarding the claimed accumulation of debris, including 3 to 4 tons of seismic tubes and electrical wire left behind over the last 20 years, indicating frustration with the environmental impact of past activities.	CGG has completd an assessment of the risks arising from the loss of waste and materials overboard. CGG has made a commitment to recover streamers that become detached and has streamer recovery units fitted to enable a support vessel to recover the equipment.	5189
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4315	The statement suggest that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	"A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments are covered below in response to concern 6."	2886

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4487	Claims that CGG's proposed activities are inconsistent with the Recovery Plans made under the EPBC Act, the Southern Right Whale Recovery Plan and the Blue Whale Recovery Plan. GMTOAC states that these activities pose known physical and behavioural risks to the Eastern Population of Southern Right Whales and to Pygmy Blue Whales. These risks include impacts from anthropogenic underwater noise, particularly seismic noise, vessel strikes, climate-driven changes in prey availability, and the cumulative effects of these pressures, all of which have the potential to injure or kill individuals and affect populations. GMTOAC notes that under the EPBC Act Program and NOPSEMA's decision-making guidelines, an Environment Plan cannot be accepted if it is inconsistent with a recovery plan. It emphasises that both Recovery Plans contain "Very High" importance actions requiring that Blue Whales and Southern Right Whales must be able to continue using their Biologically Important Areas (BIAs) without auditory impairment, injury, or displacement. The plans also call for preventing disruption and displacement of Karntubul (Southern Right Whales) from BIAs due to anthropogenic noise such as seismic surveys.	CGG maintains that its approach aligns with statutory obligations and industry best practice. It asserts that all regulatory requirements under Regulation 34 have been met, and that its environmental performance outcomes and control measures are grounded in the best available science and tailored to the ecological and cultural sensitivities revealed through consultation. The Regia MSS Environment Plan (EP) was designed to ensure impacts and risks are reduced to As Low As Reasonably Practicable (ALARP) and to an acceptable level. Regarding whale protection, CGG highlights that the EP includes specific mitigation measures for culturally and ecologically significant marine fauna, including species noted in relevant Recovery Plans. Early correspondence in February 2023 identified Southern Right Whales and Pygmy Blue Whales as key sensitivities, and the EP commits to spatial and temporal avoidance measures, sound-source shutdowns, and exclusion zones to protect them. These measures explicitly consider cultural significance, such as timing restrictions to avoid the Karntubul (Southern Right Whale) birthing period. The whales, Karntubul and Wuuloc, are identified in the EP as sensitive receptors with dedicated protective measures. CGG confirms that these cultural and ecological sensitivities were incorporated into the environmental assessment. The EP acknowledges the sacred cultural status of Koontapool (Southern Right Whale) and Wuuloc (Pygmy Blue Whale) for the Gunditjmara people and includes them in impact and cumulative risk assessments. Appendix F3 references the Nyamat Mirring Plan 2023–2033 and recognises Gunditjmara spiritual connections, including to Karntubul. CGG substantively addresses the relevant issues, including underwater noise, vessel interactions, and cumulative effects. The EP sets out noise-management frameworks, timing restrictions, and cumulative impact analyses consistent with the concerns raised.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4493	Claims that CGG's proposed seismic activities contribute both directly and indirectly to broader threats faced by Southern Right Whales, including industrialisation of the marine environment, climate change, and pollution or contamination from vessel discharges.	Broader threats such as climate change and industrialisation fall outside the scope of the Environment Plan, as outlined in the response to Statements 156–166. The EP assesses only the environmental risks directly associated with the proposed activity. These risks are evaluated in the D Appendices, which demonstrate that any residual risks have been reduced to an acceptable level.	EVT352

Annex 3

EPBC Act Listed Species within the Operational Area Relevant to Release of Materials or Waste Overboard

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Birds - Seabirds							
Antipodean Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Black-browed Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on Black-browed Albatross (*Thalassarche melanopris*) (TSSC 2005)
Blue Petrel	Species or species habitat may occur within area	Vulnerable			Listed	None identified	Conservation Advice *Halobaena caerulea* Blue Petrel (TSS 2015)
Buller's Albatross, Pacific Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging	National Recovery Plan for Albatrosses and Petrels (CoA 2022)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Campbell Albatross, Campbell Black-browed Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Common Diving-petrel						Foraging: year round Breeding: July – January Buffer around Tasmania and Victoria	None identified
Fairy Prion	Species or species habitat may occur within area				Listed	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a)
Fairy Prion (southern)	Species or species habitat may occur within area	Vulnerable				None identified	Conservation Advice *Pachyptila turtur subantarctica* fair y prion (southern) (TSSC 2015e)
Flesh-footed Shearwater, Fleshy-footed Shearwater	Foraging, feeding or related behaviour likely to occur within area		Migratory	Migratory Marine Birds	Listed (as *Puffinus carneipes*)	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a) Commonwealth Listing Advice on *Ardenna carneipes* (Flesh-footed Shearwater) (TSSC 2014)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Gould's Petrel, Australian Gould's Petrel	Species or species habitat may occur within area	Endangered				None identified	Gould's Petrel (*Pterodroma leucoptera leucoptera*) Recovery Plan (DEC NSW 2006)
Grey-headed Albatross	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Approved Conservation Advice for *Thalassarche chrysostoma* (Grey-headed Albatross) (DEWHA 2009)
Indian Yellow-nosed Albatross	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Most of the South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Northern Buller's Albatross, Pacific Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable			Listed (as *Thalassarche sp. nov.)*	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Northern Giant Petrel	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on *Macronectes halli*

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
							(Northern Giant-Petrel) (TSSC 2001)
Northern Royal Albatross	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Salvin's Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Shy Albatross	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)) Conservation Advice *Thalassarche cauta* Shy Albatross (TSS 2020)
Soft-plumaged Petrel	Species or species habitat may occur within area	Vulnerable			Listed	None identified	Conservation Advice *Pterodroma Mollis* Soft-plumaged Petrel (TSS 2015a)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Sooty Albatross	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Sooty Shearwater	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed (as *Puffinus griseus*)	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a) Conservation Advice for *Ardenna grisea* (Sooty Shearwater) (DCCEEW 2023i)
Southern Giant-Petrel, Southern Giant Petrel	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on *Macronectes giganteus* (Southern Giant-Petrel) (TSSC 2001a)
Southern Royal Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Wandering Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
White-capped Albatross	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Birds - Shorebirds							
Australian Fairy Tern	Foraging, feeding or related behaviour likely to occur within area	Vulnerable				None identified	Approved Conservation Advice for *Sternula nereis nereis* (Fairy Tern) (DSEWPaC. 2011) National Recovery Plan for the Australian Fairy Tern (*Sternula nereis nereis*) (DAWE 2020)
Brown Skua	Species or species habitat may occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Common Sandpiper	Species or species habitat may occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Curlew Sandpiper	Species or species habitat may occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice for Calidris ferruginea Curlew Sandpiper (DCCEEW 2023m)
Eastern Curlew, Far Eastern Curlew	Species or species habitat may occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed	None identified	Conservation Advice for *Numenius madagascariensis* (Far Eastern Curlew) (DCCEEW 2023n)
Fork-tailed Swift	Species or species habitat likely to occur within area		Migratory	Migratory Marine Birds	Listed - overfly marine area	None identified	None identified
Orange-bellied Parrot	Migration route likely to occur within area	Critically Endangered			Listed - overfly marine area	None identified	Commonwealth Listing Advice on *Neophema chrysogaster* (TSSC 2006). National Recovery Plan for the Orange-bellied Parrot, *Neophema chrysogaster* (DEWLP 2016)
Pectoral Sandpiper	Species or species habitat may occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Red Knot, Knot	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice for *Calidris canutus* Red Knot (DCCEEW 2024) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Sharp-tailed Sandpiper	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Calidris acuminata* (Sharp-tailed Sandpiper) (DCCEEW 2024a)
White-fronted Tern	Foraging, feeding or related behaviour likely to occur within area				Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Dolphins							
Bottlenose Dolphin	Species or species habitat may occur within area					None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Common Dolphin, Short-beaked Common Dolphin	Species or species habitat may occur within area					None identified	None identified
Dusky Dolphin	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin	Species or species habitat likely to occur within area					None identified	None identified
Risso's Dolphin, Grampus	Species or species habitat may occur within area					None identified	None identified
Southern Right Whale Dolphin	Species or species habitat may occur within area					None identified	None identified
Pinnipeds							
Australian Fur-seal, Australo-African Fur-seal	Species or species habitat likely to occur within area				Listed	None identified	None identified
Australian Sea-lion, Australian Sea Lion	Species or species habitat may occur within area	Endangered			Listed	None identified	Conservation Advice *Neophoca cinerea* Australian

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
							Sea Lion (TSSC 2020b) Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaC. 2013a)
Long-nosed Fur-seal, New Zealand Fur-seal	Species or species habitat may occur within area				Listed	None identified	None identified
Sharks							
Little Gulper Shark	Species or species habitat likely to occur within area	Conservation Dependent				None identified	Commonwealth Listing Advice on *Centrophorus zeeha* (southern dogfish) (TSSC 2013)
Porbeagle, Mackerel Shark	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark	Species or species habitat may occur within area	Conservation Dependent				None identified	Commonwealth Listing Advice on *Galeorhinus galeus (*TSSC 2009a)
Shortfin Mako, Mako Shark	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	Listing Advice *Isurus oxyrinchus* shortfin mako shark (TSSC 2014)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
White Shark, Great White Shark	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		Distribution and foraging	Recovery Plan for the White Shark (*Carcharodon carcharias*). (DSEWPaC 2013b)
Turtles							
Green Turtle	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017)
Leatherback Turtle, Leathery Turtle	Species or species habitat likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017) Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle*)* (DEWHA 2008)
Loggerhead Turtle	Species or species habitat likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017)
Whales							
Andrew's Beaked Whale	Species or species habitat may occur within area					None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Antarctic Minke Whale, Dark-shoulder Minke Whale	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Arnoux's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Blainville's Beaked Whale, Dense-beaked Whale	Species or species habitat may occur within area					None identified	None identified
Blue Whale	Foraging, feeding or related behaviour known to occur within area	Endangered	Migratory	Migratory Marine Species		Foraging (annual high use area)	Conservation Management Plan for the Blue Whale (DoE 2015c)
Cuvier's Beaked Whale, Goose-beaked Whale	Species or species habitat may occur within area					None identified	None identified
Dwarf Sperm Whale	Species or species habitat may occur within area					None identified	None identified
False Killer Whale	Species or species habitat likely to occur within area					None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Fin Whale	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		None identified	Conservation Advice *Balaenoptera physalus* Fin Whale (TSSC 2015b)
Gray's Beaked Whale, Scamperdown Whale	Species or species habitat may occur within area					None identified	None identified
Hector's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Humpback Whale	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	Listing Advice *Megaptera novaeangliae* Humpback Whale (DAWE 2022a)
Killer Whale, Orca	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Long-finned Pilot Whale	Species or species habitat may occur within area					None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Minke Whale	Species or species habitat may occur within area					None identified	None identified
Pygmy Right Whale	Foraging, feeding or related behaviour likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Pygmy Sperm Whale	Species or species habitat may occur within area					None identified	None identified
Sei Whale	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		None identified	Conservation Advice *Balaenoptera borealis* sei whale (TSSC 2015c)
Short-finned Pilot Whale	Species or species habitat may occur within area					None identified	None identified
Southern Right Whale	Breeding known to occur within area	Endangered	Migratory (as Balaena glacialis australis)	Migratory Marine Species		Migration	Conservation Management Plan for the Southern Right Whale (CoA 2012) National Recovery Plan for the Southern Right Whale (DCCEEW 2024)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Sperm Whale	Species or species habitat may occur within area		Migratory	Migratory Marine Species		None identified	None identified
Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
True's Beaked Whale	Species or species habitat may occur within area					None identified	None identified

REGIA
Marine Seismic Survey

Risk Assessment
Collision with Marine Fauna

Appendix D2: REG-EP-017-D2

Rev 5

December 2025

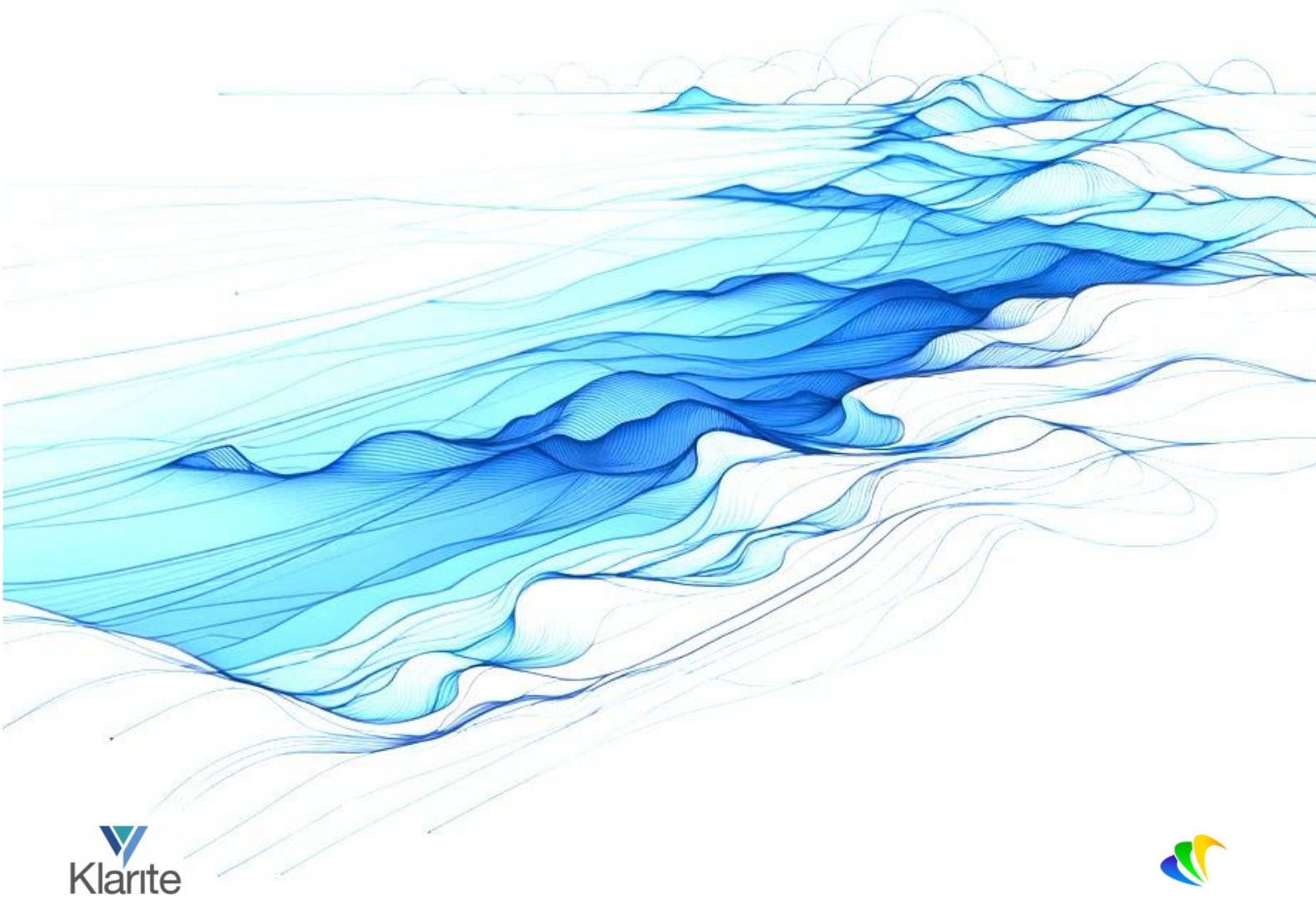

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Table of Contents

1 Introduction 4
1.1 Purpose and Scope 4
1.2 Consultation in Preparation of the EP 4
2 Aspect – Collisions with Fauna 5
2.1 How the Aspect Occurs 5
2.2 Extent and Duration of the Aspect 5
3 Cause-Effect Pathway 6
4 Description of the Existing Environment that May be Affected by the Activity 7
4.1 Turtles 7
4.2 Marine Mammals 7
4.2.1 Cetaceans 7
4.3 People and Communities 9
4.3.1 Social and Economic Features 9
4.3.2 Cultural Features 9
5 Relevant Legislative and Other Requirements 10
6 Defining Acceptable Levels of Risk 11
7 Consultation Input 13
8 Minimisation of Risks Through Activity Design 14
8.1 Elimination 14
8.2 Substitution 14
9 Predicted Levels of Risks 15
9.1 Change in Physical Condition 15
9.1.1 Turtles 15
9.1.2 Cetaceans 15
9.2 Measures Adopted to Manage Environmental Risks 17
10 Demonstration Risks Will Be of An Acceptable Level 18
10.1 Discussion on Principles of ESD 18
10.2 Biological and Ecological Categories 18
10.3 Discussion on Economic, Cultural and Social Categories 18
10.4 Discussion on Consistency with Company Processes 18
11 Environmental Performance Outcomes 20
12 Recommendations 21
13 Document Control 22
14 References 23

Annex 1 **25**
Public Comment **25**
Annex 2 **26**
Objections and Claims Raised from Consultation **26**
Annex 3 **38**
EPBC Act Listed Species within the Operational Area Relevant to Collison **38**

1 Introduction

Collisions with marine fauna was identified through the Preliminary Environmental Impact and Risk Assessment (**PEIRA**) (Appendix B4) as an aspect needing further assessment. Hence, this document presents a detailed examination of **Collisions with Marine Fauna** as a risk pathway between the Regia Marine Seismic Survey (**Regia MSS**) and the existing environment that may be affected by that aspect.

1.1 Purpose and Scope

The purpose of this document is to assess all acceptable sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document was first published in draft form to the Consultation Hub on 11 September 2023. This was done to acknowledge that the final full Environment Plan (**EP**) can be a large document that is difficult for readers to digest in the 30-day public comment period. As such, the public and relevant persons were invited to comment on the document with an explicit request for readers to provide feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

2 Aspect – Collisions with Fauna

2.1 How the Aspect Occurs

The presence of the seismic and support vessels and towed equipment provides a risk of collision or entrapment of marine fauna potentially causing injury or mortality.

2.2 Extent and Duration of the Aspect

Duration: 90 days

Extent: Operational Area

The extent of the area where the risk of a vessel collision with marine fauna may occur is within the Operational Area and the risk could occur while the activity is undertaken.

3 Cause-Effect Pathway

The PEIRA (Appendix B4) identified a cause-effect pathway for collisions with fauna for the following environmental components and their social, cultural, and economic features:

- Marine reptiles
- Marine mammals
- Fish
- People and communities

There have been no reported cases of marine fauna becoming entangled in seismic survey streamers in Australian waters. As the streamers are towed, they have a level of tautness that would not result in entanglement of fauna. Thus, there is no cause-effect pathway for entanglement of fauna in streamers.

Historically, turtles have been recorded as becoming trapped in the streamer tail buoys. Tail buoys are now of a design that does not represent an entrapment risk to turtles. In addition, where a tail buoy is not of the newer design, turtle guards are used as standard equipment. Thus, there is no cause-effect pathway for entrapment of turtles in streamer buoys.

The National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (CoA 2017a) identifies cetaceans, dugong, marine turtles, and whale sharks as being vulnerable to vessel collisions. Though vessel collisions with marine fauna occur within Australia they have not been reported during seismic surveys.

The National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna did not identify pinnipeds as vulnerable to vessel collisions, and there were no BIAs for pinnipeds identified in the PMST searches. As a result, pinnipeds are not assessed further.

Fish being identified as vulnerable to vessel collisions is specifically related to Whale Sharks who fit a similar collision profile to cetaceans. However, the PMST report verified whale sharks are not found in this region, so fish are not assessed further.

4 Description of the Existing Environment that May be Affected by the Activity

As detailed in the Section Extent and Duration of the Aspect, the Operational Area has been adopted as the extent of the area within which a collision with marine fauna may occur. To identify the presence of those species that may be at risk of vessel collision (cetaceans, dugong, marine turtles, and whale sharks) a Protected Matters Search (PMST) was undertaken for the Operational Area with the report available in Appendix B5.

The PMST Report identified that cetaceans and marine turtles may be present within the Operational Area while dugongs and whale sharks will not. Annex 3 details those species and identifies any biologically important areas and conservation advice or management plans.

PMST searches were run again prior to resubmission to ensure any changes to species or listings were identified to control for passage of time. There are no changes to protected matters information for species that may be at risk of vessel collision [Section added in response to Matters: I16 and I17].

4.1 Turtles

The PMST Report identified three turtle species, which may (*Chelonia mydas* - green) or are likely (*Dermochelys coriacea* - leatherback and *Caretta caretta* - loggerhead) to occur within the Operational Area. No BIAs or habitat critical to the survival of the species were identified.

4.2 Marine Mammals

4.2.1 Cetaceans

The PMST Report identified several cetacean (whales and dolphin) species that are known or are likely to occur within the Operational Area. Table D2-1 details those species that were identified as having biologically important areas or biologically important behaviours identified within the Operational Area.

Table D2-1 - Cetacean Species Biologically Important Behaviours and/or BIAs within the Operational Area.

Receptor	Biologically Important Behaviour
Blue Whale	Foraging, feeding or related behaviour known to occur within area
	Foraging (annual high use area) BIA (Appendix B12 MAP-REG-EPM-068)
Fin Whale	Foraging, feeding or related behaviour known to occur within area
Pygmy Right Whale	Foraging, feeding or related behaviour likely to occur within area
Sei Whale	Foraging, feeding or related behaviour known to occur within area
Southern Right Whale	Breeding known to occur
	Migration BIA (Appendix B12 MAP-REG-EPM-069)

4.2.1.1 Blue Whale

The Blue Whale (*Balaenoptera musculus*) is listed as an endangered species under the EPBC Act. There are two subspecies of blue whales that use Australian waters (including Australian Antarctic waters), the Pygmy Blue Whale (*B. m. brevicauda*) and the Antarctic Blue Whale (*B. m. intermedia*). The Otway region, where the Operational Area is located, is an important migratory and foraging area for Blue Whales, as shown by passive acoustic monitoring and aerial surveys (Gavrilov 2012, McCauley et al. 2018, Gill et al. 2011). Underwater acoustic monitoring programs have detected Antarctic and Pygmy Blue Whale calls in the Otway Region (McCauley et al. 2018).

Important foraging grounds for Blue Whales include the Great Australian Bight, South Australia, and off Portland, Victoria. Research to date has found that Pygmy Blue Whales occupy the western area of the Bonney Upwelling system in the Eastern Great Australian Bight and adjacent to the Kangaroo Island canyons from November and December (DoE 2015c). Pygmy Blue Whales then move south-east to the Bonney Upwelling system off eastern South Australia and Victoria (e.g., between Robe, SA and Cape Otway, Vic). This occurs predominately between January to April (DoE 2015c).

The Blue Whale was extremely abundant until the early 20th century when they were hunted to near extinction. Approximately 341,830 Blue Whale takes were recorded by commercial whaling in the Antarctic and sub-Antarctic in the 20th century, of which 12,618 were identified as Pygmy Blue Whales (Branch et al. 2004). The current global population of Blue Whales is uncertain but is plausibly in the range of 10,000 to 25,000, corresponding to about 3-11% of the 1911 estimated population size (Reilly et al. 2008).

The Operational Area is within the foraging (annual high use) BIA where blue whales predominately occur between January to April (DoE 2015c) (Appendix B12 MAP-REG-EPM-068).

4.2.1.2 Fin Whale

The Fin Whale (*Balaenoptera physalus*) is a cosmopolitan migratory species that is listed as vulnerable and occurs from polar to tropical waters but is rarely sighted in inshore waters. Fin Whales show well defined migratory movements between polar, temperate and tropical waters which are essentially north–south with little longitudinal dispersion.

While Australian Antarctic waters are important feeding grounds for Fin Whales, the species also feeds in the Bonney Upwelling during summer/autumn sometimes in the company of Blue and Sei Whales (DCCEEW 2023b). Areas of upwelling and interfaces with mixed and stratified waters may be an important feature of Fin Whale feeding habitat with the species feeding on planktonic crustacea, krill, some fish and cephalopods (DCCEEW 2023b). Fin Whales frequently lunge or skim feed at or near the surface and they are known to dive to 230 m to feed.

There are no BIAs for the Fin Whale within Australian waters. Fin Whales are likely to be foraging in the Operational Area at similar time as Blue Whales, predominately occur between January to April.

4.2.1.3 Pygmy Right Whale

The Pygmy Right Whale (*Caperea marginata*) is a little-studied baleen whale species that is found in temperate and sub-Antarctic waters in oceanic and inshore locations. No population estimates are available for Pygmy Right Whales globally, or in Australian waters (DCCEEW 2012c). The species has never been hunted commercially and is listed as a migratory species under the EPBC Act.

Species distribution in Australia is found close to coastal upwellings and the Subtropical Convergence may be important for regulating distribution (Bannister et al. 1996). Key locations include south-east Tasmania, Kangaroo Island (SA) and southern Eyre Peninsula (SA) close to upwelling habitats rich in marine life and zooplankton upon which it feeds (Bannister et al. 1996).

There are no BIAs for the Pygmy Right Whale within Australian waters. Pygmy Right Whales are likely to be foraging in the Operational Area at similar time as Blue Whales, predominately occur between January to April.

4.2.1.4 Sei Whale

The Sei Whale (*Balaenoptera borealis*) is listed as vulnerable under the EPBC Act. Sei Whales are considered a cosmopolitan species, ranging from polar to tropical waters, but tend to be found more offshore than other species of large whales. Sei Whales move between Australian waters and Antarctic feeding areas; subantarctic feeding areas (e.g. Subtropical Front); and tropical and subtropical breeding areas. The proportion of the global population in Australian waters is unknown as there are no estimates for Sei Whales in Australian waters.

In Australia, Sei Whales occur within Australian Antarctic Territory waters and Commonwealth waters, and have been infrequently recorded off Tasmania, NSW, Queensland, the Great Australian Bight, Northern Territory and Western Australia (Parker 1978, Bannister et al. 1996, Thiele et al. 2000, Chatto and Warneke 2000, Bannister 2008).

Sightings of Sei Whales within Australian waters includes areas such as the Bonney coast upwelling off South Australia (Miller et al. 2012), where opportunistic feeding has been observed between November and May (Gill et al. 2015).

There are no BIAs for the Sei Whale within Australian waters. Sei Whales are likely to be foraging in the Operational Area at similar time as Blue Whales, predominately occur between January to April.

4.2.1.5 Southern Right Whale

The Southern Right Whale (*Eubalaena australis*) is listed as endangered under the EPBC Act. Southern Right Whales were depleted to less than 300 individuals globally due to commercial whaling in the 19th and 20th centuries (Tormosov et al. 1998). They were protected from whaling in 1935 however, due to illegal whaling in the 1970s and because Southern Right Whales have a slow rate of increase (7% per annum) compared to other marine mammals, their numbers remain low (IWC 2013). Global abundance estimates are 13,000 for the species, across key wintering grounds in South Africa, Argentina, Australia and New Zealand.

Southern Right Whales are distributed in the Southern Hemisphere with a circumpolar distribution between latitudes of 16°S and at least 65°S. They migrate from southern feeding grounds in sub-Antarctic waters to Australia in between May and November to calve, mate and rest (Bannister et al. 1996, DCCEEW 2024). They are distributed across thirteen primary aggregation areas along the southern coast of Australia. In Australian coastal waters, they occur along the southern coastline of the mainland and Tasmania and generally extend as far north as Sydney on the east coast and Perth on the west coast (CoA 2012). There are occasional sightings further north, with the extremities of their range recorded at Hervey Bay and Exmouth (CoA 2012).

The largest established calving areas in Australia include Head of Bight in SA, and Doubtful Island Bay and Israelite Bay in WA. Smaller but established aggregation areas regularly occupied by Southern Right Whales include Yokinup Bay in WA, Fowlers Bay in SA and the Warrnambool and Portland in Victoria. Emerging aggregation areas include Flinders Bay, Hassell Beach, Cheyne/Wray Bays, and Twilight Cove in WA, and sporadically occupied areas include Encounter Bay in SA (CoA 2012). Southern Right Whales generally occupy shallow sheltered bays within 2 km of shore and within water depths of less than 20 m (Charlton et al. 2017).

The Operational Area overlaps the Southern Right Whale Migration BIA where the whales are present between April and October (AMSIS 2025, formerly National Conservation Values Atlas (NCVA)) (Appendix B12 MAP-REG-EPM-069).

4.3 People and Communities

4.3.1 Social and Economic Features

During consultation, as presented in Annex 2, objections and claims were raised regarding concerns of impacts on the local fauna, which may impact tourism and local enjoyment of the area, including whale and their habitat.

4.3.2 Cultural Features

During consultation, the cultural significance of marine mammals, such as the Southern Right Whale, Blue Whale, Killer Whale, seals, sea lions and dolphins were highlighted, with connections to songlines, totemic value and kinship, and cultural practices (Appendix F3, Section 3.16.1).

5 Relevant Legislative and Other Requirements

CGG has considered all the relevant legislative requirements, which apply to collisions with marine fauna (see Appendix B2). Measures that will be adopted to demonstrate how these requirements will be met are as follows:

- The procedures in the Fauna Management Plan details how the requirements of EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with Cetaceans and EPBC Act Policy Statement 2.1 will be met. These measures include:
  - A 300 m caution zone for whales.
  - A 150 m caution zone for dolphins (except for those bow riding).
  - A 150 m caution zone will also be applied to pinnipeds, as it is feasible that they can be detected by MFOs at 150 m.
  - A 150 m caution zone will also be applied to turtles as it is feasible that they can be detected by MFOs at 150 m.
- Whale and vessel strike incidents will be reported in the National Ship Strike Database Reporting as detailed in Appendix B3 Implementation Strategy.

6 Defining Acceptable Levels of Risk

Category	Defined Acceptable Level (General)	Defined Acceptable Level (Aspect Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	Prevent collisions with marine fauna. Prevent entrapment of turtles. Prevent collisions with Blue Whales.	Under the EPBC Act it is an offence to intentionally kill or harm a listed species. Prevention of collisions will satisfy this criterion.
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	For species and sensitivities with social, cultural and/or economic values, if the potential ecological impact or risk is deemed acceptable, it

Category	Defined Acceptable Level (General)	Defined Acceptable Level (Aspect Specific)	Rationale
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	is likely that the corresponding impact on social, cultural and/or economic values will also be considered acceptable, as the physical presence and health of these species are key for maintaining their social, economic and cultural roles. Predicted levels of impact for species that have social, cultural and economic values will be assessed on a receptor level.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons. The views of public have been considered in the impact and risk assessment.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Risks Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of risk could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of marine fauna collisions, elimination involves removing or reducing the factors that could lead to vessel strikes. One main option was considered and subsequently adopted:

The seismic vessel will operate at no more than 6 knots speed over ground during acquisition

Eliminating higher vessel speeds is intended to significantly reduce the risk of collisions with marine fauna. By operating at slower speeds, this approach ensures safer and more environmentally friendly operations. This measure has been accepted by CGG as a key component of the activity design to prevent potential harm to vulnerable species.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the risk. One main option was considered and subsequently adopted:

If the survey occurs in September, October, November, or December, the acquisition lines will be acquired working from the deepest lines first

This option is likely to minimise the disturbance to sensitive ecosystems, particularly during breeding or migration periods of marine species. By starting with the deepest lines, the risk of disturbing more sensitive coastal or shallow areas is reduced, such as the Southern Right Whale when in its coastal reproduction BIA. Similarly, acquiring the deepest lines first means the survey will be closer to the coast at the time the survey would overlap with the early arrival of Blue Whales.

9 Predicted Levels of Risks

Though vessel collisions with marine fauna occur within Australia they have not been reported during seismic surveys. The extent of the area where the risk of a vessel collision with marine fauna may occur is within the Operational Area and the risk could occur while the activity is underway. The worst potential outcome from vessel collision would be mortality or serious injury of an individual.

9.1 Change in Physical Condition

9.1.1 Turtles

No habitat critical to the survival of marine turtles or biologically important areas have been identified within the Operational Area, from the Recovery Plan for Marine Turtles in Australia (DoEE 2017) or PMST Report (Appendix B5). Thus, it is likely that the three marine turtle species identified in the PMST Report (Green, Leatherback and Loggerhead) may be present in low numbers within the Operational Area.

The Recovery Plan for Marine Turtles in Australia (DoEE 2017) details that impact from vessels can cause serious injury and/or death to individual marine turtles and is particularly an issue in shallow coastal foraging habitats and inter-nesting areas where there are high numbers of recreational and commercial craft, and in areas of marine development. Although the outcome can be fatal for individual turtles, boat strike (as a standalone threat) has not been shown to cause stock level declines.

The National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (CoA 2017c) found speed to be a critical factor in determining a flee response in marine turtles being approached by vessels. The proportion of flee responses decreased significantly with increasing speed, particularly with close encounters. While speed is a particularly important factor, so too is the movement patterns of the vessel for example, whether a vessel is transiting a dedicated route or is a recreational boat that is moving erratically.

The predicted level of consequence to marine turtles from a vessel collision is assessed as major (injury or death of individuals of a protected species) with a likelihood of rare (almost impossible / unheard of in the industry) with a predicted level of risk of medium, based on:

- Though vessel collisions with marine fauna occur within Australia they have not been reported during seismic surveys.
- There is no habitat critical to the survival of marine turtles or BIAs within Operational Area.
- There are no shallow coastal marine turtle foraging habitats or inter-nesting areas within the Operational Area.
- The seismic and support vessels will operate at a speed of no more than 6 knots during acquisition (Activity Limitation).
- The seismic survey is undertaken by following a set racetrack pattern (see the Description of Activity in Appendix A2) and not moving erratically.
- Marine fauna observers will be on the seismic vessel watching for fauna (Fauna Management System).
- If an incident occurred, it would be restricted to individual marine turtles and will not affect turtle species at a population level

9.1.2 Cetaceans

Twenty-three whale/dolphin species (or species habitat) may occur within the Operational Area. Foraging behaviours were identified for the Blue, Fin, Pygmy Right and Sei Whale and breeding for the Southern Right Whale. The Operational Area overlaps Southern Right Whale migration BIA and

the Pygmy Blue Whale foraging (annual high use area) BIA. Other whale/dolphin species identified are transient within the Operational Area.

The Conservation Management Plan for the Blue Whale (DoE 2015c) details that collisions will impede recovery of blue whale populations if enough individuals in the population lose reproductive fitness or are killed. Although all forms of vessels can collide with whales, severe or lethal injuries are more likely to occur by larger or faster vessels. Blue Whales in the Bonney Upwelling region regularly feed at the surface on krill aggregations and are likely to be more vulnerable to ship strike.

The Conservation Management Plan for the Blue Whale (DoE 2015c) assesses the threat of vessel collision to Antarctic and Pygmy Blue Whales as having a moderate consequence (population recovery stalls or reduces) with a possible likelihood (might occur at some time) giving an overall rating of high. Relevant actions from the recovery plan are ensure the risk of vessel strikes on blue whales is considered when assessing actions that increase vessel traffic in areas where blue whales occur and, if required, appropriate mitigation measures are implemented.

The National Recovery Plan for the Southern Right Whale (DCCEEW 2024) details that in Australia, Southern Right Whales are the second most common species involved in Australian vessel strikes, which is consistent with worldwide data. At present, there have been ten vessel strike reports of Southern Right Whales in Australian waters between 1997 and 2015, with at least four mortalities including mother-calf pairs in the region of the eastern population.

The Conservation Management Plan for the Southern Right Whale (DCCEEW 2022) assesses the threat of vessel collision as having a major consequence (population declines) with an almost certain likelihood (expected to occur every year) giving an overall rating of very high. Relevant actions from the recovery plan are ensure environmental impact assessments and associated plans consider and quantify the risk of vessel strike and associated potential cumulative risks in BIAs.

The National Recovery Plan for the Southern Right Whale (DCCEEW 2024) details that proven effective mitigation measures for addressing vessel strike are to reduce co-occurrence of vessels with whales through separation of vessels from areas with high concentrations of whales and to reduce vessel speeds. Mitigation actions to prevent injury and minimise disturbance from vessels to Southern Right Whales include seasonal or temporary area restrictions/exclusions and speed restrictions in biologically important areas and habitat critical for survival.

The Conservation Advice for the Sei Whale (TSSC 2015c) and Fin Whale (TSSC 2015b) lists vessel strike as a threat with a minor consequence rating.

The National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (CoA 2017c) details that speed is a concern when considering collision risk and the outcome. Vanderlaan and Taggart (2007) observed that an escalation in speed of the vessel caused an increase in the severity of injury to large cetaceans. Slower moving vessels provide greater opportunity for both fauna and vessel to avoid collision.

Large, high-speed vessels have become a major concern as they can travel at speeds of up to 35 to 40 knots, which correlates to an increase in collisions (Weinrich 2004, Ritter 2010). According to Laist et al. (2001), 89 per cent of incidences where the whale was severely hurt or killed occurred at vessel travelling speeds greater than 14 knots and were most serious in large vessels (> 80 m). Furthermore, the chance of an injury being lethal increases significantly as vessel speed increases up to 13-15 knots (Vanderlaan and Taggart 2007).

The predicted level of consequence to cetaceans from a vessel collision is assessed as major (injury or death of individuals of a protected species) with a likelihood of rare (almost impossible / unheard of in the industry) with a predicted level of risk of medium, based on:

- Though vessel collisions with marine fauna occur within Australia they have not been reported during seismic surveys.
- The seismic and support vessels will operate at low speed of no more than 6 knots during acquisition (Activity Limitation).

- Separation distances will be applied to cetaceans as per the EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with cetaceans (Fauna Management System)
- Marine fauna observers will be on the seismic vessel watching for fauna (Fauna Management System).
- If an incident occurred, it would be restricted to individual whales or dolphins and will not affect the species at a population level.

9.2 Measures Adopted to Manage Environmental Risks

The following measures have been adopted to ensure that the risks associated with potential collisions with marine fauna from the survey and support vessels will be of an acceptable level.

These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

Table D2-2 - Measures adopted to manage collisions with marine fauna.

Measure	Measure Type	Details and Justification
Streamer Design Modification or Turtle Guards	Item of Equipment	Streamer tail buoys will be of a design that does not represent an entrapment risk to turtles or in the case of older models then turtle guards will be used.
Fauna Management Plan	Resource	The Fauna Management System (Appendix G2) provides details about how the Regia MSS will be carried out in a way the environmental impacts from collisions to marine fauna will be compliant with EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with Cetaceans. The requirements of the EPBC Regulations set out measures to reduce vessel speed to decrease probability of contact with approaching cetaceans.
Operational Procedures	Procedure	Implementation of EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with Cetaceans to reduce the risk of collision with marine fauna during the activity. This procedure always applies to all vessels.

10 Demonstration Risks Will Be of An Acceptable Level

10.1 Discussion on Principles of ESD

Temporary, Reversible, Small Scale and Natural variation

The petroleum activity incorporates measures such as real-time monitoring, vessel strike avoidance protocols, and mitigation strategies to prevent collisions with marine fauna, including turtles and Blue Whales. These strategies ensure that any risk of collision is minimized and that any potential impacts are temporary, reversible, and small-scale in nature. This approach is aligned with the principles of Ecologically Sustainable Development (ESD), where the environmental damage is minimal, and any harm caused is temporary and recoverable.

Based on sufficient information

The risk assessment is based on comprehensive data, including scientific literature, species distribution information, and relevant management plans under the EPBC Act. The use of real-time monitoring and avoidance protocols ensures that risks to marine fauna are well understood and effectively managed. The precautionary principle is applied in cases where uncertainty exists regarding the potential risks, further ensuring that impacts on marine fauna are minimised.

Activity not inconsistent with EPBC Act

The environmental management strategies for the activity align with the management plans and recovery plans outlined in the EPBC Act. By adhering to these guidelines and incorporating species-specific mitigation strategies, the activity ensures that it is consistent with the EPBC Act's requirements for protecting marine fauna, particularly for vulnerable species such as turtles and Blue Whales.

10.2 Biological and Ecological Categories

The risk of collisions with marine fauna, including turtles and Blue Whales, is mitigated by implementing vessel strike avoidance protocols, real-time monitoring, and other industry-standard measures. These efforts ensure that any biological impacts are temporary, reversible, and of low intensity. The activity is not expected to result in significant harm to population levels, and marine fauna are expected to continue functioning in their ecosystems without disruption. The measures in place also reduce the risk of any lasting ecological damage, ensuring that the health, diversity, and functioning of the ecosystem remain intact.

10.3 Discussion on Economic, Cultural and Social Categories

Collisions with marine fauna could impact industries such as fishing, tourism, and marine-based recreation, especially those that rely on the presence of species like turtles and Blue Whales. However, the preventive measures in place, including vessel strike avoidance and mitigation protocols, ensure that these industries are protected from significant operational or financial consequences. Additionally, the activity poses no long-term disruption to cultural practices or communities that rely on marine fauna. The activity maintains the viability of social, cultural, and economic activities by minimizing potential harm to species with social, economic, or cultural value.

10.4 Discussion on Consistency with Company Processes

CGG's approach to managing the risks of collisions with marine fauna is consistent with its internal environmental risk framework. The company's global operational history, particularly in managing seismic sound effects on the marine environment, supports the reliability of its risk management

processes. The use of CGG's impact and risk matrix ensures that environmental impacts are conservatively assessed, and mitigation measures are implemented effectively to avoid unacceptable outcomes. The company's established processes have consistently resulted in successful environmental outcomes, demonstrating the effectiveness and reliability of its approach to managing risks associated with marine fauna collisions.

This risk assessment has demonstrated that collision between marine fauna and the survey vessels has a:

- **Predicted level of consequence of major (4).**
- **Likelihood of occurrence as rare (1).**
- **Predicted level of risk of medium (5).**

11 Environmental Performance Outcomes

Defined Acceptable Level (From Section 6)	Environmental Performance Outcome	Rationale
Prevent collisions with marine fauna.	No death or injury to fauna, including listed threatened or migratory species, from the activity.	The implementation of vessel speed restrictions, real-time marine fauna observations, and avoidance protocols ensures the activity does not result in collisions, entrapment, or injury to marine species, including listed threatened or migratory fauna such as turtles and Blue Whales.
Prevent entrapment of turtles.		
Prevent collisions with Blue Whales.		
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	Social, cultural, and economic features are protected, sustaining their value for people and communities.	The prevention of harmful interactions with marine fauna ensures that the ecological balance and species populations remain stable, which in turn supports the continuity of marine-based industries, community practices, and cultural relationships tied to the marine environment.
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		

12 Recommendations

The predicted level of risk is medium and below pre-defined acceptable levels. The mitigation and management measures in place provide a reliable prevention mechanism to ensure confidence in the predicted likelihood levels, thus there are no further recommendations.

13 Document Control

Date	Revision	Update
6 July 2023	A	Draft prepared for initial comment
23 August 2023	B	Update based on comments and relevant person feedback
11 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
14 May 2024	2	Updated following public comment, update to PMST searches, and updated literature.
21 October 2024	3	Updated following NOPSEMA assessment
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
5 December	5	Updated following NOPSEMA OMR 2 Letter

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table D2-3 shows how this feedback has been incorporated into the environmental assessments.

Table D2-3 - Public comment input

Matter	Matter ID	Changes made arising from public comment
Matter: Flawed argument regarding animals moving away	I04	CGG has considered these claims and has updated the EP Appendices E2 -E7, F1 and F3 to clarify that, while some displacement is expected from mobile taxa during the Regia MSS, the survey will not preclude animals from the Operational Area in its entirety. Instead, animals are expected to temporarily move away from the active acoustic source, but once the source passes, animals will be free to move back into the habitat that they departed from.
Matter: Effectiveness of mitigation measures	E08	EP Appendices D2 and E5 have been updated to include existing mitigation and management measures that will reduce the likelihood of injury associated with vessel collision and underwater sound including implementing the EPBC Act Policy Statement 2.1 - Interaction between offshore seismic activities and whales (Soft-start Procedure), which provides for marine turtles to move away from the activity before the airguns reach full power.
Matter: Geographic range and all species need to be defined and considered	I16	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table D2-4. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table D2-4 – Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825
4128	Lack of adequate monitoring of species present or likely to be impacted.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions regarding species that may be affected by the Regia MSS. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	3237

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4166	Risk to the marine environment with the plan.	Titleholder has conducted a series of thorough risk assessments including the following aspects: Accidental release of waste (D1), Fauna Interactions (D2), Invasive Marine Species (D3) and Accidental release of fuel (D4), wherein which relevant receptors have been assessed.	2677
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4186	Stakeholder expressed concern about the destruction and	Petroleum activities do not operate to a no-impact standard. Instead, the Regia	2963

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	depletion of the ocean due to the activity.	MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and	1659

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work	1665

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4253	The possible effects to marine life and ecosystems are my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publicly responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4315	The statement suggests that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4338	Concerned that whales in the southwest will no longer return to birth and nurture calves	Titleholder responded to the stakeholder, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1255
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	"A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments is covered below in response to concern 6."	2886
4487	Claims that CGG's proposed activities are inconsistent with the Recovery Plans made under the EPBC Act, the Southern Right Whale Recovery Plan and the Blue Whale Recovery Plan. GMTOAC states that these activities pose known physical and behavioural risks to the Eastern Population of Southern Right Whales and to Pygmy Blue Whales. These risks include impacts from anthropogenic underwater noise, particularly seismic noise, vessel strikes, climate-driven changes in prey availability, and the cumulative effects of these pressures, all of which have the potential to injure or kill individuals and affect populations. GMTOAC notes that under the EPBC Act Program and NOPSEMA's decision-making guidelines, an Environment Plan cannot be accepted if it is inconsistent with a recovery plan. It emphasises that both Recovery Plans contain "Very High" importance actions requiring that Blue Whales and Southern Right Whales must be able to continue	CGG maintains that its approach aligns with statutory obligations and industry best practice. It asserts that all regulatory requirements under Regulation 34 have been met, and that its environmental performance outcomes and control measures are grounded in the best available science and tailored to the ecological and cultural sensitivities revealed through consultation. The Regia MSS Environment Plan (EP) was designed to ensure impacts and risks are reduced to As Low As Reasonably Practicable (ALARP) and to an acceptable level. Regarding whale protection, CGG highlights that the EP includes specific mitigation measures for culturally and ecologically significant marine fauna, including species noted in relevant Recovery Plans. Early correspondence in February 2023 identified Southern Right Whales and Pygmy Blue Whales as key sensitivities, and the EP commits to spatial and temporal avoidance measures, sound-source shutdowns, and exclusion zones to protect them. These measures explicitly consider cultural significance, such as timing restrictions to avoid the Karntubul (Southern Right Whale) birthing period.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	using their Biologically Important Areas (BIAs) without auditory impairment, injury, or displacement. The plans also call for preventing disruption and displacement of Karntubul (Southern Right Whales) from BIAs due to anthropogenic noise such as seismic surveys.	The whales, Karntubul and Wuuloc, are identified in the EP as sensitive receptors with dedicated protective measures. CGG confirms that these cultural and ecological sensitivities were incorporated into the environmental assessment. The EP acknowledges the sacred cultural status of Koontapool (Southern Right Whale) and Wuuloc (Pygmy Blue Whale) for the Gunditjmara people and includes them in impact and cumulative risk assessments. Appendix F3 references the Nyamat Mirring Plan 2023–2033 and recognises Gunditjmara spiritual connections, including to Karntubul. CGG substantively addresses the relevant issues, including underwater noise, vessel interactions, and cumulative effects. The EP sets out noise-management frameworks, timing restrictions, and cumulative impact analyses consistent with the concerns raised.	
4491	Claims about the SRW and BW BIAs. States proposed activity will cause unacceptable impacts to all Karntubul species, including temporary & permanent hearing loss, displacement from BIAs, vessel strike, prey depletion during peak feeding/migration period, calving interruption, and impact to ecosystems and cultural landscapes as a result of the cumulative impact of these.	CGG has identified all Biologically Important Areas (BIAs) relevant to blue whales (BWs) and southern right whales (SRWs) and incorporated seasonal BIA use into the survey design through substantial temporal and spatial restrictions detailed in the EP. Predicted underwater-sound impacts on these Karntubul species, along with mitigation measures presented in Appendices E7 and F3, demonstrate impacts will remain acceptable and will avoid auditory impairment or displacement from BIAs or Habitats Critical to Survival (HCTS). CGG further notes that vessel-strike risk is already extremely low during seismic surveys and that additional controls in Appendix D2 ensure this risk is prevented and acceptable. It concludes that no changes to ecosystem structure, diversity, or function are expected from the one-off survey, with sound exposure too limited in extent and duration to affect prey, food webs, or predator–prey relationships. A cumulative impact assessment found residual cumulative effects to be low, reduced to ALARP, and acceptable, with no impacts predicted for regional marine parks. CGG also asserts consistency with the National Recovery Plan for Southern Right Whales and the Blue Whale Conservation Management Plan, stating that their objectives and recommended measures have been incorporated. Finally, CGG maintains that all marine mammal species likely to occur in the region have been adequately assessed	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		using up-to-date EPBC Protected Matters data, and that mitigation measures ensure impacts to all listed species will remain acceptable and not inconsistent with EPBC Act protection provisions.	
4492	Claims that the eastern population of the Southern Right Whale, estimated at only 200–300 individuals, is at particularly high risk because its migration and reproduction Biologically Important Areas (BIAs) overlap directly with CGG's Operational Area and sound propagation footprint. According to the Southern Right Whale Recovery Plan, these whales use the affected region for reproduction between May and September and for migration between April and October. The Recovery Plan also notes that Southern Right Whales do not feed in coastal waters but are expected to feed, and possibly conceive, within the Australian Whale Sanctuary—an area entirely overlapped by the proposed Regia MSS activity. As a result, the seismic survey could occur within, or affect, conceiving, calving, and feeding grounds for this critically endangered sub-population. The species is particularly vulnerable to human impacts due to its low reproductive rate, long lifespan, and strong site fidelity to key habitats. The submission therefore emphasises the relevance of underwater noise, habitat degradation, and vessel-strike risks in the context of the proposed seismic activities.	The Recovery Plan explains that BIAs can be designated for key behaviours such as reproduction, foraging, migration, and resting. While Southern Right Whale BIAs in the Plan cover reproduction and migration, the Plan notes that foraging occurs across a much broader offshore latitudinal range (30°S–65°S) and is not linked to these BIAs. Because the Regia MSS is not located in Antarctic waters, it will not affect cetaceans that forage there. CGG states the survey will avoid peak SRW abundance in the mapped BIA and apply mitigation measures to ensure no SRWs are harmed, injured, or interfered with.	EVT352
4493	Claims that CGG's proposed seismic activities contribute both directly and indirectly to broader threats faced by Southern Right Whales, including industrialisation of the marine environment, climate change, and pollution or contamination from vessel discharges.	Broader threats such as climate change and industrialisation fall outside the scope of the Environment Plan, as outlined in the response to Statements 156–166. The EP assesses only the environmental risks directly associated with the proposed activity. These risks are evaluated in the D Appendices, which demonstrate that any residual risks have been reduced to an acceptable level.	EVT352
4495	GMTOAC claims CGG's assertion that vessel strikes are "rare" or "almost impossible," noting that the absence of recorded collisions involving seismic vessels does not demonstrate that such events have not occurred. They highlight that smaller support vessels, also part of CGG's activity, are far less	CGG disagrees that they have underestimated vessel-strike risk; the survey incorporates the highest practicable controls, including limiting vessel speed to 5 knots, commencing acquisition on deep lines during sensitive months, adhering to EPBC separation distances, and using both trained observers and autonomous PAM	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	represented in AIS datasets, meaning collisions involving them are likely underreported. Citing recent research, GMTOAC notes that small vessels were responsible for 67% of humpback whale strikes in Moreton Bay and that the waters around Portland, where CGG intends to operate, have been identified by government agencies as a particular vessel-strike risk area for the critically endangered eastern population of Southern Right Whales. GMTOAC requests clarification on how CGG concluded that vessel-strike likelihood is minimal, arguing that for species with very low population numbers, such as the eastern Southern Right Whale, even a single mortality could have severe population-level consequences. They further argue that CGG has underestimated vessel-strike risk by excluding transiting vessels, used for mobilisation, demobilisation, port calls, crew changes, and maintenance, from its assessment. GMTOAC maintains that these vessel movements are an inherent part of the proposed activity and should have been assessed for their potential environmental impacts.	technologies proven to reduce strike risk. CGG maintains that these combined measures minimise spatial and temporal overlap with sensitive whale habitats and greatly improve detection capacity, resulting in a vessel-strike likelihood rated as rare. The company emphasises that its conclusion is based on operational design, low vessel speeds, continuous real-time monitoring, and mandatory separation measures, not merely on AIS data or a lack of past seismic-related strikes. CGG concludes that the overall suite of controls reduces vessel-strike risk to ALARP and provides a defensible basis for determining that the likelihood of a strike is minimal.	
4496	GMTOAC objects to CGG removing a previous control measure limiting seismic discharge in the Pygmy Blue Whale foraging BIA during periods of low whale presence, replacing it with a vague condition requiring CGG to determine whether whale presence is “compatible” with proceeding. GMTOAC argues this new measure lacks detail on how whale presence or “unacceptable disturbance” will be assessed, and that it fails to reference Recovery Plans which define unacceptable impacts. GMTOAC warns that the proposed survey timing (April–June 2026) coincides with peak Pygmy Blue Whale foraging season and Southern Right Whale migration and calving periods, meaning the seismic survey is likely to occur when both species are using their BIAs. Preventing whales from accessing these areas, or exposing them to injury while they remain, would constitute unacceptable impacts inconsistent with Recovery Plan objectives.	CGG has further reduced the likelihood of interactions with marine mammals by excluding the April–June period and commencing the survey only after 15 September. Because blue whales typically do not arrive from Western Australia until November, CGG argues that most of the survey will occur when blue whales are absent from the area. It adds that sighting data show very few blue whales in November and December, with peak abundance occurring later, from January to March during the Bonney Upwelling.	EVT352

Annex 3

EPBC Act Listed Species within the Operational Area Relevant to Collison

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Turtles							
Green Turtle	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017)
Leatherback Turtle, Leathery Turtle	Species or species habitat likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017) Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle*)* (DEWHA 2008)
Loggerhead Turtle	Species or species habitat likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017)
Dolphins							
Bottlenose Dolphin	Species or species habitat may occur within area					None identified	None identified
Common Dolphin, Short-beaked Common Dolphin	Species or species habitat may occur within area					None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Dusky Dolphin	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin	Species or species habitat likely to occur within area					None identified	None identified
Risso's Dolphin, Grampus	Species or species habitat may occur within area					None identified	None identified
Southern Right Whale Dolphin	Species or species habitat may occur within area					None identified	None identified
Whales							
Andrew's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Antarctic Minke Whale, Dark-shoulder Minke Whale	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Arnoux's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Blainville's Beaked Whale, Dense-beaked Whale	Species or species habitat may occur within area					None identified	None identified
Blue Whale	Foraging, feeding or related behaviour known to occur within area	Endangered	Migratory	Migratory Marine Species		Foraging (annual high use area)	Conservation Management Plan for the Blue Whale (DoE 2015c)
Cuvier's Beaked Whale, Goose-beaked Whale	Species or species habitat may occur within area					None identified	None identified
Dwarf Sperm Whale	Species or species habitat may occur within area					None identified	None identified
False Killer Whale	Species or species habitat likely to occur within area					None identified	None identified
Fin Whale	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		None identified	Conservation Advice *Balaenoptera physalus* Fin Whale (TSSC 2015b)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Gray's Beaked Whale, Scamperdown Whale	Species or species habitat may occur within area					None identified	None identified
Hector's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Humpback Whale	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	Listing Advice *Megaptera novaeangliae* Humpback Whale (DAWE 2022a)
Killer Whale, Orca	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Long-finned Pilot Whale	Species or species habitat may occur within area					None identified	None identified
Minke Whale	Species or species habitat may occur within area					None identified	None identified
Pygmy Right Whale	Foraging, feeding or related behaviour likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Pygmy Sperm Whale	Species or species habitat may occur within area					None identified	None identified
Sei Whale	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		None identified	Conservation Advice *Balaenoptera borealis* sei whale (TSSC 2015c)
Short-finned Pilot Whale	Species or species habitat may occur within area					None identified	None identified
Southern Right Whale	Breeding known to occur within area	Endangered	Migratory (as Balaena glacialis australis)	Migratory Marine Species		Migration	Conservation Management Plan for the Southern Right Whale (CoA 2012) National Recovery Plan for the Southern Right Whale (DCCEEW 2024)
Sperm Whale	Species or species habitat may occur within area		Migratory	Migratory Marine Species		None identified	None identified
Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale	Species or species habitat may occur within area					None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
True's Beaked Whale	Species or species habitat may occur within area					None identified	None identified

REGIA
Marine Seismic Survey

Risk Assessment
Introduction of Marine Pest Species

Appendix D3: REG-EP-018-D3

Rev 5

December 2025

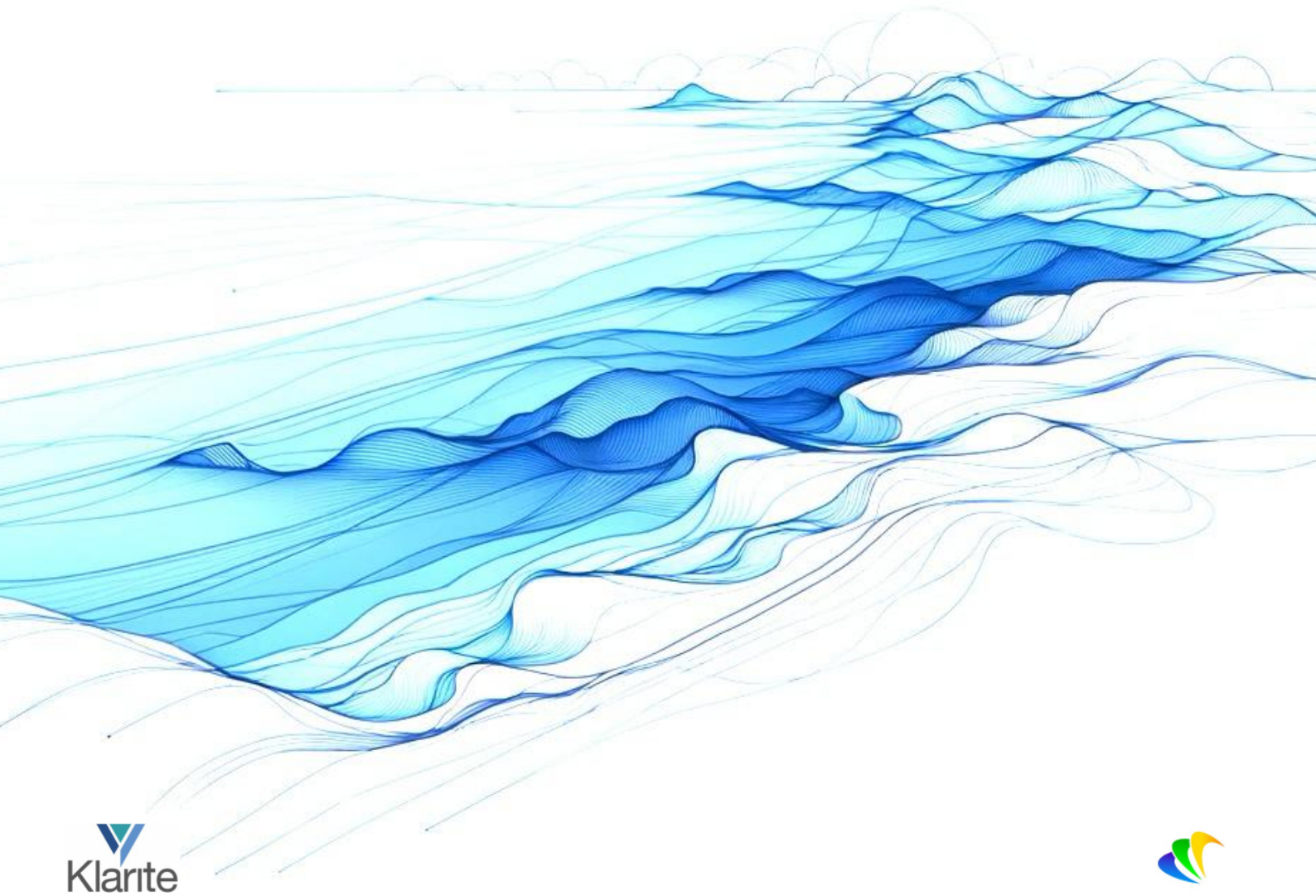

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Table of Contents

1 Introduction 4
1.1 Purpose and Scope 4
1.2 Consultation in Preparation of the EP 4
2 Aspect – Introduction of Marine Pest Species 5
2.1 How the Aspect Occurs 5
2.2 Extent and Duration of the Aspect 5
3 Cause-Effect Pathway 6
4 Description of the Existing Environment that May be Affected by the Activity 7
4.1 Marine Pests 7
4.2 Benthic Assemblages 8
4.3 Invertebrates 9
4.4 West Tasmanian Canyons Key Ecological Feature 9
4.5 Commercial and Recreational Fishing and Aquaculture 10
4.6 Diving 10
4.7 People and Communities 10
4.7.1 Social and Economic Features 10
4.7.2 Cultural Features 11
5 Relevant Legislative and Other Requirements 12
6 Defining Acceptable Levels of Risk 13
7 Consultation Input 15
8 Minimisation of Risks Through Activity Design 16
8.1 Elimination 16
8.2 Substitution 16
9 Predicted Levels of Risk 17
9.1 Change in ecosystem dynamics and social and cultural value 17
9.2 Changes to the functions, interests, or activities of other users 17
9.3 Measures Adopted to Manage Environmental Impact 18
10 Demonstration Risks Will Be of An Acceptable Level 20
10.1 Discussion on Principles of ESD 20
10.2 Biological and Ecological Categories 20
10.3 Discussion on Economic, Cultural and Social Categories 20
10.4 Discussion on Consistency with Company Processes 20
11 Environmental Performance Outcomes 22
12 Recommendations 23

13 Document Control **24**

14 References **25**

Annex 1 **26**

Public Comment 26

Annex 2 **27**

Objections and Claims Raised from Consultation 27

1 Introduction

The introduction of invasive marine species was identified through the Preliminary Environmental Impact and Risk Assessment (**PEIRA**) (Appendix B4) as an aspect needing further assessment. Hence, this document presents a detailed examination of **Invasive Marine Species** as a risk pathway between the Regia Marine Seismic Survey (**Regia MSS**) and the existing environment that may be affected by that aspect.

1.1 Purpose and Scope

The purpose of this document is to assess all acceptable sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document was first published in draft form to the Document Library of the Regia MSS Consultation Hub on 11 September 2023. This was done to acknowledge that the final full Environment Plan (EP) can be a large document that is difficult for readers to digest in the 30-day public comment period. As such, the public and relevant persons were invited to comment on the document with an explicit request for readers to provide feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

2 Aspect – Introduction of Marine Pest Species

2.1 How the Aspect Occurs

The introduction of marine pests could occur from vessels used for the Regia MSS because of:

- Discharge of ballast water containing foreign species.
- Translocation of species through biofouling of the vessel hull and/or niches (e.g., sea chests, bilges, and strainers) or in-water equipment (e.g., source array and streamers).

2.2 Extent and Duration of the Aspect

Duration: 90 days

Extent: Operational Area

The extent of the area where the risk of an introduction of marine pest species may occur is within the Operational Area and the risk could occur while the activity is undertaken.

3 Cause-Effect Pathway

The PEIRA (Appendix B4) identified a cause-effect pathway for marine pests for the following environmental components and their social, cultural, and economic features:

- Benthic assemblages.
- Invertebrates.
- Commercial Fishing and Aquaculture.
- Diving.
- Recreational fishing.
- People and communities.

No cause-effect pathway for marine pests and marine protected areas such as Australian and Victorian marine parks was identified as the closest Australian Marine Park (Apollo) is ~36 km from the Operational Areas (Appendix B12 MAP-REG-EPM-078). The Victorian Twelve Apostles Marine National Park was identified to abut the previous Activity Planning Area and to reduce the risk of IMS translocation into the park a 5 km buffer was put in place for the final Operational Area making the distance to the park from the Operational Area ~ 6 km (Appendix B12 MAP-REG-EPM-079).

Marine pests may become established where conditions are suitable, and these species may have impacts on local ecological and economic values. However, establishment of introduced marine species is mostly likely to occur in shallow waters in areas where large numbers of vessels are present and are stationary for an extended period.

Successful marine pest establishment requires the following three steps (Marine Pest Sectoral Committee 2018):

- Colonisation and establishment of the marine pest on a vector (e.g., vessel hull) in a donor region (e.g., home port).
- Survival of the settled marine species on the vector during the voyage from the donor to the recipient region (e.g., Operational Area).
- Colonisation (e.g., dislodgement or reproduction) of the marine species in the recipient region, followed by successful establishment of a viable new local population.

The Australian Government Bureau of Resource Sciences (BRS) established that the relative risk of a marine pest incursion around the Australian coastline decreases with distance from the shoreline. Modelling conducted by BRS (2007) estimates:

- 33% chance of colonisation at 3 nm.
- 8% chance at 12 nm.
- 2% chance at 24 nm.

If the risk of establishment of IMS is realised, the following known and potential environmental impacts may occur:

- Change in ecosystem dynamics.
- Changes to the functions, interests, or activities of other users.

Change in ecosystem dynamics may include reduction in native marine species diversity and abundance, displacement of native marine species, socio-economic impacts on commercial fisheries, and changes to conservation values of protected area.

4 Description of the Existing Environment that May be Affected by the Activity

As detailed in Section 2.2, the Operational Area has been adopted as the extent of the area wherein marine pest translocation could occur from Regia MSS vessels.

As detailed in the PMST Report for the Operational Area (Appendix B5) there are no marine protected areas within the Operational Area. The Operational Area overlaps the West Tasmanian Canyons Key Ecological Feature (KEF) and the Giant Kelp Marine Forests of Southeast Australia Threatened Ecological Community (TEC). However, giant kelp requires clear, shallow water no deeper than approximately 35 m deep (TSSC 2012) which is outside the water depths for the Regia MSS Operational Area (40 to 1,400 m) and thus it is not assessed further.

PMST searches were run again prior to resubmission to ensure any changes to species or listings were identified to control for passage of time. There are no changes to protected matters information for receptors that may be impacted by an introduction of marine pests [Section added in response to Matters: I16 and I17]

4.1 Marine Pests

In the South-east Marine Region, 115 marine pest species have been introduced and an additional 84 have been identified as possible introductions, or 'cryptogenic' species (NOO 2002). Several introduced species have become pests either by displacing native species, dominating habitats or causing algal blooms.

Marine pests in Victoria marine waters according to Parks Victoria (No date) and Agriculture Victoria (2023) are:

- Asian date mussel (*Musculista senhousia*) – prefers soft sediments in waters up to 20 m deep, forming mats and altering food availability for marine fauna. Found in Port Phillip and Western Port, including Yaringa and French Island Marine National Parks; some records from eastern Victoria, particularly the Gippsland Lakes.
- Asian shore crab (*Hemigrapsus sanguineus*) - found on hard surfaces like under rocks, shells, debris or artificial structures (marinas, moorings, etc.) in exposed rocky coasts, estuaries, tidal flats and shallow waters. Currently present in Port Phillip Bay.
- Cord grass (*Spartina anglica* and *Spartina x townsendii* sp) – found at the mouth of Bass River and in drain outlets near Tooradin in Westernport. Widespread in South Gippsland including Anderson's Inlet and Corner Inlet. Invades native saltmarsh, mangroves and mudflats, altering the mud habitat and excluding other species.
- Dead man's fingers (*Codium fragile* ssp. fragile) – widespread in Port Phillip and known to inhabit San Remo and Newhaven in Westernport. It grows rapidly to shade out native vegetation and can regenerate from a broken fragment enabling easy transfer from one area to another. Attaches to subtidal rocky reef and other hard surfaces.
- European fan worm (*Sabella spallanzanii*) - found at depths down to 30 m and is found in nutrient-rich waters in sheltered locations where there are no strong currents and little wave action. It is a filter feeder and grows on soft sediments or anchors itself to rocks, mollusc shells, jetties, pontoons or other solid surfaces. Well established in Port Phillip and some other local ports but not yet observed in Western Port or elsewhere.
- Green Shore Crab (*Carcinus maenas*) - voracious and aggressive predator with a broad diet, it out-competes native crabs for food and habitat. It is a major cause of mortality of native crabs and mollusc populations. Widespread across Victoria and common in Port Phillip and Western Port. This crab has been present in Victoria since the 1800s
- New Zealand screw shell (*Maoricolpus roseus*) – lies on or partially buried in sand, mud or gravel in waters up to 130 m deep. It can densely blanket the sea floor with live and dead shells and compete with native scallops and other shellfish for food. This species is widespread in coastal areas of Eastern Victoria, including Corner Inlet and has been found

west of Wilsons Promontory in Waratah Bay and Shallow Inlet. Its range is slowly expanding westward. Not currently known in Port Phillip or Western Port.

- Northern pacific seastar (*Asterias amurensis*) – prefer soft sediment habitat, but also use artificial structures and rocky reefs, living in water depths usually less than 25 m but up to 200 m water depths. It is thought to have been introduced in 1995 through ballast water from Japan.
- Pacific Oyster (*Crassostrea gigas*) - alter habitats by covering substrates, forming reefs and over growing native species. It is fast growing and is a filter feeder, competing with native species for food. Known pest in Western Port. Also observed in Port Phillip, Tidal River, Corner Inlet and Nooramunga Marine and Coastal Park however not considered a pest in these locations.
- Red Algae (*Grateloupia turuturu*) - large size of the plant shades out native algae on the reef. It grows rapidly in summer and dies back in winter causing large change in the availability of food for grazers such as snails. Widespread in northern Port Phillip.
- Wakame (*Undaria pinnatifida*) - grows rapidly and forms dense underwater forests, outcompeting native kelp and algae for light and space, then dies back in summer, changing kelp habitat. Well established in Port Phillip but currently not present in other Victorian locations, apart from Apollo Bay Harbour.

The National Introduced Marine Pests Information System (NIMPIS 2023) indicates that Portland, a potential port for mobilisation, harbours the following marine pests:

- Bryozoan (*Bugula neritina*) - most abundant bryozoans in ports and harbours and an important member of the fouling community. They grow well on pier piles, vessel hulls, buoys, and similar submerged surfaces.
- Bryozoan (*Cryptosula pallasiana*) - typical habitats include seagrasses, drift algae, oyster reef, artificial structures such as piers and breakwaters, man-made debris, rock, shells, ascidians, glass and vessel hulls. It has been reported from depths down to 35 m.
- Dead man's fingers (*Codium fragile* ssp. fragile) - as per Victorian waters.
- East Asian bivalve (*Theora lubrica*) - typically lives in muddy sediments from the low tide mark to 50 m, however it has been found at 100 m.
- European clam (*Varicorbula gibba* - inhabits the shallow sublittoral zone to depths of around 140 m, where it is a shallow burrower in thick muddy sand with coarse elements.
- European fan worm (*Sabella spallanzanii*) - as per Victorian waters.
- Fanworm (*Euchone limnicola*) - burrows into soft sediments, secreting a mucous layer to enable it to build firm burrow walls.
- Solitary ascidian (*Ascidiella aspersa*) - found from intertidal to shallow subtidal waters to 50 m depth attached to clay, stones, rocks, algae and wharf piles, where it can be the dominant fouling species.
- Toxic dinoflagellate (*Alexandrium tamarense*) - found in the photic zone; 1-20 m depth inshore; possibly deeper offshore.
- Toxic dinoflagellate (*Alexandrium minutum*) - found to a depth of 20 m in inshore waters but may also be found deeper offshore.
- Wakame (*Undaria pinnatifida*) – as per Victorian waters.
- White bushy bryozoan (*Amathia distans*) - Usually found in sheltered, often turbid, waters. Rocks, rock reef, oyster reef, docks, pilings, breakwaters, buoys, pontoons, man-made debris, and drift algae are all good substrates for this species.

The National Introduced Marine Pests Information System (NIMPIS 2023) indicates that other ports which may be used for the survey, Warrnambool, Apollo Bay or Port Fairy do not currently harbour any marine pests.

4.2 Benthic Assemblages

Benthic assemblages are biological communities that live in or on the seabed. They typically contain light-dependent taxa such as algae, seagrass and corals, which obtain energy primarily from

photosynthesis, and/or animals such as molluscs, sponges and worms. Benthic habitats are the seabed substrates that benthic communities grow on or in; these can range from unconsolidated sand to hard substrates (e.g., limestone) and occur either singly or in combination.

Rocky reefs and hard grounds are in all areas of the South-east Marine Region continental shelf including Bass Strait, from the sub-tidal zone shore to the continental shelf break. On the continental shelf, rocky reefs and hard grounds provide attachment sites for macroalgae and sessile invertebrates, increasing the structural diversity of shelf ecosystems. The reefs provide habitat and shelter for fish and are important for aggregations of biodiversity and enhanced productivity. The shallowest depth at which the rocky reefs occur in Commonwealth waters is approximately 50 m (CoE 2015a).

Corals do not occur as a dominant habitat type within the Environmental Planning Area. Reef development by hard corals does not occur further south than Queensland (Tzioumis and Keable, 2007). Soft corals are typically present in deeper waters throughout the continental shelf, slope and off-slope regions, to well below the limit of light penetration (BBG 2003, Boreen et al. 1993). Gorgonian corals (soft corals) were identified during seabed surveys of the Beach Otway Development area within the Environmental Planning Area (Ramboll 2020).

James et al (2013) undertook extensive surveys of macroalgal communities along the Otway Shelf from Warrnambool to Portland in south-west Victoria. Sites were adjacent to shore or on offshore rocky reefs covering a depth range of 0 to 36 meters water depth. These surveys did not locate giant kelp at any site but identified that other brown algae species (*Durvillaea, Ecklonia, Phyllospora, Cystophora*, and *Sargassum*) are prolific to around 20 m water depth. Brown algae tend to be replaced by red algae in deeper waters.

4.3 Invertebrates

Studies by the Museum of Victoria found that invertebrate diversity was high in southern Australian waters although the distribution of species was patchy, with little evidence of any distinct biogeographic regions (Wilson and Poore 1987). Results of sampling in shallower inshore sediments reported high diversity and patchy distribution (Parry et al. 1990). In these areas, crustaceans, polychaetes, and molluscs were dominant.

Throughout the region, a variety of seabed habits support a range of animal communities such as sparse sponges to extensive 'thickets" of lace corals and sponges, polychaete worms and filter feeders (DNP 2013). Echinoderms, such as sea stars, sea urchins and sea cucumbers are also an important fauna species of the southern Australian and Tasmanian waters, with several species at risk of extinction (DPIPWE 2020).

4.4 West Tasmanian Canyons Key Ecological Feature

The West Tasmanian Canyons are located on the relatively narrow and steep continental slope west of Tasmania. This location has the greatest density of canyons within Australian waters where 72 submarine canyons have incised a 500 km-long section of slope (Heap & Harris 2008).

The Operational Area overlaps a small portion of the West Tasmanian Canyons KEF (Appendix B12 MAP-REG-EPM-004).

Submarine canyons modify local circulation patterns by interrupting, accelerating, or redirecting current flows that are generally parallel with depth contours. Their size, complexity and configuration of features determine the degree to which the currents are modified and hence their significant influence on local nutrients, prey, dispersal of eggs, larvae and juveniles and benthic diversity with subsequent effects which extend up the food chain.

Eight submarine canyons surveyed in Tasmania, Australia, by Williams et al (2009) displayed depth-related patterns with regard to benthic fauna, in which the percentage occurrence of faunal coverage

visible in underwater video peaked at 200-300 m water depth, with averages of over 40% faunal coverage. Coverage was reduced to less than 10% below 400 m depth. Species present consisted of low-relief bryozoan thicket and diverse sponge communities containing rare but small species in 150 to 300 m water depth.

Sponges are concentrated near the canyon heads, with the greatest diversity between 200 m and 350 m depth. Sponges are associated with abundance of fishes and the canyons support a diversity of sponges comparable to that of seamounts. Based upon this enhanced productivity, the West Tasmanian Canyon system includes fish nurseries (blue wahoo and ocean perch), foraging seabirds (albatross and petrels), white shark and foraging blue and humpback whales (CoA 2015a).

4.5 Commercial and Recreational Fishing and Aquaculture

As detailed in the Commercial Fisheries Analysis Report (Appendix B6), the Operational Area overlaps the following fisheries that have catch effort:

- Commonwealth:
  - Southern and Eastern Scalefish and Shark (SESS) Fishery SESSF following sectors:
    - Scalefish Hook
    - Shark Gillnet sector
  - Trawl – otter board
  - Southern Squid Jig Fishery
- Victorian:
  - Giant Crab
  - Multi-species Ocean
  - Octopus
  - Southern Rock Lobster
  - Wrasse

Recreational fishing may occur within the Operational Area but there are no known popular areas.

No aquaculture sites have been identified within the Operational Area and thus it is not assessed further.

4.6 Diving

No dive sites have been identified within the Operational Area and thus it is not assessed further.

4.7 People and Communities

4.7.1 Social and Economic Features

During consultation, as presented in Annex 2, objections and claims were raised regarding concerns of impacts on the local flora and fauna, which may impact tourism and local enjoyment of the area. The commercial fisheries that overlap the Operational Area and have catch effort are described in Section 4.5.

4.7.2 Cultural Features

Kelp forests, home to giant and bull kelps, are identified as culturally significant to the Wadawurrung People as habitats and food sources for numerous animals, including rock lobster and abalone and their ability to be used to create water carriers (WTOAC, 2020) (Appendix F3, Section 3.16.1).

Several invertebrate species including torbos, pipis, abalone, limpets, mussels, elephant snails, crayfish/lobster, crabs and squid are identified as culturally significant to the Gunditjmara People as both a resource and in harvesting as a cultural practice (GMTOAC, 2023). Barnabeel (oyster), murrabal (mussel), bam bam (crayfish), abalone and pipi are also culturally important resources to the Wadawurrung People (WTOAC, 2020). Invertebrate species are an important traditional, social and economic resource for the Eastern Maar People. Abalone, cockles and crayfish are collected as tucker along the coast (EMAC, 2015) (Appendix F3, Section 3.16.1).

5 Relevant Legislative and Other Requirements

CGG has considered all the relevant legislative requirements, that apply to the risk of the introduction of invasive marine species (see Appendix B2). Measures that will be adopted to demonstrate how these requirements will be met are as follows:

- CGG Marine Assurance System which includes a vessel contractor pre-qualification assessment and OVID-Style Inspections prior to the activity starting that:
  - Checks that vessels used have met the following requirements before being deployed for the survey:
    - Biosecurity Act 2015
    - Biosecurity Regulations 2016
    - Biosecurity Amendment (Biofouling Management) Regulations 2021
    - Marine Order 98 - Marine pollution prevention - antifouling systems
    - Australian Ballast Water Management Requirements
    - Australia Biofouling Management Requirements
    - Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species (Biofouling Guidelines)
    - Marine Pest Plan 2018–2023: National Strategic Plan for Marine Pest Biosecurity
    - National Biofouling Management Guidance for the Petroleum Production and Exploration Industry 2009.
  - Check the vessel Anti-Fouling System.

6 Defining Acceptable Levels of Risk

Category	Defined Acceptable Level (General)	Defined Acceptable Level (Aspect Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	Prevent the introduction of any invasive marine pest species.	Australia is a party to the MARPOL convention and the International Convention on the Control of Harmful Anti-fouling Systems, which requires prevention of marine environmental pollution from shipping. Prevention of IMS will ensure the Regia MSS is compliant with the relevant legislation.
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	For species and sensitivities with social, cultural and/or economic values, if the potential ecological impact or risk is deemed acceptable, it is likely that the corresponding impact on social, cultural and/or economic values will also be considered acceptable, as the physical presence and health of these species
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	

Category	Defined Acceptable Level (General)	Defined Acceptable Level (Aspect Specific)	Rationale
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons. The views of public have been considered in the impact and risk assessment.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	are key for maintaining their social, economic and cultural roles. Predicted levels of impact for species that have social, cultural and economic values will be assessed on a receptor level.
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Risks Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of risk could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of invasive marine species introduction, elimination involves removing or reducing the factors that could lead to this introduction. Two main options were considered and subsequently adopted:

No vessel movements within 5 km of the Twelve Apostles State Marine Park

This measure removes the possibility of transporting biofouling organisms in proximity to a sensitive marine environment. This measure was adopted because of consultation with Marine Parks Victoria who were concerned about IMS risks. It is also protective of cultural values of the marine park and Southern Rock Lobsters which are also a key value.

Ballast water exchange activities will be conducted outside of Marine Protected Areas

By ensuring that these activities occur well outside MPAs, the potential for releasing non-native organisms into highly sensitive and ecologically valuable environments is effectively removed. This approach supports the complete avoidance of invasive species risks in the most vulnerable areas.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the risk. No substitution-based limitations were required in this case, as the elimination measures applied were sufficient (when applied with other measure types) to reduce the identified risk to an acceptable level.

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2. These limitations were evaluated to determine whether the source of risk could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

9 Predicted Levels of Risk

9.1 Change in ecosystem dynamics and social and cultural value

The introduction and subsequent establishment and spread of a marine pest may result in the reduction in native marine species diversity and abundance, displacement of native marine species, changes to conservation values of protected areas and culturally important species. The extent of the initial risk to benthic assemblages are likely to be localised (isolated locations if there is no spread) but may become widespread if establishment and spread occurs.

Receptors which may occur within the Operational Area and are at risk from marine pest introduction are:

- Benthic Assemblages (sponges, bryozoans etc.)
- West Tasmania Canyons KEF
- Invertebrates

Only a small proportion of marine pests become invasive (Wells 2018) with the risk of a marine pest being able to successfully establish itself depending on depth, distance from the coast, water movement and latitude. Survival is not expected in deep oceanic waters (>90 m depth) with establishments more likely within shallower waters (<50m), where vessels are stationary for extended periods of time.

The Regia MSS vessels will not be stationary within the Operational Area and no anchoring will take place further reducing the risk of translocating a marine pest to the seabed. All subsea survey equipment is stored on the vessel so a marine pest would not be able to survive on equipment in these exposed dry conditions. Support vessels will generally not be alongside the survey vessel for more than two hours during support operations, so a cross transfer of a marine pest is highly unlikely.

As the Operational Area at its nearest point is ~7 km from the Victorian coast, BRS (2007) estimates indicate that the chance of colonisation of a marine pest is 33%. However, as detailed in the Existing Environment Section, marine pests which are known to occur in the Bass Strait are limited to either sheltered areas or shallow waters which are not present in the exposed well mixed waters of the Operational Area where water depths range from 40 to 1,400 m.

The CGG Marine Pest Risk Assessment Process ensures contracted vessels meet ballast water and biofouling legislative requirements to prevent the introduction of marine pests.

Values for the West Tasmania Canyons KEF includes sponges that are associated with abundance of fishes and a diversity, greatest between 200 and 350 m, comparable to that of seamounts (DCCEEW 2020d). At the water depths of these values the possibility of a marine pest becoming established is negligible.

No EPBC listed invertebrate species were identified from the PMST Report for the Operational Area (Appendix B5).

The predicted level of consequence of introducing a marine pest causing a change in ecosystem dynamics, and therefore a change to social and cultural value, is assessed as major as there is the potential to alter ecosystem processes and reduce biodiversity. However, the likelihood of a marine pest being present on a Regia MSS vessel and becoming established is assessed as rare due to the implementation of ballast and biofouling management requirements and that a marine pest would be unable to colonize the benthic substrate due to the deep and well mixed waters within the Operational Area. The predicted level of risk is assessed as low.

9.2 Changes to the functions, interests, or activities of other users

The introduction of a marine pest may result in the reduction in native marine species diversity and abundance, displacement of native marine species which could result in changes to commercial fish

species diversity and abundance. The extent of the initial risk to commercial fisheries is likely to be localised if a marine pest introduction occurred and did not spread but may become more widespread if colonisation and spread occurs.

As detailed in the assessment of a change in ecosystem dynamics, the introduction of a marine pest in the Operational Area is unlikely to impact on fisheries within the region as colonisation and spread is unlikely based on the Operational Area water depth and distance from shore which BRS (2007) estimates indicate that the chance of colonisation of a marine pest is 33%. In addition, the low light levels (water depth of 40 to 1,400 m) and well mixed marine environment is not conducive to the establishment of marine pests.

The CGG Marine Assurance System ensures contracted vessels meet ballast water and biofouling legislative requirements to prevent the introduction of marine pests. Thus, it is highly unlikely that marine pests would be present on vessels.

None of the fisheries identified as being active in the Operational Area identified marine pests as a threat. Whilst Southern Rock lobster is suspectable to tail fan necrosis, caused by combination of several bacteria and fishing practices such as live holding (Musgrove et al. 2005) and both crab and lobster can be susceptible to paralytic shellfish toxin, none are related to the introduction of marine pests.

The predicted consequence of introducing a marine pest causing a change to the functions, interests or activities of commercial fisheries is assessed as major as there is the potential to alter ecosystem processes and reduce biodiversity, however, the likelihood of a marine pest being present on a Regia MSS vessel and becoming established is assessed as rare due to the implementation of ballast and biofouling management requirements and that a marine pest would be unable to colonize the benthic substrate due to the deep and well mixed waters within the Operational Area. The predicted level of risk is assessed as low.

9.3 Measures Adopted to Manage Environmental Impact

The following measures have been adopted to ensure that the risks associated with potential introduction of invasive marine species from the survey and support vessels will be of an acceptable level.

These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

Measure	Measure Type	Details and Justification
Vessel contractor pre-qualification assessment	Practice	CGG undertakes this assessment in accordance with its Marine Risk Management Standard (GM-STD-MA-003) to ensure vessel biofouling controls meet these EP requirements.
OVID-Style Inspections	Practice	Confirm that all contracted vessels conduct pre-port entry checks using the National Introduced Marine Pest Information System database and assess changes in known invasive species. Confirm that the sound source and towed streamers will be inspected and cleaned (where required) prior to deployment.
Anti-Fouling Systems	System	Anti-fouling systems are essential for maritime vessels to prevent the accumulation of marine organisms like barnacles, algae, and mussels on the hull. All contracted vessels must have anti-foulant systems that are properly maintained and in compliance with the International Convention on the Control of Harmful Anti-Fouling Systems on Ships.

Measure	Measure Type	Details and Justification
IMS Risk Assessment Procedure	Procedure	A procedure which mandates an IMS risk assessment be conducted on vessels and immersible equipment. The CGG IMS Risk Assessment Procedure aligns with national standards for IMS management. This procedure assures CGG's adherence to the International Convention for the Control and Management of Ship's Ballast Water and Sediments 2004 and the Australian Ballast Water Management Requirements. The IMS risk assessment procedure requires a qualified IMS inspector to, prior to mobilisation into the region, evaluate the vessels operational history, inspection results, and biofouling management measures to determine risk levels before mobilisation. If a vessel or facility presents a low biofouling risk, it may proceed with offshore activities, while moderate or high-risk cases may require actions such as cleaning, antifouling treatments, or operational restrictions depending on the findings to ensure all vessels used during the activity have a 'low-risk' rating. Biofouling management plans and record-keeping align with IMO Guidelines (2011), ensuring vessels maintain effective biosecurity controls, including inspections, maintenance logs, and marine growth prevention systems. Vessels moving between regions will be assessed for prior exposure to high-risk areas.

10 Demonstration Risks Will Be of An Acceptable Level

10.1 Discussion on Principles of ESD

Temporary, Reversible, Small Scale and Natural variation

The risk of introducing marine pests from the petroleum activity is assessed as rare due to the application of stringent biosecurity measures, such as vessel inspections, ballast water management, and compliance with national guidelines. Any residual risk is considered localized, and any potential impacts are expected to be temporary, reversible, and of low intensity, with minimal long-term or widespread environmental consequences. Marine pests are unlikely to establish or spread due to the proactive and robust risk mitigation measures.

Based on Sufficient Information

The risk assessment is informed by peer-reviewed literature, government marine pest databases, and relevant management plans. Expert judgment, alongside an understanding of vessel origin, operational logistics, and known marine pest distribution, supports the conclusion that the risk of pest introduction is low. The assessment incorporates all available data to ensure a conservative and scientifically grounded evaluation of potential risks.

Activity not inconsistent with EPBC Act

The activity is in full compliance with EPBC Act-listed species recovery plans, as well as biosecurity and marine pest management frameworks. The measures in place align with national ballast water management standards and broader marine biosecurity protocols, ensuring no inconsistency with the statutory obligations under the EPBC Act.

10.2 Biological and Ecological Categories

Marine pests are known to cause significant ecological consequences, such as species displacement, loss of biodiversity, and disruption of ecosystem functions. However, the likelihood of marine pest establishment is very low due to the rigorous biosecurity procedures in place. As a result, no significant biological or ecological impacts are predicted. Ecosystem function, biodiversity, and the health of marine habitats are expected to remain intact, with no adverse long-term effects on species composition or ecological processes.

10.3 Discussion on Economic, Cultural and Social Categories

Marine pests have the potential to impact commercial fisheries, aquaculture, and culturally significant marine species. However, the likelihood of pest establishment is minimal, and the application of preventive measures such as biosecurity protocols ensures that the economic, cultural, and social fabric tied to these species remains protected. No long-term disruption to economic activities, including fishing industries or recreational use, is expected. The continuation of traditional and culturally important practices, such as fishing for specific species, will not be hindered. Communities will maintain ongoing access to marine resources and heritage values without experiencing significant or irreversible disruption.

10.4 Discussion on Consistency with Company Processes

The risk assessment process was conducted in line with CGG's internal environmental risk framework, employing a conservative threshold for biosecurity risks. All measures for vessel and equipment mobilization followed national and international best practices for marine pest prevention. The risk of marine pest introduction is considered rare, and there have been no recorded introductions in past company operations. The mitigation strategies implemented by CGG align with industry standards and reflect a commitment to maintaining environmental integrity throughout the project. This consistency with company processes ensures that the activity complies with all relevant environmental regulations and has no adverse long-term effects.

This risk assessment has demonstrated that the introduction of marine pests causing a change to both ecosystem dynamics and to the functions, interests or activities of commercial fisheries has a:

- Predicted level of consequence of major.
- Likelihood of rare.
- Predicted level of risk of medium.

11 Environmental Performance Outcomes

Defined Acceptable Level (From Section 6)	Environmental Performance Outcome	Rationale
Prevent the introduction of any invasive marine pest species.	No introduction of a known or potential invasive marine species.	Biosecurity controls such as vessel inspections, ballast water management, and adherence to national guidelines significantly reduce the risk of marine pest introduction, preserving ecosystem integrity.
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	Social, cultural, and economic features are protected, sustaining their value for people and communities.	Protecting native marine species and preventing the establishment of invasive pests maintains ecological balance, which in turn supports the ongoing viability of industries, cultural practices, and recreational use of the marine environment.
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		

12 Recommendations

The predicted level of risk level is medium; thus, good industry practice (including legislation and standards) has been applied. Risks are of an acceptable level without further recommendations being required.

13 Document Control

Date	Revision	Update
6 July 2023	A	Draft prepared for initial comment
23 August 2023	B	Update based on comments and relevant person feedback
11 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
14 May 2024	2	Reviewed and update following public comment and rerun of the PSMT searches.
28 October 2024	3	Updated following NOPSEMA assessment
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
6 December	5	Updated following NOPSEMA OMR 2 Letter

14 References

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table D3- 1 shows how this feedback has been incorporated into the environmental assessments.

Table D3- 1 - Public comment input since the beginning of the public comment period starting 25 January 2024.

Matter	Matter ID	Changes made arising from public comment
Matter: Geographic range and all species need to be defined and considered	I16	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table D3-2. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table D3-2 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825
4128	Lack of adequate monitoring of species present or likely to be impacted.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions regarding species that may be affected by the Regia MSS. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	3237
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise	4808

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		adverse impacts on marine life are outlined in the EP in G1.	
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4166	Risk to the marine environment with the plan.	Titleholder has conducted a series of thorough risk assessments including the following aspects: Accidentl release of waste (D1), Fauna Interactions (D2), Invasive Marine Species (D3) and Accidental release of fuel (D4), wherin which relevant receptors have been assessed.	2677
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	3343
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined	2963

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		acceptable levels and is presented in the Environment Plan	
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1659
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the	1661

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1665
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined	1667

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		acceptable levels and is presented in the Environment Plan	
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049
4253	The possible effects to marine life and ecosystmens is my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publically responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is	2064

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	future of herself, other people of Port Fairy and the greater community.	used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747
4315	The statement suggest that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times	786

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	"A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments are covered below in response to concern 6."	2886
4493	Claims that CGG's proposed seismic activities contribute both directly and indirectly to broader threats faced by Southern Right Whales, including industrialisation of the marine environment, climate change, and pollution or contamination from vessel discharges.	Broader threats such as climate change and industrialisation fall outside the scope of the Environment Plan, as outlined in the response to Statements 156–166. The EP assesses only the environmental risks directly associated with the proposed activity. These risks are evaluated in the D Appendices, which demonstrate that any residual risks have been reduced to an acceptable level.	EVT352

REGIA
Marine Seismic Survey

Risk Assessment
Accidental Release of Fuel

Appendix D4: REG-EP-019-D4

Rev 5

December 2025

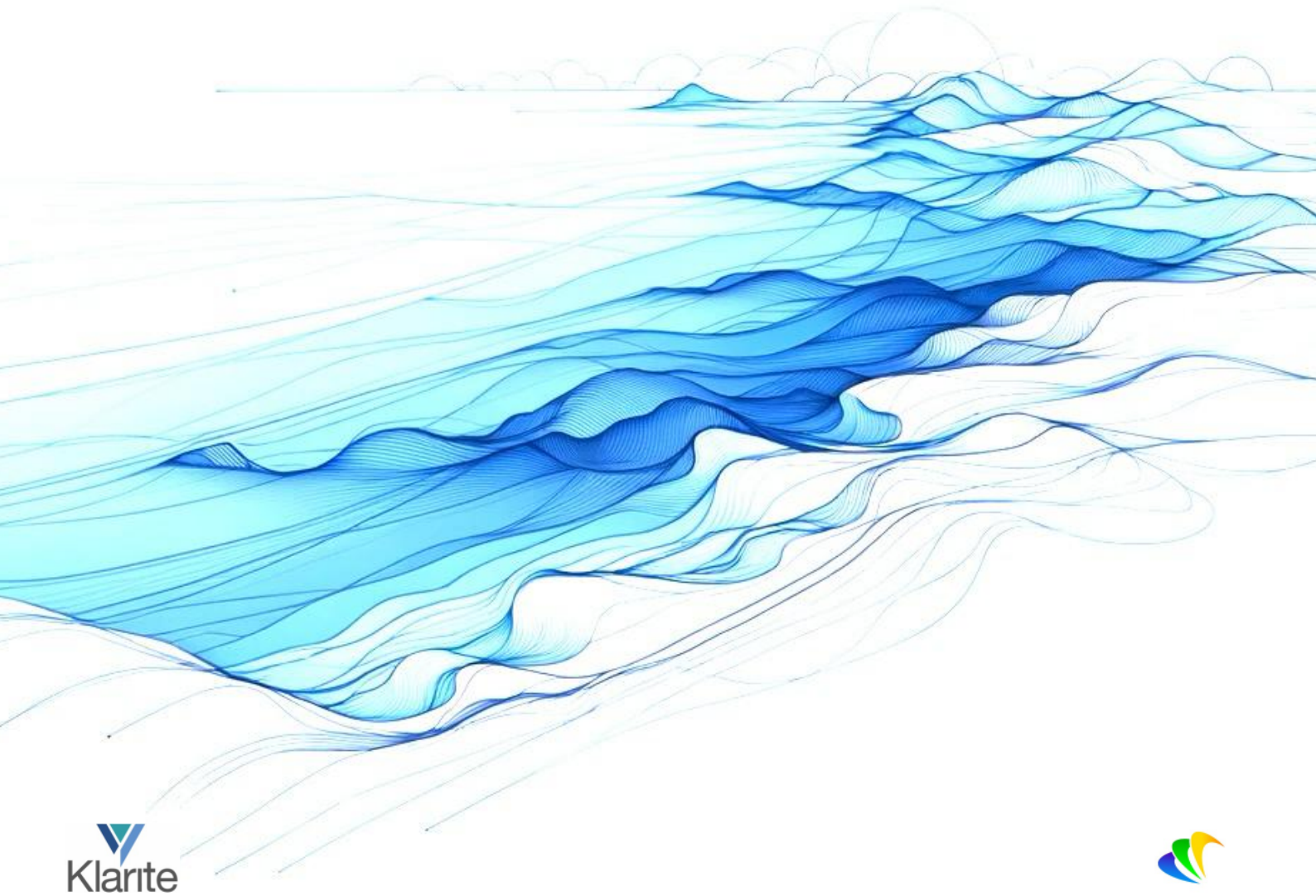

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Table of Contents

1 Introduction 4
1.1 Purpose and Scope 4
1.2 Consultation in Preparation of the EP 4
2 Aspect – Accidental Release of Fuel 5
2.1 How the Aspect Occurs 5
2.2 Extent and Duration of the Aspect 6
3 Cause-Effect Pathway 8
4 Description of the Existing Environment that may be Affected by the Activity 10
5 Relevant Legislative and Other Requirements 12
6 Defining Acceptable Levels of Risk 13
7 Consultation Input 15
8 Minimisation of Risks Through Activity Design 17
8.1 Elimination 17
8.2 Substitution 17
9 Predicted Levels of Risk 18
9.1 Change in Water Quality 20
9.2 Change in Sediment Quality 22
9.3 Change in Fauna Behaviour and Physical Condition 23
9.4 Change in Ecosystem Dynamics 44
9.5 Changes to Functions, Interests and Activities and Change in Aesthetic Value 52
9.6 Measures Adopted to Manage Environmental Risks 80
10 Demonstration Risks Will Be of An Acceptable Level 81
10.1 Discussion on Principles of ESD 81
10.2 Biological and Ecological Categories 81
10.3 Discussion on Economic, Cultural and Social Categories 81
10.4 Discussion on Consistency with Company Processes 82
11 Environmental Performance Outcomes 83
12 Recommendations 84
13 Document Control 85
14 References 86
Annex 1 96
Public Comment 96
Annex 2 97
Objections and Claims Raised from Consultation 97

Annex 3 **109**

Loss of Containment Sensitive Species 109

1 Introduction

Accidental release of fuel was identified through the Preliminary Environmental Impact and Risk Assessment (**PEIRA**) (Appendix B4) as an aspect needing further assessment. Hence, this document presents a detailed examination of **Accidental Release of Fuel** as a risk pathway between the Regia Marine Seismic Survey (**Regia MSS**) and the existing environment that may be affected by that aspect.

This document also uses information in two preceding study:

1. PEIRA
2. Oil Spill Modelling Analysis (Appendix B11)

1.1 Purpose and Scope

The purpose of this document is to assess all acceptable sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document was first published in draft form to the Document Library of the Regia MSS Consultation Hub on 11 September 2023. This was done to acknowledge that the final full Environment Plan (EP) can be a large document that is difficult for readers to digest in the 30-day public comment period. As such, the public and relevant persons were invited to comment on the document with an explicit request for readers to provide feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

2 Aspect – Accidental Release of Fuel

2.1 How the Aspect Occurs

The following hydrocarbons and chemicals will be present on the seismic vessel and support vessels:

- Marine diesel oil (MDO) used as fuel for the vessels.
- Hydraulic fluids such as engine and synthetic oils required for equipment and engine use.
- Chemicals for cleaning and maintenance purposes.

Hydrocarbons and chemicals are stored in contained areas but there is the potential for a loss of containment to occur resulting in a release of hydrocarbons or chemicals to the marine environment. Loss of containment scenarios are details in Table D4-1.

Table D4-1: Accidental Release of Fuel Scenarios

Scenario	Material and Potential Volume	Description
Vessel fuel tank rupture	257.4 m^3 MDO	A collision between the survey vessel, support vessel or a third-party vessel has the potential to result in the breach of the vessel hull and subsequent rupture of a fuel tank. A spill to sea because of vessel collision/grounding is only likely to occur under exceptional circumstances where these conditions resulted in significant damage to one or more of the fuel tanks in the hull of the vessel. These may include: • Navigational error • Vessel loss of power • Floundering due to weather. If a collision/grounding involving the seismic vessel occurred, the worst-case credible scenario would be the loss of the largest single fuel tank volume (consistent with AMSA (2015) guidelines), which is 257.4 m^3 of MDO. Vessel fuel tank inventory will be limited to 250m^3 to align with the modelling report.
Vessel refuelling failure	1.2 m^3 to 25 m^3 of MDO	A vessel refuelling failure may result in the release of MDO to the marine environment. Using dry-break couplings (which provide an automatic mechanism to seal off both the hose and the fixed pipe end when the hose is disconnected), the maximum credible spill volume from a refuelling failure is the maximum typical volume of a transfer hose (1.2 m^3). In the event dry break couplings fail, guidelines indicate the maximum credible spill volume from a refuelling incident with continuous supervision is equivalent to the volume of MDO transferred within a 15-minute period (AMSA 2053), which represent the estimated time required to shut down refuelling operations following discovery of a spill. Based on a transfer volume of 100 m^3/hr, this may result in a spill volume of 25 m^3.
Loss of containment overboard	1 m^3 of hydraulic fluid, lubricating fluids, or chemicals	A loss of containment may occur because of mechanical/ structural failure, human error, or poor housekeeping. Should a spill occur on a vessel deck, controls such as equipment bunds, scupper plugs and on-board clean up should prevent the spilt material reaching the marine environment.

Scenario	Material and Potential Volume	Description
		However, in the event these controls fail, or are not implemented, spill volumes released to the environment are likely to be less than 1 m^3 based on the inventory typically used on deck.

2.2 Extent and Duration of the Aspect

Duration: 90 days survey duration +30 days

A loss of containment could occur at any time during the activity (90 days). If there were a loss of containment the consequences of the largest release (fuel tank rupture of MDO) may persist for up to 30 days post-incident before water quality was below acceptable thresholds again.

Extent: Environmental Planning Area

If there were an accidental release of fuel it could potentially disperse 150 km from the location of the vessel. An additional 5 km was added to this range to ensure that coastal sensitivities were included in the search ranges for environmental values and sensitivities to inform the description of environment. This area is the Environmental Planning Area (Appendix B12 MAP-REG-EPM-083).

The 150 km is based on the NERA Reference Case: Consequences analysis of an accidental release of MDO (NERA 2018) that found that MDO spills under 700m^3 were reliably predicted to disperse within 150 km from the source of the spill. However, this reference case was based on exposure values that are higher than the current commonly used exposure values for oil spill modelling (NOPSEMA 2019) that are selected to approximate the spatial extent and variability of the receiving environment's contact with oil and subsequently inform risk evaluation and planning for oil spill response and monitoring. Thus, to validate that 150 km was sufficiently conservative a review was undertaken to identify oil spill modelling that has been undertaken in the Otway area since the NOPSEMA Oil Spill Modelling Environment Bulletin was published in April 2019. The review, provided in Oil Spill Modelling Analysis (Appendix B11), confirmed that 150 km was sufficiently conservative to approximate the spatial extent and variability of the receiving environment's contact with oil and subsequently inform risk evaluation and planning for oil spill response and monitoring for a spill up to 250 m^3 of MDO within the Regia MSS Operational Area.

2.2.1 Analysis of Low Threshold Exposure Ranges

As acknowledged above, the NERA Reference Case (NERA 2018) was prepared before NOPSEMA clarified its expectations for exposure values from modelling to conform to 10 parts per billions (ppb) thresholds for entrained hydrocarbons. Whilst the analysis presented in Appendix B11 did consider the higher thresholds in the NOPSEMA Oil Spill Modelling Environment Bulletin (April 2019), the highest distances in this analysis exceed the Environmental Planning Area distance.

The analysis is reasonable to apply to the Regia MSS for the reasons provided in Appendix B11 and because:

- An accidental release of hydrocarbons from vessel collisions with seismic survey operations has never occurred in Australia.
- A volume of 250m^3 has been used as the worst-case release rather than 257.4m^3 because fuel tanks are rarely topped out and hydrostatic pressure and/or ballasting can prevent release of the full inventory. The difference of 7.4m^3 in predicting the level of risk is immaterial to the analysis.
- The most likely accidental release of hydrocarbons would occur from an accident whilst bunkering which would be a release orders of magnitude less than the predicted loss of 250m^3.

- The consequence analysis undertaken relies on modelled results from multiple thousands of modelled runs rather than the typical range of 100 – 300 model runs in a single analysis.

The consequence analysis presented covers all months of the year and the sea states in the operational months September – December will:

- Enhance the natural degradation of entrained hydrocarbons; and
- Significantly limit the spread of entrained hydrocarbons.

If entrained hydrocarbons did exceed the Environmental Planning Area distance:

- The only part of the environment that may be affected by entrained hydrocarbons is water quality and the description of water quality in the bioregion is the same as that provided in Section 4.
- The predicted impacts in an area beyond the environmental planning area remain unchanged.

Whilst the effect range at 10-ppb may be larger, the operational and scientific monitoring plan (OMSP) and arrangements are sufficient to detect exceedances of thresholds noting that:

- Water quality monitoring at sea in the months in which the activity is being carried out is unlikely to be effective, limiting detection options to coastal locations.
- The Otway coastline is known as being one of the highest energy coastlines around Australia further improving natural degradation and limiting the spread of entrained hydrocarbons.

3 Cause-Effect Pathway

The PEIRA identified a cause-effect pathway for an accidental release of fuel for the following environmental components and their social, cultural, and economic features:

- Water quality
- Sediment quality
- Benthic assemblages
- Coastal habitats and communities
- Plankton
- Invertebrates
- Fish
- Birds
- Marine reptiles
- Marine mammals
- Coastal development
- Indigenous culture
- Commercial fishing and aquaculture
- Marine industries
- Marine Tourism
- Diving
- Recreational Fishing
- Marine Protected Areas

Hydraulic fluids and lubricating fluids behave similarly to MDO when spilt in the marine environment. Hydraulic fluids are oils of light to moderate viscosity and have a relatively rapid spreading rate. Like MDO, they will dissipate quickly, particularly in high sea states, although lubricating oils are more viscous and so the spreading rate of a spill of these oils would be slightly slower.

Impacts associated with a spill of chemicals to the marine environment will depend on the nature of the liquid released, the volume and its behaviour in the marine environment (whether it sinks, floats, disperses, etc.). In the event of a spill to the marine environment, these liquids would be subjected to rapid dispersion and dilution by the open ocean water conditions and prevailing currents and would remain within the surface waters.

Potential impacts from minor spills of hydraulic fluids, lubricating fluids or chemicals include a temporary and highly localised decline in water quality. This would have limited potential for toxicity to marine fauna or impact socio-economic receptors, due to the short duration of exposure and rapid dilution of the released liquids in the marine environment. As there is no likely cause-effect pathway to impact fauna or socio-economic receptors and impacts to water quality is predicted to be negligible no further assessment is required.

MDO is a light, refined petroleum product that when spilled on water, most of the oil evaporates or naturally disperses quickly (hours to days). However, the rates differ with both water and air temperature, more so with wind speed (and wave energy).

MDO is much lighter than water, so it is not possible for MDO to sink and accumulate on the seabed as pooled or free oil.

Dispersion into the sea by the action of wind and waves can result in 25–50% of the loss of hydrocarbons from surface slicks and dissolution (solubility of hydrocarbons) can account for 1-10% loss from the surface. While the majority of the MDO evaporates quickly, it is common for the residues of MDO spills after weathering to contain n-alkanes, iso-alkanes and naphthenic hydrocarbons.

Spilled MDO can affect biological receptors via direct contact or through inhalation of vapours as the MDO as it disperses. Visual slicks or oil shoreline oil can have impacts on socio-economic and cultural receptors especially where there is commercial, recreational, and traditional fishing, coastal activities, and tourism.

The known and potential environmental risks of a MDO spill are:

- Change in water quality
- Change in sediment quality
- Change in ecosystem dynamics
- Change in physical condition
- Change in fauna behaviour
- Changes to the functions, interests, or activities of other users (e.g., commercial fisheries, shipping).
- Change in aesthetic value

4 Description of the Existing Environment that may be Affected by the Activity

As detailed in Section 2.2, the Environmental Planning Area has been adopted as the areal extent within which receptors could be exposed to oil from a MDO spill.

To identify key values and sensitivities that may be at risk from an accidental release of marine diesel oil within the Environmental Planning Area a PMST search was undertaken using the Environmental Planning Area, with the PMST Report available in Appendix B5: PMST Search Reports. A summary of the values and sensitivities protected under the EPBC Act relevant to a loss of containment is detailed in within this document. The summary also identifies any relevant conservation advice or recovery plans.

The identified Cultural Features values and sensitivities (refer to section 3.16, Appendix F3), were also reviewed to assess potential risks from an accidental release of fuel.

In addition, a review was undertaken of commercial fisheries that may fish within the Environmental Planning Area and is documented in the Commercial Fisheries Analysis Report (Appendix B6).

A description of the existing environment that may be affected by an accidental release of fuel is provided for each environmental component in Section 9.

PMST searches were run again prior to resubmission (Rev 2) to ensure any changes to species or listings were identified to control for passage of time. Conservation Advice has also been updated for several species and subsequent changes have been made to Annex 3. Changes relevant to the assessment of an accidental release of fuel include:

- Changes to EPBC Act status of several species
    - Red Knot is listed as Vulnerable (previously Endangered)
    - Sharp-tailed Sandpiper is listed as Vulnerable (previously not listed as threatened)
    - Sooty Shearwater is listed as Vulnerable (previously not listed as threatened)
    - Great Knot is listed as Vulnerable (previously Critically Endangered)
    - Western Alaskan Bar-tailed Godwit is listed as Endangered (previously Vulnerable)
    - Common Greenshank is listed as Endangered (previously not listed as threatened)
    - Ruddy Turnstone is listed as Vulnerable (previously not listed as threatened)
    - Latham's Snipe is listed as Vulnerable (previously not listed as threatened)
    - Terek Sandpiper is listed as Vulnerable (previously not listed as threatened)
    - Grey Plover is listed as Vulnerable (previously not listed as threatened)
    - Eastern Dwarf Galaxias is listed as Endangered (previously Vulnerable)
    - Yarra Pygmy Perch is listed as Endangered (previously Vulnerable)
    - Blue-winged Parrot is listed as Vulnerable (previously not listed as threatened)
- Updates to conservation advice for several species
    - Conservation Advice for *Calidris canutus* (Red Knot) (DCCEEW 2024)
    - Conservation Advice for *Calidris acuminata* (Sharp-tailed Sandpiper) (DCCEEW 2024a)
    - Conservation Advice for *Ardenna grisea* (Sooty Shearwater) (DCCEEW 2023i)
    - Conservation Advice for *Calidris tenuirostris* (Great Knot) (DCCEEW 2024f)
    - Conservation Advice for *Limosa lapponica baueri* (Bar-tailed Godwit western Alaskan) (DCCEEW 2024b)
    - Conservation Advice for *Tringa nebularia* (Common Greenshank) (DCCEEW 2024e
    - Conservation Advice for *Arenaria interpres* (Ruddy Turnstone) (DCCEEW 2024c)
    - Conservation Advice for *Gallinago hardwickii* (Latham's snipe) (DCCEEW 2024d)
    - Conservation Advice for *Xenus cinereus* (Terek Sandpiper) (DCCEEW 2024g)

  - Conservation Advice for *Pluvialis squatarola* (Grey Plover) (DCCEEW 2024h)
  - Conservation Advice for *Neophema chrysostoma* (Blue-winged Parrot) (DCCEEW 2023l)
  - Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DCCEEW 2023m)
  - Conservation Advice for *Numenius madagascariensis* (Far Eastern Curlew) (DCCEEW 2023n)
  - Conservation Advice for *Charadrius leschenaultii* (Greater Sand Plover) (DCCEEW 2023o)
  - Conservation Advice for *Galaxiella pusilla* (Dwarf Galaxias) (DCCEEW 2023j)
  - Conservation Advice for *Nannoperca obscura* (Yarra Pygmy Perch) (DCCEEW 2023k
- Removal of bird species, Broad-billed Sandpiper (species no longer appears in PMST).
- Removal of National Heritage place, 'Quarantine Station and Surrounds' (doesn't overlap with the Environmental Planning Area).

These changes have been incorporated throughout the EP and the risk assessment has been revised accordingly [Section added in response to Matters: I16 and I17].

All changes listed above remain relevant after the PMST searches were rerun prior to resubmission of Rev 3, with two exceptions:

- The National Heritage place 'Quarantine Station and Surrounds' which now overlaps with the Environmental Planning Area again.
- Southern Bluefin Tuna (*Thunnus maccoyii*) also has been removed from the February 2025 PMST reports for all areas searched, as it is no longer listed as a threatened species under the EPBC Act (DCCEEW 2024k). This species remains to be discussed here for a number of reasons including the view that a precautionary approach remains appropriate to assess this species that was only recently delisted, the species known relevance to regional fisheries, and to accurately reflect the passage of time over which this EP has been constructed.

Additional changes from the most recent PMST searches relevant to the assessment of an accidental release of fuel include:

- Changes to Biologically Important Areas
  - Pygmy Blue Whale Distribution BIA has been removed (from all areas searched).
  - Distribution BIAs for White Shark have been removed (from all areas searched).
  - Breeding BIA added for Short-tailed Shearwater to three areas searched (Light EMBA, and Underwater Sound EMBAs for Birds and LF cetaceans).
  - Breeding BIA added for White-faced storm-petrel to the EPA.
- Additional Species detected
  - Grey Nurse Shark (*Carcharias taurus*) appears in searches for all areas as 'Species or species habitat may occur within area'.
- Additional Listed Threatened Ecological Community
  - King Island Scrub Complex overlaps the Environmental Planning Area.
- National Heritage place 'Budj Bim National Heritage Landscape – Tyrendarra Area' was present in one additional search area and now overlaps with the Environmental Planning Area.
- World Heritage Property – 'Budj Bim Cultural Landscape' was present in one additional search area and now overlaps with the Environmental Planning Area.

These changes have been incorporated throughout the EP and the risk assessment has been revised accordingly.

5 Relevant Legislative and Other Requirements

CGG has considered all the relevant legislative requirements, that apply to the risk of accidental release of fuel (see Appendix B2). Measures that will be adopted to demonstrate how these requirements will be meet are as follows:

- CGG Marine Assurance System which ensures compliance of contract vessels with Navigation Act, MARPOL, COLREGS and Marine Orders.
- Oil Spill Response Plans where the NOPSEMA Accepted OPEP details the role of the vessel operator, CGG and AMSA in the event of an oil spill.
- Consultation Management System which details notification requirements to the AHO and AMSA and to relevant stakeholders as required.

6 Defining Acceptable Levels of Risk

Category	Defined Acceptable Level (General)	Defined Acceptable Level (Aspect Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	Prevent any accidental release of fuel to the marine environment. Have comprehensive emergency response plans, aligned with the National Plan for Maritime Environmental Emergencies, in place to mitigate consequences. Have an Operational and Scientific Monitoring Plan in place to monitor the effects of a release of fuel to the marine environment.	No accidental release of fuel to the marine environment. Maintain arrangements to respond to an unplanned release of fuel in accordance with the OPEP. Maintain arrangements to monitor the effects of a release of fuel to the marine environment in accordance with the OSMP.
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	For species and sensitivities with social, cultural and/or economic values, if the potential ecological impact or risk is deemed acceptable, it is likely that the

Category	Defined Acceptable Level (General)	Defined Acceptable Level (Aspect Specific)	Rationale
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	corresponding impact on social, cultural and/or economic values will also be considered acceptable, as the physical presence and health of these species are key for maintaining their social, economic and cultural roles. Predicted levels of impact for species that have social, cultural and economic values will be assessed on a receptor level.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	
	The views of public have been considered in the impact and risk assessment.		
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in

Annex 2.

8 Minimisation of Risks Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of risk could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of accidental release of fuel, elimination involves removing or reducing the factors that could lead to this risk occurring. One main option was considered and subsequently adopted:

Bunkering operations will not occur within 50 km of a Commonwealth or State marine park

Even though spills from collisions and bunkering are extremely unlikely this measure adds a precautionary measure because diesel releases are not expected to travel more than 50 km from the source of the release given the prevailing conditions in the region.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the risk. No substitution-based activity limitations were required in this case, as other measures applied were sufficient to reduce the identified risk to an acceptable level.

9 Predicted Levels of Risk

Based upon an understanding of the cause/effect pathway, an accidental release of fuel releases 250 m^3 of MDO is used to predict the level of risk to receptors as this is the largest loss of containment scenario.

Table D4-2 provides the criteria used to determine the sensitivity of receptors within the Environmental Planning Area with the following tables assessing each receptor identified within the Environmental Planning Area having regard to the legislative and other requirement.

Table D4-2 - Receptor Sensitivity Criteria.

Sensitivity	Protected Areas	Species Status	BIA	Coastal Habitat Sensitivity	Relevant Receptors
Low	State - no marine protected areas. Commonwealth - multiple use zones are the dominant component of the protected area.	Species not threatened (or limited to only a few species of a particular faunal grouping). Present in the Environmental Planning Area only occasionally or as vagrants. Populations known to recover rapidly from disturbance.	No BIA (or limited to only a few species of a particular faunal grouping).	Low sensitivity habitat, such as fine-grained beaches, exposed wave-cut platform and exposed rocky shores, with rapid recovery from oiling (~ 1 year or less). Public recreation beaches not present or not widely used. No harbours or marinas.	Sediment quality Plankton Invertebrates Fish Marine protected areas
Medium	State – no marine protected area. Commonwealth -little to no special purpose zonation.	Species may be threatened (or some species of a particular faunal grouping). Species may or may not be present at time of activity. Some susceptibility to oiling. Populations may take a moderate time to recover from oiling.	Some intersection with one or more BIAs, generally for distribution or migration rather than breeding.	Moderately sensitive habitat present, such as sheltered rocky rubble coasts, exposed tidal flats, gravel beaches, mixed sand and gravel beaches, with a medium recovery period from oiling (~2-5 years). Public recreation beaches present but not often used. No harbours or marinas	Water quality Benthic assemblages Coastal habitats and communities Seabirds Marine reptiles Marine mammals Commercial fisheries and aquaculture Marine industries Marine protected areas
High	State - marine protected area present. Commonwealth -special purposes zones are the dominant component of the protected area.	Species are threatened (or most species of a particular faunal grouping). Species known to be present at time of activity. Known to be susceptible to oiling. Populations may take a long time to recover from oiling.	Significant intersection with one or more BIAs, particularly with regard to foraging or breeding.	Sensitive habitat present, such as mangrove, salt marshes, and sheltered tidal flats, with long recovery periods from oiling (> 5 years). Public recreation beaches present that are widely used. Busy harbours or marinas.	Coastal developments Aquatic birds Shorebirds Diving Indigenous culture Marine Tourism Marine protected areas Recreational fishing

9.1 Change in Water Quality

9.1.1 Water Quality

Water Quality	
Sensitivity Rating	**Medium**
Predicted Level of Risk	**Low**
Environmental Planning Area Existing Environment	
Water quality within the Environmental Planning Area is expected to be typical of offshore waters of southern Australia. Water sampling undertaken for the Beach Otway Development area within the Environmental Planning Area (Ramboll 2020) detailed that the water quality at survey areas indicated an undisturbed mid-depth environment.	
Predicted Level of Risk	
The Environmental Planning Area is based on the following thresholds where water quality could be potentially at risk: The low threshold to assess the potential for floating oil exposure of 1 g/m^2 equates to an average thickness of 1 µm, referred to as visible oil. Oil of this thickness is described as rainbow sheen in appearance, according to the Bonn Agreement Oil Appearance Code (AMSA 2014). This threshold is used to establish the planning area for scientific monitoring. The low threshold of 10 ppb to assess the potential for dissolved and entrained oil exposure represents the very lowest concentration and corresponds generally with the lowest trigger levels for chronic exposure for entrained hydrocarbons in the ANZECC & ARMCANZ (2000) water quality guidelines. This threshold is used to establish the planning area for scientific monitoring. A summary of the mass balance of a MDO spill within the Environmental Planning Area (RPS 2022) showed: Under a constant 5 knot (~2.5 m/s) wind, 40.3% of the oil is predicted to evaporate within 24 hours. Under calm conditions, most of the remaining oil on the water surface will weather at a slower rate due to being comprised of the longer-chain compounds with higher boiling points. Evaporation shall cease when the residual compounds remain, and they will be subject to more gradual decay through biological and photochemical processes. Under a variable-wind where the winds are of greater strength on average, entrainment of MDO into the water column is predicted to increase. Approximately 24 hours after the spill, 60.1% of the oil mass is forecast to have entrained and a further 38.4% is forecast to have evaporated, leaving only a small proportion of the oil floating on the water surface (<0.1%). The increased level of entrainment in the variable-wind case result in a higher percentage decaying at an approximate rate of 1.5% per day with or ~10.5% after 7 days, compared to <0.1% per day and a total of 0.9% after 7 days for the constant-wind case. Given the proportion of entrained oil and the tendency for it to remain mixed in the water column, the remaining hydrocarbons will decay over time scales of several weeks. Based on the weathering properties of MDO water quality within the Environmental Planning Area, 40% of a 250 m^3 MDO spill will evaporate within 24 hours with the remaining oil to becoming entrained in the water column where it will decay below threshold levels within 30 days.	

Water Quality
Thus, the predicted level of consequence to water quality from a 250 m^3 MDO spill is assessed as minor as any consequences will be short-term (< 30 days for oil to decay below low thresholds) within a localised area with full recovery, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of low.

9.2 Change in Sediment Quality

9.2.1 Sediment Quality

Sediment Quality	
Sensitivity Rating	**Low**
Predicted Level of Risk	**Low**
Environmental Planning Area Existing Environment	
Sediment quality within the Environmental Planning Area is expected to be typical of coastal and nearshore area of southern Australia. Water sampling undertaken for the Beach Otway Development area within the Environmental Planning Area (Ramboll 2020) detailed that the sediment quality at survey areas had a high oxidation reduction potential and low or undetectable levels of toxicants indicating an unmodified seabed environment.	
Predicted Level of Risk	
In previous risk assessment studies, French-McCay et al. (2005a; 2005b) used a threshold of 10 g/m^2 to assess the potential for shoreline accumulation. It would equate to approximately 2 teaspoons of hydrocarbon per square meter of shoreline accumulation. The appearance is described as a stain/film. On that basis, the 10 g/m2 shoreline accumulation threshold has been selected to define the zone of potential "low shoreline accumulation". As detailed in the assessment of water quality, the majority of surface oil will have evaporated or entrained in the water column within ~ 24 hours, thus only a small proportion is likely to move to shoreline areas above the low threshold. Furthermore, wave action in shoreline areas will further breakdown the remaining oil. Thus, the predicted level of consequence to sediment quality from a 250 m^3 MDO spill is assessed as minor as consequences will be short-term (< 30 days) within a localised area with full recovery, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of low.	

9.3 Change in Fauna Behaviour and Physical Condition

9.3.1 Plankton

Plankton	
Sensitivity Rating	**Low**
Predicted Level of Risk	**Low**
Environmental Planning Area Existing Environment	

Plankton is a key component in oceanic food chains and support nearly all marine life. Plankton is divided into two groups, namely phytoplankton (microscopic plants) and zooplankton (microscopic animals). Plankton is the dominant biomass of marine ecosystems (CSIRO 2015).

Copepods are the most common zooplankton and are some of the most abundant animals on earth. Plankton communities are highly diverse, with members from almost all phyla. Phytoplankton are photosynthetic organisms that drift with ocean currents and are mostly microscopic; however, some gelatinous plankton can be up to 2 m in diameter. Phytoplankton is grazed by zooplankton such as small protozoa, copepods, decapods, krill and gelatinous zooplankton.

The carrying capacity of marine ecosystems (the mass of fish resources) and recruitment of individual stocks is strongly related to plankton abundance, timing and composition. In the Environmental Planning Area, the seasonal Bonney coast upwelling is a productivity hotspot, with high densities of zooplankton and are important for fish and whales, including culturally significant species (see Appendix F3, section 3.16.1). The primary ecological importance of the Bonney coast upwelling is as a feeding area for the Pygmy Blue Whale (PBW) (*Balaenoptera musculus brevicauda*). The upwelled nutrient-rich water promotes blooms of coastal krill (*Nyctiphanes australis*), which in turn attracts PBW to the region to feed. The upwelling is one of only three identified feeding areas consistently used by PBW in Australian coastal waters (Butler et al. 2002). The upwelling occurs when strong south-easterly surface winds induce warm, nutrient-deficient surface waters away from the coastline. This leads to surface upwellings bringing cool, nutrient-rich deep waters closer to the surface where there is enough sunlight for primary production among planktonic organisms to take place (Hosack and Dambacher 2012).

Plankton distribution from the upwelling area is dependent upon prevailing ocean currents including the Leeuwin Current, East Australia Current, flows into and from Bass Strait and Southern Ocean water masses. Populations are thought to be highly variable both spatially and temporally and are likely to comprise characteristics of tropical, southern Australian, central Bass Strait and Tasman Sea populations.

A detailed analysis of satellite-derived ocean data (chlorophyll a levels) for the periods 1998-2000 and 2005- 2014 suggests that the western Tasmanian shelf also accommodates a productive ecosystem. Based upon the Kampf (2015) study, this region forms part of the Great South Australian Coastal Upwelling System and experiences two phytoplankton blooms per annum:

The first and larger bloom – occurs in the late austral summer months (typically February-April) resulting from favourable winds that occur between December-April. Stronger upwelling winds do not always create phytoplankton blooms.

The second smaller bloom – occurs in spring (October) coincident with the onset of spring bloom in the western Tasman Sea. The mechanism for this smaller bloom remains unclear.

Plankton
Kampf (2015) identifies that the accuracy of satellite data cannot be used to identify upwelling jets however would suggest the existence of upwelling jets on the western Tasmanian shelf. The significance of these jets is that they operate to disperse nutrient-rich water northwards along the shelf and possibly into western Bass Strait. This advective process would explain elevated chlorophyll a level in western Bass Strait – a typical feature of the region during austral summer months. The western Tasmanian upwelling system lies to the west of the Tasmanian mainland and at least 130 km southeast of the acquisition area.
Predicted Level of Risk
Plankton are likely to be exposed to oil within the upper 10 m of the water column in areas close to the spill source where oil concentrations are the highest. Phytoplankton is typically not sensitive to the impacts of oil, though they do accumulate it rapidly due to their small size and high surface area to volume ratio (Hook et al. 2016). If phytoplankton is exposed to hydrocarbons at the sea surface, this may directly affect their ability to photosynthesize via smothering and would have implications for the next trophic level in the food chain (e.g., small fish) (Hook et al. 2016). In addition, the presence of surface hydrocarbons may result in a reduction of light penetrating the water column, which may affect the rate of photosynthesis, particularly in instances where there is prolonged presence of surface hydrocarbons over an extensive area such that the phytoplankton was restricted from light exposure, in turn affecting the rate of photosynthesis and inhibiting growth, depending on the concentration range. For example, photosynthesis is stimulated by low concentrations of oil in the water column (10-30 ppb) but become progressively inhibited above 50 ppb. Conversely, photosynthesis can be stimulated below 100 ppb for exposure to weathered oil (Volkman et al. 2004). Zooplankton (microscopic animals such as rotifers, copepods and krill that feed on phytoplankton) are vulnerable to hydrocarbons due to their small size and high surface area to volume ratio, along with (in many cases) their high lipid content (that facilitates hydrocarbon uptake and bioaccumulation) (Hook et al. 2016). Water column organisms that come into contact with oil risk exposure through ingestion, inhalation, and dermal contact (NRDA 2012), which can cause immediate mortality or declines in egg production and hatching rates along with a decline in swimming speeds (Hook et al. 2016). Plankton is generally abundant in the upper layers of the water column and acts as the basis for the marine food web, meaning that a MDO spill in any one location is unlikely to have long-lasting impacts on plankton populations at a regional level. Variations in the temporal scale of oceanographic processes typical of the ecosystem have a greater influence on plankton communities than the direct effect of spilt hydrocarbons. This is because reproduction by survivors or migration from unaffected areas would be likely to rapidly replenish any losses from permanent zooplankton (Volkman et al. 2004). Field observations from oil spills show minimal or transient effects on marine plankton (Volkman et al. 2004). Once background water quality conditions have re-established, the plankton community will take weeks to months to recover (ITOPF 2011), allowing for seasonal influences on the assemblage characteristics. Thus, the predicted level of consequence to plankton from a 250 m^3 MDO spill is assessed as minor as consequences will be short-term (days to weeks to months), recoverable and affect a small portion of the plankton population that is widely representative of the region and would be unlikely to impede associated food chains within the region, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of low.

9.3.2 Invertebrates

Invertebrates	
Sensitivity Rating	**Low**
Predicted Level of Risk	**Low**
Environmental Planning Area Existing Environment	
Studies by the Museum of Victoria found that invertebrate diversity was high in southern Australian waters although the distribution of species was patchy, with little evidence of any distinct biogeographic regions (Wilson and Poore 1987). Results of sampling in shallower inshore sediments reported high diversity and patchy distribution (Parry et al. 1990). In these areas, crustaceans, polychaetes, and molluscs were dominant. Throughout the region, a variety of seabed habits support a range of animal communities such as sparse sponges to extensive 'thickets" of lace corals and sponges, polychaete worms and filter feeders (DNP 2013). Echinoderms, such as sea stars, sea urchins and sea cucumbers are also an important fauna species of the southern Australian and Tasmanian waters, with several species at risk of extinction (DPIPWE 2020). Rock lobster, giant grab, scallops, abalone, and octopus are fished by commercial and recreational fishers in the Environmental Planning Area. Risks to these fisheries are assessed in the section on commercial fishing. Several invertebrate species including torbos, pipis, abalone, limpets, mussels, elephant snails, crayfish/lobster, crabs and squid are identified as culturally significant to the Gunditjmara People as both a resource and in harvesting as a cultural practice (GMTOAC, 2023). Barnabeel (oyster), murrabal (mussel), bam bam (crayfish), abalone and pipi are also culturally important resources to the Wadawurrung People (WTOAC, 2020). Invertebrate species are an important traditional, social and economic resource for the Eastern Maar People. Abalone, cockles and crayfish are collected as tucker along the coast (EMAC, 2015) (Appendix F3, Section 3.16.1).	
Predicted Level of Risk	
The primary modes of exposure for benthic invertebrate communities for a surface oil spill are: Direct exposure to oil within the water column to a depth of 10 m (RPS 2019a). Direct exposure to oil on shoreline or within sediment within 10 m water depth. Indirect exposure to oil through the food web via uptake of oiled plankton, detritus, prey, etc. (NRDA 2012). Acute or chronic exposure, through surface contact, and/or ingestion can result in toxicological risks. Entrained and dissolved hydrocarbons can have negative impacts on marine invertebrates and associated larval forms. Impacts to some adult species (e.g. crustaceans) is reduced as a result of the presence of an exoskeleton, while other invertebrates with no exoskeleton and larval forms may be more prone to impacts from pelagic hydrocarbons.	

Invertebrates
Localised impacts to larval stages may occur which could impact on population recruitment. If invertebrates are contaminated by hydrocarbons, tissue taint can remain for several months, although taint may eventually be lost. For example, it has been demonstrated that it took 2-5 months for lobsters to lose their taint when exposed to a light hydrocarbon (NOAA 2002) (see Commercial Fisheries' assessment). Exposure to microscopic oil droplets may also impact aquatic biota either mechanically (especially filter feeders) or act as a conduit for exposure to semi-soluble hydrocarbons (that might be taken up by the gills or digestive tract) (McCay-French 2009). Toxicity is primarily attributed to water soluble PAHs, specifically the substituted naphthalene (C2 and C3) as the higher C-ring compounds become insoluble and are not bioavailable. ANZECC/ARMCANZ (2000) identifies the following 96-hr LC50 concentrations for naphthalene (a key PAH dissolved phase toxicant in crude oils): For the bivalve mollusc, *Katelysia opima*, a concentration of 57,000 ppb For six species of marine crustaceans, a concentration between 850 and 5,700 ppb. Other possible impacts from the presence of dispersed and non-dispersed oil include effects of oxygen depletion in bottom waters due to bacterial metabolism of oil (and/or dispersants), and light deprivation under surface oil (NRDA 2012). Water quality in benthic habitats exposed to entrained hydrocarbons would be expected to return to background conditions within < 30 day. Several studies have indicated that rapid recovery rates may occur even in cases of heavy oiling (Committee on Oil in the Sea 2003). Due to the low concentrations and physical properties of the MDO, and the exposed nature of shoreline and well- mixed nature of the waters in the Environmental Planning Area coating of invertebrates and prolonged exposure to hydrocarbons is considered highly unlikely. Thus, the predicted level of consequence to invertebrates from a 250 m^3 MDO spill is assessed as minor as consequences will be short-term (days to weeks), recoverable and affect a small portion of the invertebrate population would be unlikely to impede associated food chains within the region the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of low.

9.3.3 Fish

Fish	
Sensitivity Rating	**Low**
Predicted Level of Risk	**Low**
Environmental Planning Area Existing Environment	
The PMST Report (Appendix B5) identified multiple fish species or species habitat within the Environmental Planning Area as detailed in Annex 3 of this document. None of these fish species were identified to be undertaking biologically important behaviours or have BIAs or habitat critical to the survival of the fish species. The Dwarf Galaxias is a freshwater species (Saddler et al. 2010) and the Yarra Pygmy Perch occurs in lakes, ponds, and slow flowing rivers (Sadler and Hammer 2010) which are outside the Environmental Planning Area. The Australian Grayling is a small to medium-sized, slender, silvery fish with soft-rayed fins lacking any spines. It is endemic to south-eastern Australia, including Victoria, Tasmania, and New South Wales, and is a migratory species that inhabits estuarine waters and coastal seas as larvae/juveniles, and freshwater rivers and streams as adults (Backhouse et al. 2008). The Blue Warehou is a medium-sized, deep-bodied fish, reaching a maximum total length of 90 cm and a maximum weight of 7 kg (TSSC 2015). Globally, the Blue Warehou is confined to Australian and New Zealand waters predominantly in coastal shelf, upper continental slope, and seamount waters offshore from New South Wales, Tasmania, Victoria and South Australia (TSSC 2015). Blue Warehou is a target species for the Tasmania Scalefish Fishery. The eastern population of Gemfish (Eastern Gemfish) is taken as bycatch in commercial fisheries. The largest proportion of catch of the species is taken in the South East Trawl sector of the Commonwealth Southern and Eastern Scalefish and Shark Fishery (SESSF), where it is caught primarily in deepwater trawl nets that are targeting multiple species that are found on the continental shelf. Eastern Gemfish are mesopelagic and inhabit deeper continental shelf habitats and upper slope waters from 100 m to 700 m (down to 1254 m) but are generally found in waters about 250 to 500 m deep (TSSC 2009). The Orange Roughy is a demersal fish targeted by the Southern and Eastern Scalefish and Shark Fishery. They are widely distributed throughout the world and forms dense spawning and feeding aggregations on or near topographic features such as seamounts, canyons, and plateaus (DCCEEW 2023). No spawning or feeding aggregation areas have been identified in the Environmental Planning Area. Southern Bluefin Tuna can grow to 225 cm in length and 200 kg in weight (TSSC 2010). They are a highly migratory species that occurs globally in waters between 30°S and 50°S forming on single global population (TSSC 2010). In Australian waters, they range from northern Western Australia, around the southern region of the continent, to northern New South Wales (TSSC 2010). Southern Bluefin Tuna are a target species for the Southern Bluefin Tuna Fishery. Most of the listed marine ray-finned fish species identified in the PMST Report for the Environmental Planning Area are syngnathids, which includes seahorses and their relatives (sea dragon, pipehorse and pipefish). The majority of these species are associated with seagrass meadows, macroalgal seabed habitats, rocky reefs and sponge gardens located in shallow, inshore waters (e.g., protected coastal bays, harbours and jetties) less than 50 m deep (Fishes of Australia 2015). They are sometimes recorded in deeper offshore waters, where they depend on the protection of sponges and rafts of floating seaweed such as sargassum. The PMST Report (Appendix B5) identified six shark species with the White Shark having foraging or feeding related behaviour and a foraging BIA as detailed in Annex 3 of this document.	

Fish
The east coast population of the Grey Nurse Shark covers a range of approximately 2700 km and extends from the Capricornia coast (central Queensland) to Narooma in southern New South Wales. Sightings data from the New South Wales Department of Primary Industries (NSW DPI) includes sightings as far south as the NSW/Victoria border (CoA 2014). Grey Nurse Sharks tend to live in shallow inshore waters, with their preferred habitats have sandy-bottomed gutters or rocky caves and are close to inshore rocky reefs or islands (DCCEEW 2021). Gulpener Sharks are targeted by the Southern and Eastern Scalefish and Shark Fishery. There are endemic to Australia in habitats on the upper-slope and are mainly demersal (bottom dwelling) between 180 m to 900 m (Williams et al. 2012) of the southern continental shelf. The Porbeagle occurs in waters from southern Queensland to south-west Australia (Last & Stevens 2009). Animals typically occur in oceanic waters off the continental shelf, although they occasionally enter coastal waters (Francis et al. 2002). The Porbeagle is known to undertake seasonal migrations, although the timing and details of these migratory movements are not well-understood (Saunders et al. 2011). Individuals have been tracked moving large distances (i.e. 1500-1800 km along continental shelves and crossing the Atlantic Ocean between Europe and North America) (Francis et al. 2002). School Shark appears to have undergone a significant reduction in numbers as the result of commercial fishing in south eastern Australian waters (TSSC 2009a). School Shark is primarily a deep water demersal (bottom-dwelling) species, although individuals have been recorded undertaking daily vertical migrations, remaining at depths of around 500 m during the day and moving up to around 100 m at night (McLoughlin, 2007). Females and juveniles utilise inshore coastal areas around Victoria, Tasmania and parts of South Australia for nursery areas (Pogonoski et al., 2002). The Shortfin Mako is a large pelagic shark with a circum-global distribution inhabiting tropical and temperate waters. It is rarely encountered in waters with temperatures below 16°C (Last and Stevens 2009). In Australian waters, the shortfin mako has been recorded in offshore waters all around the continent's coastline except for the Arafura Sea, Gulf of Carpentaria, and Torres Strait. The species primarily occurs in offshore, oceanic waters and is pelagic (has no habitat associations with the seafloor) (Last and Stevens 2009). The White Shark is listed as Vulnerable. White Sharks are long-lived, living for 30 years or more (Bruce 2008), and are found throughout temperate and sub-tropical regions in the northern and southern hemispheres (Last & Stephens 2009). The species is also commonly found in inshore waters in the vicinity of islands, and often near seal colonies (Malcolm et al. 2001). The foraging BIA that is within the Environmental Planning Area is centred on Lady Julia Percy Island which is a known seal breeding colony (Appendix B12 MAP-REG-EPM-027). The Environmental Planning Area also overlaps the distribution BIA that covers Australian waters from Barrow Island/Montebello Islands, WA to Yeppoon/Swains Reef, Qld. In addition to protected fish species, commercial fish and shark species such as mackerel, salmon, sardines, snapper, sawsharks, whiting and wrasse are likely to be present in the Environmental Planning Area. Short finned eels, known as Kooyang, are an important Indigenous cultural value, and may migrate through the Environmental Planning Area (GMTOAC, 2023; WTOAC, 2020; EMAC, 2015). The Environmental Planning Area does not overlap any freshwater or estuaries where eels spend most of their life cycle (VFA 2022) or where Indigenous eel traps are present. Perch, and Blackfish species also hold Indigenous cultural value in traditional, social and economic practices (GMTOAC, 2023; WTOAC, 2020; EMAC, 2015). Blackfish are an inland river fish (VFA 2024b) and therefore outside of the Operational and Planning Areas (Appendix F3, Section 3.16.1).
Predicted Level of Risk
Fish are exposed to in-water hydrocarbon (entrained and dissolved) through a variety of pathways, including: Direct dermal contact such as swimming through oil or waters with elevated dissolved hydrocarbon concentrations and other constituents, with diffusion across their gills (Hook et al. 2016).

Fish
Ingestion either directly or via food base, fish that have recently ingested contaminated prey may themselves be a source of contamination for their predators.
Inhalation where elevated dissolved contaminant concentrations in water pass over the gills.
Exposure to hydrocarbons entrained or dissolved in the water column can be toxic to fish. Studies have shown a range of impacts including changes in abundance, decreased size, inhibited swimming ability, changes to oxygen consumption and respiration, changes to reproduction, immune system responses, DNA damage, visible skin and organ lesions, and increased parasitism. However, many fish species can metabolise toxic hydrocarbons, which reduces the risk of bioaccumulation of contaminants in the food web and human exposure to contaminants through the consumption of seafood (NRDA 2012).
Sub-lethal impacts in adult fish include altered heart and respiratory rates, gill hyperplasia, enlarged liver, reduced growth, fin erosion, impaired endocrine systems, behavioural modifications and alterations in feeding, migration, reproduction, swimming, schooling, and burrowing behaviour (Kennish 1996). However, fish are highly mobile and unlikely to remain in the area of a spill for long enough to be exposed to sub-lethal doses of hydrocarbons.
The toxicity of dissolved hydrocarbons and dispersed oil to fish species has been the subject of a number of laboratory studies (AMSA 1998). Generally, concentrations in the range of 0.1–0.4 mg/L dispersed oil have been shown to cause fish deaths in laboratory experiments (96-hour LC50). No reported studies of the impacts of oil spills on cartilaginous fish (including sharks, rays and sawfish) were found in the literature.
The assessment of effects on fish species in the Timor Sea as a result of the Montara well blowout (a light gas condensate), conducted from November 2009 to November 2010 undertaken by Gagnon & Rawson (2011), found that of the species studied (mostly Goldband Snapper Pristipomoides multidens, Red Emperor Lutjanus sebae, Rainbow Runner Elegatis bipinnulata and Spanish Mackerel Scomberomorus commerson), all 781 specimens were in good physical health at all sites. Results show that:
Phase 1 study (November 2009, immediately after the blowout ceased) - indicated that in the short-term, fish were exposed to and metabolised petroleum hydrocarbons, however no consistent adverse effects on fish health or their reproductive activity were detected.
Phase 2 study (March 2010, 5 months after the blowout ceased) – indicated continuing exposure to petroleum hydrocarbons, as detected by elevated liver detoxification enzymes and PAH biliary metabolites in three out of four species collected close to the spill site, and elevated oxidative DNA damage.
Phase 3 study (November 2010, 12 months after the blowout ceased) – showed a trend towards a return to reference levels with often, but not always, comparable biomarker levels in fish collected from reference and impacted sites. This evidence of exposure to petroleum hydrocarbons at sites close to the spill location suggest an ongoing trend toward a return to normal biochemistry/physiology (Gagnon & Rawson 2011).
The main finding of the Gagnon & Rawson (2011) study concluded that there were no detectable petroleum hydrocarbons found in the fish muscle samples, limited ill effects were detected in a small number of individual fish, and no consistent adverse effects of exposure on fish health could be detected within two weeks following the end of the well release. Notwithstanding, fishes from close to the Montara well, collected seven months after the discharge began, showed continuing exposure to hydrocarbons in terms of biomarker responses. Two years after the discharge, biomarker levels in fishes had mostly returned to reference levels, except for liver size. However, this was potentially attributed to local nutrient enrichment, or to past exposure to hydrocarbons. Fishes near Heyward Shoal, approximately 100 km southwest of the Montara well, had elevated biomarker responses indicating exposure to hydrocarbons, but were collected close to the Cornea natural hydrocarbon seep. Studies on the Montara discharge have shown recovery in terms of the abundance and composition of fishes, and toxicological and physiological responses of fishes.
No reports of oil spills in open waters have been reported to cause fish kills (though mortality in aquaculture pens has), which is likely to be because vertebrates can rapidly metabolise and excrete hydrocarbons (Hook et al. 2016).
Recovery of fish assemblages depends on the intensity and duration of an unplanned discharge, the composition of the discharge and whether dispersants are used, as each of these factors influences the level of exposure to potential toxicants. Recovery would also depend on the life cycle attributes of fishes. Species that are abundant,

Fish
short-lived and highly fecund may recover rapidly. However less abundant, long-lived species may take longer to recover. The range of movement of fishes will also influence recovery. The nature of the receiving environment would influence the level of impact on fishes. None of the conservation advices or recovery plans for fish or sharks identify oil spill as a threat. The syngnathid species are most likely to be present in the top 10 m of the water column where oil may be present. The other fish and shark species are either demersal species (bottom dwelling) or pelagic species which swim large distances and hence these species are unlikely to be affected by oil from a diesel spill. Impacts to syngnathid species are more likely close to the spill location which oil concentrations would be highest, however as there are no reef or seagrass areas in the Operational Areas it is unlikely, they would be present in significant numbers. Thus, the predicted level of consequence to fish from a 250 m^3 MDO spill is assessed as minor as consequences will be short-term (days to weeks), recoverable and affect a small portion of the fish population would be unlikely to impede associated food chains within the region, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of low.

9.3.4 Birds

Birds	
Sensitivity Rating	**Medium– seabirds**
	High - aquatic birds, shorebirds
Predicted Level of Risk	**Low – seabirds, aquatic birds**
	Medium - shorebirds
Environmental Planning Area Existing Environment	
The PMST Report (Appendix B5) identified multiple bird species or species habitat within the Environmental Planning Area as detailed in Annex 3 of this document. Several of these bird species were identified to be undertaking biologically important behaviours and/or have BIAs within the Environmental Planning Area. No habitat critical to the survival of the bird species were identified within the Environmental Planning Area. The orange-bellied parrot, which is critically endangered is known to migrate through the Environmental Planning Area, however, it does not land at sea or use coastal areas as habitat so impacts to this species are not predicted. A number of albatross and two petrel species were identified as foraging behaviour known or likely within the Environmental Planning Area as detailed in Annex 3 of this document. Of these the following have foraging BIAs: Antipodean Albatross (Appendix B12 MAP-REG-EPM-059) Black-browed Albatross (Appendix B12 MAP-REG-EPM-060 Buller's Albatross (Appendix B12 MAP-REG-EPM-071) Campbell Albatross (Appendix B12 MAP-REG-EPM-061) Indian Yellow-nosed Albatross (Appendix B12 MAP-REG-EPM-063) Shy Albatross (Appendix B12 MAP-REG-EPM-066) Wandering Albatross (Appendix B12 MAP-REG-EPM-072) Common Diving Petrel (Appendix B12 MAP-REG-EPM-062) White-face Storm Petrel (Appendix B12 MAP-REG-EPM-075 These BIAs cover either most or all the South-east Marine Region (CoA 2015a). In addition, the Common Diving Petrel has a breeding BIA on Lady Julia Percy Island which is within the Environmental Planning Area (Appendix B12 MAP-REG-EPM-062). A breeding BIA was also identified for the White-faced Storm Petrel within the Environmental Planning Area.	

Birds
Albatrosses and petrels are among the most oceanic of all seabirds, and seldom come to land unless breeding (CoA 2022). Albatross and petrel species exhibit a broad range of diets and foraging behaviours, and hence at-sea distributions are diverse. Combined with their ability to cover vast oceanic distances, all waters within Australian jurisdiction can be considered foraging habitat, however the most critical foraging habitat is those waters south of 25° where many species spend the majority of their foraging time (CoA 2022). Albatrosses have a widespread distribution throughout the southern hemisphere. They feed mainly on cephalopods, fish, and crustaceans, using surface feeding or plunge diving to seize their prey (ACAP 2020). Albatrosses are colonial, usually nesting on isolated islands and foraging across oceans in the winter months with most observations along the edge of the continental shelf (CoA 2022). Petrels are oceanic and have a widespread distribution throughout the southern hemisphere. They are colonial and breed on sub-Antarctic and Antarctic islands in a circumpolar band generally between 40°S and 60°S. Petrel species feed on small fish, cephalopods (octopus, squid, and cuttlefish) and crustaceans along the edge of the continental shelf and open waters (CoA 2022). Within the Environmental Planning Area Little Penguin breeding and foraging BIAs occur at Black Pyramid, Christmas Island and Councillor Island in Tasmanian waters (Appendix B12 MAP-REG-EPM-064). A small breeding colony also occurs at Middle Island off Victoria. Breeding typically occurs from September to February, but some birds reside at the colony all year round. The Bass Strait supports approximately 60% of the known breeding population, with additional breeding BIAs outside of the Environmental Planning Area located at Albatross Island (Tasmania), Egg Island (Tasmania), Hunter Island (Tasmania), Phillip Island (Victoria), Sisters Island (Tasmania) and Three Hummock Island (Tasmania). The Little Tern and Short-tailed Shearwater (migratory marine birds) were identified as breeding known to occur in the Environmental Planning Area with a proportion of the Short-tailed Shearwater breeding and foraging BIAs overlapping the Environmental Planning Area (Appendix B12 MAP-REG-EPM-065). Birds are typically present between September to May. The Environmental Planning Area also overlaps breeding and foraging BIAs for the Wedge-tailed Shearwater (Appendix B12 MAP-REG-EPM-067) that covers an area 160 km from Mutton bird Island where birds may be present between August and May. Short-tailed shearwaters (mutton birds) are identified as being culturally significant to the Gunditjmara People and are used in harvesting practice (GMTOAC, 2023). Shearwaters are also identified as culturally significant species to the Eastern Maar people, along with gannets and Little Penguins (Appendix F3, Section 3.16.1). The Black-faced Cormorant has two foraging/breeding BIAs within the Environmental Planning Area, at Christmas Island and Councillor Island just off King Island (Appendix B12 MAP-REG-EPM-074). Breeding usually occurs on rocky islands, but also on stacks, slopes, and sea cliffs in colonies of up to 2,500 individuals (del Hoyo et al. 1992). It feeds in coastal waters, sometimes in sheltered places such as bays and islets and can be found entering rivers along the coast (CoA. 2020a). The Australasian Gannet was identified as having a foraging BIA within the Environmental Planning Area (Appendix B12 MAP-REG-EPM-073). The Australasian Gannet generally feeds over the continental shelf or inshore waters. Their diet is comprised mainly of pelagic fish, but also squid and garfish. Prey is caught mainly by plunge-diving, but it is also seen regularly attending trawlers (CoA 2015a). Several shorebirds were identified from the PMST Report as being present in the Environmental Planning Area with the threatened species, Black-tailed Godwit, Great Knot, Grey Plover, Lesser Sand Plover, Sharp-tailed Sandpiper, Ruddy Turnstone and Terek Sandpiper identified as roosting in the area. No BIAs for shorebirds were identified. Other threatened shorebirds that are known to occur within the Environmental Planning Area are the Australian Painted Snipe, Blue-winged Parrot, Common Greenshank, Curlew Sandpiper, Eastern Curlew, Eastern Hooded Plover, Greater Sand Plover, Latham's Snipe, Red Knot and Western Alaskan Bar-tailed Godwit. These species are commonly found on coastal shores including beaches and rocky shores and either feed at low tide on worms, crustaceans and molluscs or fish species or feed on aquatic biota. Many of the wader species are migratory travelling from the Northern Hemisphere in non-breeding months. Most inhabit intertidal mudflats, rocky islets, sand beaches, mangroves, rocky coastline and coral reefs. Roosting occurs in similar habitats and species are found feeding on fish, crustaceans, aquatic insects, as well as plants and seeds (Higgins & Davies 1996).

Birds
Important coastal habitat where shorebirds are likely to be present within the Environmental Planning Area and have a marine interface are wetlands and shorelines. Impacts to these areas are assessed in the respective sections. The King Island Important Bird Area (IBA) is within the Environmental Planning Area. Birdlife International (2008) detail the following regarding the IBA. The IBA includes the entire coastline of King Island, which supports significant numbers of Hooded Plovers; Lavinia State Reserve, which supports the critically endangered Orange-bellied Parrot and endemic subspecies of bush birds; and three inshore islands which support large numbers of nesting seabirds. These islands are Christmas Island (a 63 ha Nature Reserve), New Year Island (a 98 ha Game Reserve, on which harvesting of shearwaters is allowed) and Councillor Island (11 ha of Crown Land). The coastline is a mixture of rocky outcrops and long sandy beaches with beach-washed kelp. The IBA is defined as the coastal strip extending from the low water mark to 1 km inland of the high-water mark around the entire island; this is intended to capture most significant habitat for shorebirds and Orange-bellied Parrots. Two other IBAs within the Environmental Planning Area are Lawrence Rocks Wildlife Reserve, which consists of two rocky islets off the coast from Portland with a resident Australasian Gannett population, and the Discovery Bay Coast through to Picaninnie Ponds in South Australia with resident populations of Australasian Bittern, Hooded Plover, Rufous Bristlebird and Striated Fieldwren, and non-breeding Orange-bellied Parrot (Parks Victoria 2015).
Predicted Level of Risk
Seabirds, shorebirds, and aquatic birds are sensitive to the impacts of oiling, with their vulnerability arising from the fact that they cross the air-water interface to feed, while their shoreline habitats may also be oiled (Hook et al. 2016). Species that raft together in large flocks on the sea surface are particularly at risk (ITOPF 2011). Toxic effects of hydrocarbons on birds may result where the oil is ingested as the bird attempts to preen its feathers, and the preening process may spread the oil over otherwise clean areas of the body (ITOPF 2011). Whether this toxicity ultimately results in mortality will depend on the amount of hydrocarbons consumed and other factors relating to the health and sensitivity of the bird. Birds that are coated in oil also suffer from damage to external tissues including skin and eyes, as well as internal tissue irritation in their lungs and stomachs. Breeding seabirds may be directly exposed to oil via a number of potential pathways. Any direct impact of oil on terrestrial habitats has the potential to contaminate birds present at the breeding sites (Clarke 2010). Bird eggs may also be damaged if an oiled adult sits on the nest. Fresh crude was shown to be more toxic than weathered crude, which had a medial lethal dose of 21.3 mg/egg (Clarke 2010). Studies of contamination of duck eggs by small quantities of crude oil, mimicking the effect of oil transfer by parent birds, have been shown to result in mortality of developing embryos. Engelhardt (1983), Clark (1984), Geraci & St Aubin (1988) and Jenssen (1994) indicated that the threshold thickness of oil that could impart a lethal dose to some intersecting wildlife individual is 10 µm (~10 g/m^2). Scholten et al (1996) indicates that a layer 25 µm thick would be harmful for most birds that contact the slick. *Seabirds* Birds foraging at sea have the potential to directly interact with oil on the sea surface some considerable distance from breeding sites in the course of normal foraging activities. Species most at risk include those that readily rest on the sea surface such as shearwaters and surface plunging species such as terns and boobies. As seabirds are top order predators, any impact on other marine life (e.g., pelagic fish) may disrupt and limit food supply both for the maintenance of adults and the provisioning of young. In the case of seabirds, direct contact with hydrocarbons is likely to foul plumage, which may result in hypothermia due to a reduction in the ability of the bird to thermo-regulate and impair waterproofing (ITOPF 2011). A bird suffering from cold, exhaustion and a loss of buoyancy resulting from fouling of plumage may dehydrate, drown, or starve (ITOPF 2011, DSEWPC 2011). It may also result in impaired navigation and flight performance (Hook et al. 2016). Increased heat loss as a result of a loss of water-proofing results in an increased metabolism of food reserves in the body, which is not countered by a corresponding increase in food intake and may lead to emaciation (DSEPWC 2011). The greatest vulnerability in this case occurs when birds are feeding or resting at the sea surface (Peakall et al. 1987). In a review of 45 marine hydrocarbon spills, there was no correlation between the numbers of bird deaths and the volume of the spill (Burger 1993). Most of the seabird species that are likely to occur in the Environmental Planning Area forage over an extensive area and are distributed over a wide geographic range. Seabirds plunge diving through the sea surface for prey are most likely to encounter the low concentration of hydrocarbons due to its broader extent than moderate and

Birds
high concentrations. Seabirds rafting, resting, diving or feeding at sea have the potential to come into contact with oil. However, the low threshold level of exposure is not expected to result in the lethal impacts or feather matting and hypothermia. However, contact at the high threshold is expected to impart toxicity and ecological impacts. Though, oil at high thresholds is only predicted within a small area around the spill location and for a short duration (days). The extensive ocean foraging habitat available to species such as albatrosses, petrels, shearwaters and terns and the small area and temporary nature of the hydrocarbon release on the sea surface (~ 24 hours) makes it unlikely that a spill will limit their ability to forage for unaffected prey, nor will the unlikely event of exposure at the sea surface result in permanent injury or mortality. The area where dissolved hydrocarbons would exceed the moderate threshold or entrained hydrocarbons exceed the high threshold during an MDO spill would be relatively small in comparison to the Bass Strait and Otway region where seabirds forage. It is these small areas where sub-lethal or toxic effects to birds may occur. There is a low probability that seabirds would be feeding exclusively or predominantly on fish found in areas of higher hydrocarbon thresholds, thus there is low probability of seabirds experiencing sub-lethal or toxic impacts as a result of consuming hydrocarbon-tainted fish. Seabird interactions with shorelines is expected to be largely during periods of rest and breeding activities. Most seabirds are oceanic and seldom come to land unless breeding in areas associated with burrows on sloping ground in coastal forest, scrubland, shrubland or grassland. As detailed in the assessment of coastal habitats and communities due to the exposed nature of the coastal areas within the Environmental Planning Area and the nature of MDO, long-term toxicity or smothering effects in areas of moderate or high MDO are not expected. The predicted level of consequence to seabirds from a 250 m^3 MDO spill is assessed as minor as consequences are unlikely to occur at thresholds levels where oiling of birds or tainting of food would occur, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of low. *Shorebirds* Shorebirds are likely to be exposed to oil when it directly impacts their intertidal feeding habitat. Shorebird species foraging for invertebrates on exposed sand and mud flats at lower tides will be at potential risk of both direct impacts through contamination of individual birds (ingestion or soiling of feathers) and indirect impacts through the contamination of foraging areas that may result in a reduction in available prey items (Clarke 2010). Shorebird species (e.g., plovers, godwits, curlews, etc.) prefer varying habitats including tidal flats, open saltmarsh, freshwater wetlands, open grasslands and sandy beaches. These habitats on the Victorian coastline inshore of the Operational Area could be exposed to moderate or high threshold shoreline oil due that has not yet evaporated or entrained. Exposure to moderate or high threshold shoreline oil at King Island and the King Island IBA is less likely due to the distance from the Operational Area. Due to the proximity to the Victorian coastline, the predicted level of consequence to shorebirds from a 250 m^3 MDO spill is assessed as moderate as consequences could be longer lasting (> 30 days) if shorebirds are exposure to oil above low threshold, though if consequences occurred, they are likely to only affect a small portion of the shorebird population due to the low volume of oil that would come onshore, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of medium. *Aquatic birds* Penguins may be especially vulnerable to oil because they spend a high portion of their time in the water and readily lose insulation and buoyancy if their feathers are oiled (Hook et al. 2016). The Iron Baron vessel spill (325 tonnes of bunker fuel in Tasmania in 1995) is estimated to have resulted in the death of up to 20,000 penguins (Hook et al. 2016). As characteristic of aquatic birds, Little Penguins forage while swimming and often forage for extended periods of time (dawn to dusk) and may forage up to 50 km from the colony. As such Little Penguins are most at risk of direct contact, ingestion or inhalation while feeding at sea. Little Penguins are most likely to encounter the low concentration of hydrocarbons due to its broader extent than moderate and high concentrations. However, the low threshold level of exposure is not expected to result in

Birds
the lethal impacts of feather matting and hypothermia. The high threshold is expected to impart toxicity and ecological impacts. Given the offshore location of the spill volume, the small area of exposure and temporary nature of the hydrocarbon release on the sea surface (~ 24 hrs) it is unlikely that a spill would limit Little Penguins ability to forage for unaffected prey, nor will the unlikely event of exposure at the sea surface result in permanent injury or mortality. The area of exposure to dissolved hydrocarbons above the moderate threshold and entrained hydrocarbons above the high threshold during an MDO spill are relatively small in comparison to the Bass Strait and Otway region. It is these small areas where sub-lethal or toxic effects may occur. There is a low probability that Little Penguins would be feeding exclusively or predominantly on fish found in areas of higher hydrocarbon thresholds, thus there is low probability of Little Penguins experiencing sub-lethal or toxic impacts as a result of consuming hydrocarbon-tainted fish. The Little Penguin foraging/breeding BIAs on Black Pyramid Island off Tasmania and Christmas Island and Councillor Island off King Island are unlikely to be exposed to oil above the low threshold due to the distance from the Operational Area and low volume of MDO that could be spilt. The predicted level of consequence to aquatic birds (Little Penguins) from a 250 m^3 MDO spill is assessed as minor as consequences are unlikely to occur at thresholds levels where oiling of birds, next or tainting of food would occur, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of low

9.3.5 Marine Reptiles

Marine Reptiles	
Sensitivity Rating	**Medium**
Predicted Level of Risk	**Low**
Environmental Planning Area Existing Environment	
The PMST Report (Appendix B5) identified three turtle species within the Environmental Planning Area, green, leatherback and loggerhead turtle. No BIAs or habitat critical to the survival of the species were identified. The PMST Report also identified foraging, feeding or related behaviour known to occur within area for the leatherback and loggerhead turtle as detailed in Annex 3 of this document. Green turtles' nest, forage and migrate across tropical northern Australia. Green turtles spend their first 5-10 years drifting on ocean currents. Green turtles are predominantly found in Australian waters off the Northern Territory, Queensland, and Western Australian coastlines, with limited numbers in NSW, Victoria, and South Australia (DoEE 2017). Small numbers of leatherback turtles' nest on the Cobourg Peninsula (NT) and there are unconfirmed accounts of leatherback turtles nesting in Western Australia. Leatherback turtles are more commonly found foraging in Australian waters along the east coast and in Bass Strait. The southern waters of Australia are one of five identified foraging sites (where area restricted behaviour occurs) for Leatherback turtles (DoEE 2017). There are two genetically distinct stocks of loggerhead turtles nesting in Australia, one in Queensland (known as the south-west Pacific stock) and one in Western Australia. Loggerhead turtles forage in all coastal states and the Northern Territory, but are uncommon in South Australia, Victoria, and Tasmania (DoEE 2017).	
Predicted Level of Risk	
The Recovery Plan for Marine Turtles (DoEE 2017) identifies oil spill as a threat detailing that there is well documented evidence of the detrimental effects from encountering oil either via external contact, ingestion, or inhalation, resulting in breathing, sight or gastro-intestinal injuries. Sea turtles are vulnerable to the effects of oil at all life stages—eggs, post-hatchlings, juveniles, and adults in nearshore waters. Several aspects of sea turtle biology and behaviour place them at particular risk, including a lack of avoidance behaviour, indiscriminate feeding in convergence zones, and large pre-dive inhalations. Effects of oil on turtles include increased egg mortality and developmental defects, direct mortality due to oiling in hatchlings, juveniles and adults, and negative impacts to the skin, blood, digestive and immune systems and salt glands. Oil exposure affects different turtle life stages in different ways. Thus, information on oil toxicity needs to be organised by life stage. Turtles may be exposed to chemicals in oil in two ways: Internally – eating or swallowing oil, consuming prey containing oil-based chemicals, or inhaling of volatile oil related compounds; and Externally – swimming in oil or dispersants, or oil or dispersants on skin and body. Records of oiled wildlife during spills rarely include marine turtles, even from areas where they are known to be relatively abundant (Short 2011). An exception to this was the large number of marine turtles collected (613 dead and 536 live) during the Macondo spill in the Gulf of Mexico, although many of these animals did not show any sign of oil exposure (NOAA 2013). Of the dead turtles found, 3.4% were visibly oiled and 85% of the live turtles found were oiled (NOAA 2013). Of the captured animals, 88% of the live turtles were later released, suggesting that oiling does not inevitably lead to mortality.	

Marine Reptiles
There is potential for contamination of turtle eggs to result in similar toxic impacts to developing embryos as has been observed in birds. Studies on freshwater snapping turtles showed uptake of PAHs from contaminated nest sediments, but no impacts on hatching success or juvenile health following exposure of eggs to dispersed weathered light crude (Rowe et al. 2009). However, other studies found evidence that exposure of freshwater turtle embryos to PAHs results in deformities (Bell et al. 2006, Van Meter et al. 2006). Turtles may experience oiling impacts on nesting beaches and eggs through chemical exposure, resulting in decreased survival to hatching and developmental defects in hatchlings. Turtle hatchlings may be more vulnerable to smothering as they emerge from the nests and make their way over the intertidal area to the open water (AMSA 1998). Hatchlings that contact oil residues while crossing a beach can exhibit a range of effects including impaired movement and bodily functions (Shigenaka 2003). Hatchlings sticky with oily residues may also have more difficulty crawling and swimming, rendering them more vulnerable to predation. Ingested oil may cause harm to the internal organs of turtles. Oil covering their bodies may interfere with breathing because they inhale large volumes of air to dive. Oil can enter cavities such as the eyes, nostrils, or mouth. Turtles may experience oiling impacts on nesting beaches when they come ashore to lay their eggs, and their eggs may be exposed during incubation, potentially resulting in increased egg mortality and/or possibly developmental defects in hatchlings. There are no turtle nesting sites within the Environmental Planning Area thus impacts to turtling eggs, post-hatchlings and juveniles are not predicted. Turtle interaction with surface oil is likely to include direct contact due to resting behaviours floating on the sea surface and through inhalation of volatile compounds in the vicinity of unweathered MDO. At moderate and high concentrations, toxicity impacts may occur including sub-lethal irritation of skin or cavities. However, due to the absence of turtle BIAs and nesting locations in the Environmental Planning Area. As low numbers of turtles forage or migrate through the Otway area, individual marine reptiles may come into contact with hydrocarbons on the sea surface or within the water column. This is most likely to be at the low threshold levels as exposure levels above the low thresholds would be within a small area of the spill location for a short period of time (~24 hours). Thus, the predicted level of consequence to marine turtles from a 250 m^3 MDO spill is assessed as minor as consequences will be short-term (days to weeks), recoverable and affect a small portion of the marine turtle population the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of low.

9.3.6 Marine Mammals

Marine Mammals	
Sensitivity Rating	Medium
Predicted Level of Risk	Medium
Environmental Planning Area Existing Environment	
The PMST Report for the Environmental Planning Area (Appendix B5) identified the following for marine mammals: Three species (Blue, Fin and Sei whales) with foraging, feeding or related behaviour known to occur within area. Pygmy blue whale foraging (annual high use area) BIA and known foraging area BIA. Southern Right Whale breeding and migration known to occur within area. Australian Fur-seal breeding known to occur within area. New Zealand Fur-seal and Australian Sea-lion may occur in the area. Six dolphin species likely or may occur in the area. 25 whale species likely or may occur in the area. In addition, the Environmental Planning Area overlaps the Southern Right Whale BIAs for reproduction and migration. During consultation, the cultural significance of marine mammals, such as the Southern Right Whale, Blue Whale, Killer Whale, dolphins, seals, and sea lions were highlighted, with connections to songlines, totemic value and kinship, and cultural practices (Appendix F3, Section 3.16.1). The National Recovery Plan for Southern Right whale describes Whale Birthing Dreaming Sites being in coastal bay areas from Port Campbell to Portland, including Warrnambool. These places on Gunditjmara Country are known resting and feeding sites for mothers and calves and are directly related to Gunditjmara Neeyn (midwives), explaining why Gunditjmara is a Matrilineal Nation. (DCCEEW, 2024) More information is provided on those species undertaking biologically important behaviour within the Environmental Planning Area. Australian Fur-seal Australian fur-seals (*Arctocephalus pusillus*) breed on islands of the Bass Strait but range throughout waters off the coasts of South Australia, Tasmania, Victoria and NSW. Numbers of this species are believed to be increasing as the population recovers from historic hunting (Hofmeyr et al. 2008). The species is endemic to south-eastern Australian waters. In Victorian waters they breed on offshore islands, including Lady Julia Percy Island, Seal Rocks in Westernport Bay, Kanowna and Rag Islands off the coast of Wilson's Promontory and The Skerries off Wingan Inlet in Gippsland. In Tasmanian waters they breed on Reid Rocks. There are important breeding sites on Lady Julia Percy Island	

Marine Mammals
and Seal Rocks, with 25% of the population occurring at each of these islands. Their preferred breeding habitat is a rocky island with boulder or pebble beaches and gradually sloping rocky ledges. Haul out sites with occasional pup births are located at Cape Bridgewater, at Moonlight Head, on various small islands off Wilsons Promontory and Marengo Reef near Apollo Bay. Australian fur-seals are present in the region all year, with breeding taking place during November and December. Research being undertaken at Lady Julia Percy Island indicates that adult females feed extensively in the waters between Portland and Cape Otway, out to the 200 m bathymetric contour. Seal numbers on the island reach a maximum during the breeding season in late October to late December. By early December, large numbers of lactating females are leaving for short feeding trips at sea and in late December there is an exodus of adult males. Thereafter, lactating females continue to alternate between feeding trips at sea and periods ashore to suckle their pups. Even after pups begin to venture to sea, the island remains a focus, and at any time during the year groups may be seen ashore resting (Robinson et al. 2008, Hume et al. 2004, Arnould & Kirkwood 2007). Lady Julia Percy Island and Reid Rocks are within the Environmental Planning Area as is the haul out area at Cape Bridgewater. Blue whale The Blue Whale (*Balaenoptera musculus*) is listed as an endangered species under the EPBC Act. There are two subspecies of blue whales that use Australian waters (including Australian Antarctic waters), the Pygmy Blue Whale (*B. m. brevicauda*) and the Antarctic Blue Whale (*B. m. intermedia*). The Otway region, where the Operational Area is located, is an important migratory and foraging area for Blue Whales, as shown by passive acoustic monitoring and aerial surveys (Gavrilov 2012, McCauley et al. 2018, Gill et al. 2011). Underwater acoustic monitoring programs have detected Antarctic and Pygmy Blue Whale calls in the Otway Region (McCauley et al. 2018). Important foraging grounds for Blue Whales include the Great Australian Bight, South Australia, and off Portland Victoria. Research to date has found that Pygmy Blue Whales occupy the western area of the Bonney Upwelling system in the Eastern Great Australian Bight and adjacent to the Kangaroo Island canyons from November and December (DoE 2015c). Pygmy Blue Whales then move south-east to the Bonney Upwelling system off eastern South Australia and Victoria (e.g., between Robe, SA and Cape Otway, Vic). This occurs predominately between January to April (DoE 2015). The Blue Whale was extremely abundant until the early 20th century when they were hunted to near extinction. Approximately 341,830 Blue Whale takes were recorded by commercial whaling in the Antarctic and sub-Antarctic in the 20th century, of which 12,618 were identified as Pygmy Blue Whales (Branch et al. 2004). The current global population of Blue Whales is uncertain but is plausibly in the range of 10,000 to 25,000, corresponding to about 3-11% of the 1911 estimated population size (Reilly et al. 2008). The Environmental Planning Area is within the foraging (annual high use) and known foraging area BIA where blue whales predominately occur between January to April (DoE 2015) (Appendix B12 MAP-REG-EPM-068). Fin whale The Fin Whale is a cosmopolitan migratory species that is listed as vulnerable and occurs from polar to tropical waters but is rarely sighted in inshore waters. Fin Whales show well defined migratory movements between polar, temperate and tropical waters which are essentially north–south with little longitudinal dispersion. While Australian Antarctic waters are important feeding grounds for Fin Whales, the species also feeds in the Bonney Upwelling during summer/autumn sometimes in the company of Blue and Sei Whales (DCCEEW 2023b). Areas of upwelling and interfaces with mixed and stratified waters may be an important feature of Fin Whale feeding habitat with the species feeding on planktonic crustacea, krill, some fish, and cephalopods (DCCEEW 2023b). Fin Whales frequently lunge or skim feed at or near the surface and they are known to dive to 230 m to feed. There are no BIAs for the Fin Whale within Australian waters. Fin Whales are likely to be foraging in the Environmental Planning Area at similar time as Blue Whales, predominately occur between January to April.

Marine Mammals
Sei Whale The Sei Whale is listed as vulnerable under the EPBC Act. Sei Whales are considered a cosmopolitan species, ranging from polar to tropical waters, but tend to be found more offshore than other species of large whales. Sei Whales move between Australian waters and Antarctic feeding areas; subantarctic feeding areas (e.g. Subtropical Front); and tropical and subtropical breeding areas. The proportion of the global population in Australian waters is unknown as there are no estimates for Sei Whales in Australian waters. In Australia, Sei Whales occur within Australian Antarctic Territory waters and Commonwealth waters, and have been infrequently recorded off Tasmania, NSW, Queensland, the Great Australian Bight, Northern Territory and Western Australia (Parker 1978, Bannister et al. 1996, Thiele et al. 2000, Chatto and Warneke 2000, Bannister 2008). Sightings of Sei Whales within Australian waters includes areas such as the Bonney coast upwelling off South Australia (Miller et al. 2012), where opportunistic feeding has been observed between November and May (Gill et al. 2015). There are no BIAs for the Sei Whale within Australian waters. Sei Whales are likely to be foraging in the Environmental Planning Area at similar time as Blue Whales, predominately occur between January to April. Southern Right Whale The Southern Right Whale (*Eubalaena australis*) is listed as endangered under the EPBC Act. Southern Right Whales were depleted to less than 300 individuals globally due to commercial whaling in the 19th and 20th centuries (Tormosov et al. 1998). They were protected from whaling in 1935 however, due to illegal whaling in the 1970s and because Southern Right Whales have a slow rate of increase (7% per annum) compared to other marine mammals, their numbers remain low (IWC 2013). Global abundance estimates are 13,000 for the species, across key wintering grounds in South Africa, Argentina, Australia, and New Zealand. Southern Right Whales are distributed in the Southern Hemisphere with a circumpolar distribution between latitudes of 16°S and at least 65°S. They migrate from southern feeding grounds in sub-Antarctic waters to Australia in between May and November to calve, mate and rest (Bannister et al. 1996, DCCEEW 2024). They are distributed across thirteen primary aggregation areas along the southern coast of Australia. In Australian coastal waters, they occur along the southern coastline of the mainland and Tasmania and generally extend as far north as Sydney on the east coast and Perth on the west coast (CoA 2012). There are occasional sightings further north, with the extremities of their range recorded at Hervey Bay and Exmouth (CoA 2012). The peak period for Southern Right Whale mating is from mid-July through to August (CoA 2012). Pregnant females generally arrive during late May/early June and depart with calves in September to October however the general time of arrivals and departures varies on an inter-annual basis. Calving females are known to have high site fidelity and a 3 to 4-year calving interval. Other population classes stay for shorter and variable periods undertaking coastal movements and departing the coast earlier than female-calf pairs (CoA 2012). The Environmental Planning Area overlaps the Southern Right Whale reproduction and migration BIAs (Appendix B12 MAP-REG-EPM-069).
Predicted Level of Risk
Marine mammals may be exposed to the chemicals in oil through: • Internal exposure by consuming oil or contaminated prey. • Inhaling volatile oil compounds when surfacing to breathe. • Dermal contact, by swimming in oil and having oil directly on the skin and body (NRDA 2012, Hook et al. 2016). The effects of this exposure include:

Marine Mammals
• Maternal transfer of contaminants to embryos. • Hypothermia due to conductance changes in skin, resulting in metabolic shock (expected to be more problematic for non-cetaceans in colder waters). • Toxic effects and secondary organ dysfunction due to ingestion of oil. • Congested lungs. • Damaged airways. • Interstitial emphysema due to inhalation of oil droplets and vapour. • Gastrointestinal ulceration and haemorrhaging due to ingestion of oil during grooming and feeding. • Eye and skin lesions from continuous exposure to oil. • Decreased body mass due to restricted diet. • Stress due to oil exposure and behavioural changes. Whales and Dolphins French-McCay (2009) identifies that a 10–25 µm oil thickness threshold has the potential to impart a lethal dose on marine species, however, they also estimate a probability of 0.1% mortality to cetaceans if they encounter these thresholds based on the proportion of the time spent at surface. Direct surface oil contact with hydrocarbons is considered to have little deleterious effect on whales, possibly due to the skin's effectiveness as a barrier to toxicity, as such effect of oil on cetacean skin is probably minor and temporary (Geraci & St Aubin 1988). Cetaceans in particular have mostly smooth skins with limited areas of pelage (hair covered skin) or rough surfaces such as barnacled skin. Oil tends to adhere to rough surfaces, hair, or calluses of animals, so contact with hydrocarbons by cetaceans is expected to cause only minor hydrocarbon adherence. The physical impacts from ingested hydrocarbon with subsequent lethal or sub-lethal impacts are both applicable to entrained oil. However, the susceptibility of cetaceans varies with feeding habits. Baleen whales (such as blue, fin, humpback and sei whales) are not particularly susceptible to ingestion of oil in the water column but are susceptible to oil at the sea surface as they feed by skimming the surface. Oil may stick to the baleen while they 'filter feed' near slicks. Sticky, tar-like residues are particularly likely to foul the baleen plates. The inhalation of oil droplets, vapours and fumes is a distinct possibility if whales surface in slicks to breathe. Exposure to hydrocarbons in this way could damage mucous membranes, damage airways, or even cause death. Toothed whales and dolphins may be susceptible to ingestion of dissolved and entrained oil as they gulp feed at depth. There are reports of declines in the health of individual pods of killer whales (a toothed whale species), though not the population as a whole, in Prince William Sound after the Exxon Valdez vessel spill (heavy oil) (Hook et al. 2016). It has been stated that pelagic species will avoid hydrocarbon, mainly because of its noxious odours, but this has not been proven. The strong attraction to specific areas for breeding or feeding (e.g., use of the Warrnambool coastline as a nursery area for southern right whales) may override any tendency for cetaceans to avoid the noxious presence of hydrocarbons. So weathered or tar-like oil residues can still present a problem by fouling baleen whales feeding systems. Dolphin populations from Barataria Bay, Louisiana, USA, which were exposed to prolonged and continuous oiling from the Macondo oil spill in 2010, had higher incidences of lung and kidney disease than those in the other urbanised environments (Hook et al. 2016). The spill may have also contributed to unusually high perinatal mortality in bottlenose dolphins (Hook et al. 2016).

Marine Mammals
There is the potential for the survey to occur when blue, fin and sei whales are foraging in the areas If present, these species may be exposed to oil externally and via ingestion whilst feeding. If large quantities of zooplankton exposed to the spill were ingested, chronic toxicity impacts may occur. However, as oil exposure above low thresholds will only occur within a small area at the spill source and for ~24 hours biological consequences of physical contact with localised areas of low concentrations of hydrocarbons are unlikely to lead to any long-term population impacts, with temporary skin irritation and very light fouling/matting of baleen plates likely to occur.
Southern Right Whales may also be present in the area of oil exposure and they and their calves could be exposed to oil. However, as oil exposure above low thresholds will only occur within a small area at the spill source and for ~ 24 hours biological consequences of physical contact with localised areas of low concentrations of hydrocarbons are unlikely to lead to any long-term population impacts.
It is unlikely that highly mobile and transient species that are not undertaking biologically important behaviour would be affected by exposure to oil within the relatively small area of the Environmental Planning Area and that oil exposure above low thresholds will only occur within a small area at the spill source.
The predicted levels of consequence to whales and dolphins from a 250 m^3 MDO spill is assessed as moderate as exposure to oil above low thresholds could occur to whales undertaking biologically important behaviours (feeding, reproduction), though if consequences occurred, they are likely to only affect a small portion of the population due to the low spill volume and short duration of any exposure the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of medium.
Pinnipeds
Pinnipeds are vulnerable to sea surface exposures given they spend much of their time on or near the surface of the water as they need to surface every few minutes to breathe and regularly haul out on to beaches. Pinnipeds are also sensitive as they will stay near established colonies and haul-out areas, meaning they are less likely to practice avoidance behaviours. This is corroborated by Geraci & St. Aubin (1988) who suggest seals, sea- lions and fur-seals have been observed swimming in oil slicks during a number of documented spills.
Exposure to surface oil can result in skin and eye irritations and disruptions to thermal regulation. As a result of exposure to surface oils, pinnipeds, with their relatively large, protruding eyes are particularly vulnerable to effects such as irritation to mucous membranes that surround the eyes and line the oral cavity, respiratory surfaces, and anal and urogenital orifices. Hook et al (2016) reports that seals appear not to be very sensitive to contact with oil, but instead to the toxic impacts from the inhalation of volatile components.
For some pinnipeds, fur is an effective thermal barrier because it traps air and repels water. Petroleum stuck to fur reduces its insulative value by removing natural oils that waterproof the pelage. Consequently, the rate of heat transfer through fur seal pelts can double after oiling (Geraci & St. Aubin 1988), adding an energetic burden to the animal. Kooyman et al (1976) suggest that in fact, fouling of approximately one-third of the body surface resulted in 50% greater heat loss in fur seals immersed in water at various temperatures. Fur-seals are particularly vulnerable due to the likelihood of oil adhering to fur. Heavy oil coating and tar deposits on fur-seals may result in reduced swimming ability and lack of mobility out of the water. Davis and Anderson (1976) observed two Gray Seal pups drowning, their "flippers stuck to the sides of their bodies such that they were unable to swim".
However, pinnipeds other than Fur-seals are less threatened by thermal effects of fouling, if at all. Oil has no effect on the relatively poor insulative capacity of sea-lion and bearded and ringed seal pelts; oiled Weddell seal samples show some increase in conductance (Oritsland 1975, Kooyman et al. 1976, 1977). ITOPF (2011) documents impacts on species that rely on fur to regulate their body temperature (such as fur-seals), demonstrating these species are most vulnerable to oil as the animals may die from hypothermia or overheating, depending on the season, if the fur becomes matted with oil.

Marine Mammals
It is reported that most pinnipeds scratch themselves vigorously with their flippers and do not lick or groom themselves, so are less likely to ingest oil from skin surfaces (Geraci & St. Aubin 1988). However, mothers trying to clean an oiled pup may ingest oil. All pinnipeds examined to date have the enzyme systems necessary to convert absorbed hydrocarbons into polar metabolites, which can be excreted in urine (Engelhardt 1982, Addison and Brodie 1984, Addison et al. 1986). Ingested hydrocarbons can irritate or destroy epithelial cells that line the stomach and intestine, thereby affecting motility, digestion and absorption. However, pinnipeds have been found to have the enzyme systems necessary to convert absorbed hydrocarbons into polar metabolites, which can be excreted in urine (Engelhardt 1982, Addison & Brodie 1984, Addison et al. 1986). Geraci & St. Aubin (1988) suggest that a small phocid weighing 50 kg might have to ingest approximately 1 litre of oil to be at risk. Volkman et al (1994) report that benzene and naphthalene ingested by seals is quickly absorbed into the blood through the gut, causing acute stress, with damage to the liver considered likely. If ingested in large volumes, hydrocarbon, may not be completely metabolised, which may result in death. Breeding colonies (used to birth and nurse until pups are weaned) are particularly sensitive to hydrocarbon spills (Higgins & Gass 1993). Pinnipeds also appear to rely on scent to establish a motherpup bond (Sandegren 1970, Fogden 1971), and consequently oil-coated pups may not be recognisable to their mothers. This is only theorised, with studies and research indicating interaction between mothers and oiled pups were normal (Davis and Anderson 1976, Davies 1949, Shaughnessy & Chapman 1984). The long-term Environmental Impact and Recovery report for the Iron Barren oil spill (in Tasmania, 1995) concluded that “The number of seal pups born at Tenth Island in 1995 was reduced when compared to previous years. There was a strong relationship between the productivity of the seal colonies and the proximity of the islands to the oil spill wherein the islands close to the spill showed reduced pup production and those islands more distant to the oil spill did not” (Tasmanian SMPC 1999). Australian sea-lions have ‘naturally poor recovery abilities’ due to ‘unusual reproductive biology and life history’ (TSSC 2005). Due to the extreme philopatry of females and limited dispersal of males between breeding colonies, the removal of only a few individuals annually may increase the likelihood of decline and potentially lead to the extinction of some of the smaller colonies. Extinction of breeding colonies has the potential to further reduce genetic diversity and the already limited genetic flow between colonies. This, in turn, may weaken the genetic resilience of the species and impact on its ability to cope with other natural or anthropogenic impacts. In addition, the extreme philopatry of females suggests that extinction of breeding colonies may lead to a contraction of the range of the species as re-colonisation of breeding sites via immigration is limited. For the reasons outlined above, small breeding colonies are under particular pressure of survival from even low levels of anthropogenic mortality. As highly mobile species, in general it is very unlikely that marine mammals will be constantly exposed to concentrations of hydrocarbons in the water column for continuous durations (e.g., >96 hours) that would lead to chronic toxicity effects. There is the potential for Lady Julia Percy Island and Cape Bridgewater to be exposed to oil above the low threshold levels, though unlikely for Reid Rocks due to the distance from the Operational Area. Thus, seals at Lady Julia Percy Island and Cape Bridgewater could be exposed to oil at levels that could result in some level of impact. As diesel is a light fuel and readily evaporates matting and heavy coating of fur is not predicted. Impacts from inhalation of vapours is more likely as the diesel evaporates resulting in irritations to mucous membranes. Ingestion and tainting of prey are less likely as pinnipeds have large foraging ranges and are less likely to be exposed to oil above low thresholds in the water column. The predicted level of consequence to pinnipeds from a 250 m^3 MDO spill is assessed as moderate as exposure to oil above low thresholds could occur to breeding and haul out locations, though if consequences occurred, they are likely to only affect a small portion of the population due to the low spill volume and short duration of any exposure the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of medium.

9.4 Change in Ecosystem Dynamics

9.4.1 Benthic Assemblages

Benthic Assemblages	
Sensitivity Rating	**Medium**
Predicted Level of Risk	**Medium**
Environmental Planning Area Existing Environment	
Benthic assemblages are biological communities that live in or on the seabed. They typically contain light-dependent taxa such as algae, seagrass and corals, which obtain energy primarily from photosynthesis, and/or animals such as molluscs, sponges and worms. Benthic habitats are the seabed substrates that benthic communities grow on or in; these can range from unconsolidated sand to hard substrates (e.g., limestone) and occur either singly or in combination. Given that MDO would only be present on the sea surface or within the water column to a depth of 10 m (RPS 2019a) the existing environment covers those benthic assemblages along the Victorian, South Australian and King Island coastlines within the Environmental Planning Area. Rocky reefs and hard grounds are located in all areas of the South-east Marine Region continental shelf including Bass Strait, from the sub-tidal zone shore to the continental shelf break. On the continental shelf, rocky reefs and hard grounds provide attachment sites for macroalgae and sessile invertebrates, increasing the structural diversity of shelf ecosystems. The reefs provide habitat and shelter for fish and are important for aggregations of biodiversity and enhanced productivity. The shallowest depth at which the rocky reefs occur in Commonwealth waters is approximately 50 m (CoE 2015a). Corals do not occur as a dominant habitat type within the Environmental Planning Area. Reef development by hard corals does not occur further south than Queensland (Tzioumis and Keable, 2007). Soft corals are typically present in deeper waters throughout the continental shelf, slope and off-slope regions, to well below the limit of light penetration (BBG 2003, Boreen et al. 1993). Gorgonian corals (soft corals) were identified during seabed surveys of the Beach Otway Development area within the Environmental Planning Area (Ramboll 2020). James et al (2013) undertook extensive surveys of macroalgal communities along the Otway Shelf from Warrnambool to Portland in south-west Victoria. Sites were adjacent to shore or on offshore rocky reefs covering a depth range of 0 to 36 meters water depth. These surveys did not locate giant kelp at any site but identified that other brown algae species (Durvillaea, Ecklonia, Phyllospora, Cystophora, and Sargassum) are prolific to around 20 m water depth. Brown algae tend to be replaced by red algae in deeper waters. Bull kelp or southern bull kelp (Durvillaea potatorum) is a fast-growing brown macroalgae (seaweed) with large dark brown and leathery strap-like blades. It consists of a body, called the thallus, with a stipe connecting the blades to the holdfast (a structure adhering the bull kelp to the seafloor. Offshore Victoria and Tasmania there are two main species of Durvillaea, these are D. potatorum and D. amatheiae. The approximate distribution of the species is shown in Figure D4-1 with locations within the Environmental Planning Area. Bull kelp is a significant habitat. The holdfast can be inhabited by a diverse array of epifauna and infauna invertebrates. These burrow into the holdfast creating holes that can be used by a wide variety of animals. In addition, bull kelp grows in large groups or forests that can become important nursery areas and sanctuary areas for fish, crustaceans and other fauna. Bull kelp has a long history of use by First Nations in Australia, New Zealand, and Chile. In Australia this reportedly dates back 65,000 years	

Benthic Assemblages
(Thurstan et al. 2018). First Nation people in Tasmania used dried bull kelp to transport water and food. The species name came from this use: potatorum means 'to drink' in Latin (Govt of SA 2023). Wadawurrung Traditional Owners Aboriginal Corporation describe in their Country Plan how kelp forests, with their giant and bull kelps, serve as a habitat for numerous native species, as well as being used to create water carriers (WTOAC 2020). Thurstan et al. (2018) details several First Nations historical references for bull kelp including: Cultural activities and cultural history –mythology and sacred songs. Ceremonial activities –being burned or being used during smoking ceremonies. Medicinal use –bandages and medicinal poultice. Clothing – cloaks and shoes. Diet – raw, jelly, dried and roasted (preserving for several months). Fishing – ropes and fishing nets / traps, traps for short-finned eels, also used to assist during diving for crayfish. Shelter – waterproofing, wind proofing and carpeting. Bulk kelp is also collected by the seaweed industry as described in the assessment of Commercial fishing and aquaculture.

Benthic Assemblages

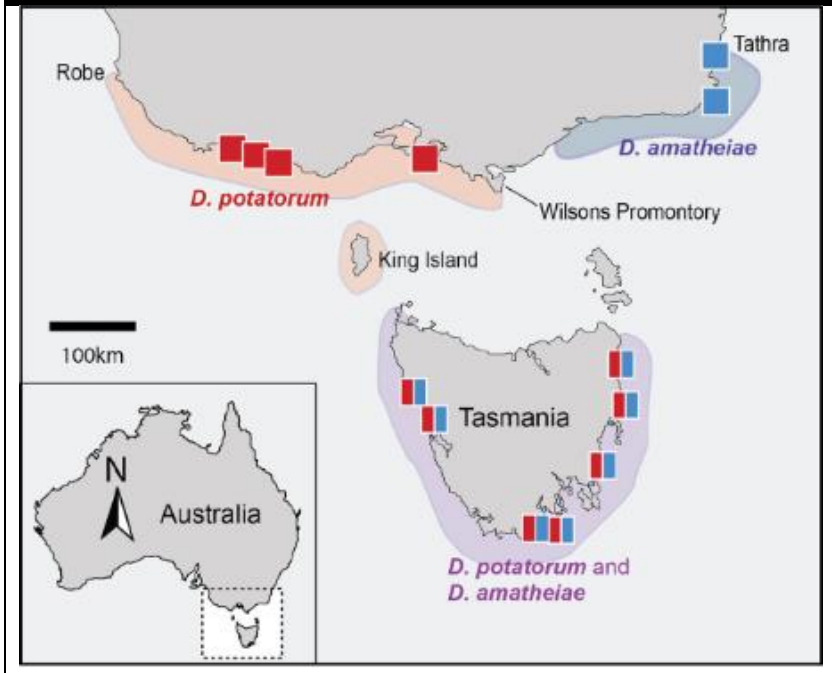

Figure D4-1 - Distribution of bull kelp off Victoria and Tasmania (Velasquez et al. 2029)

The PMST Report (Appendix B5) for the Environmental Planning Area did not identify any Key Ecological Features with benthic habitats in water depths > 10 m.

The PMST Report (Appendix B5) for the Environmental Planning Area did identify the Giant Kelp Marine Forests of South East Australia threatened ecological community. The Giant Kelp Forests of South East Australia ecological community is defined as giant kelp growing typically at depths greater than eight metres below sea level and forming a closed or semi-closed surface or sub-surface canopy (TSSC 2012). The ecological community is characterised by a closed to semi-closed surface or subsurface canopy of Macrocystis pyrifera which is the only species of kelp able to provide this three-dimensional structure from the sea floor to the sea surface, so if giant kelp plants are lost or removed, the ecological community no longer exists (TSSC 2012). The giant kelp forests provide habitat for other marine flora such as seaweeds and marine fauna including fish, molluscs (sea snails), bryozoans (lace corals), polychaetes (worms), crustaceans (crabs, isopods, amphipods), echinoderms (sea urchins, seastars) and sponges (TSSC 2012). There distribution is restricted to waters off the coast of Tasmania particularly in the Bruny, Freycinet and Davey bioregions, but also the Boags and Franklin, Flinders and Otway bioregions, the coast of South Australia in the Otway and Coorong bioregions as far west as Margaret Bock Reef and the coast of Victoria in the Otway, Flinders, Central Victoria and Twofold Shelf bioregions as far east as Gabo Island.

Benthic Assemblages
Predicted Level of Risk
Studies of offshore benthic seaweeds in the northwest Gulf of Mexico prior to and after the Macondo well blowout at Sackett and Ewing banks (in water depths of 55–75 m) found a dramatic die-off of seaweeds after the spill (60 species pre-spill compared with 10 species post-spill) (Felder et al. 2014). Benthic decapod assemblages (crabs, lobsters, prawns) associated with the seaweeds and benthic substrate also showed a strong decline in abundance at both banks post-spill (species richness on Ewing Bank reduced by 42% and on Sackett Bank by 29%), though it is noted that these banks are exposed to influences from Mississippi River discharges that vary year to year, so definitive links to the oil spill are not possible. It is noted, however, that petroleum residues were observed on Ewing Bank, and it is possible that this may have caused localised mortalities, reduced the fecundity of surviving female decapods or reduced recruitment (Felder et al. 2014). Felder et al (2014) also notes that freshly caught soft-sediment decapod samples caught in early and mid-2011 near the spill site exhibited lesions that were severe enough to cause appendage loss and mortality. Water quality in benthic habitats exposed to entrained hydrocarbons would be expected to return to background conditions within weeks to months of contact. Several studies have indicated that rapid recovery rates may occur even in cases of heavy oiling (Committee on Oil in the Sea 2003). Studies undertaken after the Montara oil spill incident included diver surveys to assess the status of Ashmore, Cartier and Seringapatam coral reefs. These found that other than a region-wide coral bleaching event caused by thermal stress (i.e. caused by sea water exceeding 32°C), the condition of the reefs was consistent with previous surveys, suggesting that any effects of oil reaching these reefs was minor, transitory, or sub-lethal and not detectable (Heyward et al. 2010). This is despite AMSA observations of surface slicks or sheen nears these shallow reefs during the spill (Heyward et al. 2010). Surveys in 2011 indicated that the corals exhibiting bleaching in 2010 had largely survived and recovered (Heyward et al. 2012), indicating that potential exposure to hydrocarbons while in an already stressed state did not have any impact on the healthy recovery of the coral. Macroalgae are generally limited to growing on intertidal and subtidal hard substrata in shallow waters within the photic zone. As such, they may be exposed to subsurface and entrained and dissolved hydrocarbons, however, are susceptible to surface hydrocarbon exposure more so in intertidal habitats as opposed to subtidal habitats. Smothering, fouling, and asphyxiation are some of the physical effects that have been documented from oil contamination in marine plants (Blumer 1971, Cintron et al. 1981). In macroalgae, oil can act as a physical barrier for the diffusion of CO_2 across cell walls (O'Brian & Dixon 1976). The effect of hydrocarbons, however, is largely dependent on the degree of direct exposure and how much of the hydrocarbon adheres to algae, which will vary depending on the oils physical state and relative 'stickiness'. The morphological features of macroalgae, such as the presence of a mucilage layer or the presence of fine 'hairs' will influence the amount of hydrocarbon that will adhere to the algae. A review of field studies conducted after spill events by Connell et al (1981) indicated a high degree of variability in the level of impact, but in all instances, the algae appeared to be able to recover rapidly from even very heavy oiling. The rapid recovery of algae was attributed to the fact that for most algae, new growth is produced from near the base of the plant while the distal parts (which would be exposed to the oil contamination) are continually lost. Other studies have indicated that kelp beds oiled by crude oil had a 90% recovery within 3-4 years of impact, however full recovery to pre-spill diversity may not occur for long periods after the spill (French- McCay 2004). Intertidal macroalgal beds are more prone to oil spills than subtidal beds because, although the mucous coating prevents oil adherence, oil that is trapped in the upper canopy can increase the persistence of the oil, which impacts upon site-attached species. Additionally, when oil sticks to dry fronds on the shore, they can become overweight and break as a result of wave action (IPIECA 2002). The toxicity of hydrocarbons to macroalgae varies for the different macroalgal life stages, with water-soluble hydrocarbons more toxic (Van Overbeek and Blondeau 1954, Kauss et al. 1973 cited in O'Brien and Dixon, 1976). Toxic effect concentrations for hydrocarbons and algae have varied greatly among species and studies, ranging 0.002–10,000 ppm (Lewis & Pryor 2013). The sensitivity of gametes, larva and zygote stages however have all proven more responsive to petroleum oil exposure than adult growth stages (Thursby and Steele 2004, Lewis & Pryor 2013).

Benthic Assemblages
Macrophytes, including seagrasses and macroalgae, require light to photosynthesise. So, in addition to the potential impacts from direct smothering or exposure to entrained and dissolved hydrocarbons, the presence of entrained hydrocarbon within the water column can affect light qualities and the ability of macrophytes to photosynthesise. Experiments verified the susceptibility *of Nereocystis luetkeana* (bull kelp – North America) tissue to the direct exposure to several petroleum types. Antrim et al (1995) showed that petroleum treatments resulted in visible tissue damage, with a distinct bleached line being the most visible indication of plant contact with the petroleum. Moderate to heavy colour loss, which was generally followed by rapid decay of tissue, was most pronounced in 24 h exposures to unweathered and weathered diesel. Due to the exposed nature of the coastal areas within the Environmental Planning Area and the nature of MDO, long-term effects in areas of moderate MDO exposure are not expected and natural weathering should result in rapid recovery of communities. MDO shoreline loading at the high threshold is not predicted due to the low spill volume. Consequently, impacts resulting in the loss of coastal seaweed to the extent that coastal erosion could be affected are not predicted. [Paragraph added in response to Matter: E14]. The predicted level of consequence to benthic assemblages from a 250 m^3 MDO spill is assessed as moderate as the consequences could be longer lasting (> 30 days) if kelp and other macroalgal areas are exposure to oil above the low threshold level, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of medium.

9.4.2 Coastal Habitats and Coastal Communities

Coastal Habitats and Communities	
Sensitivity Rating	**Medium**
Predicted Level of Risk	**Medium**
Environmental Planning Area Existing Environment	
The Environmental Planning Area overlaps a wide variety of shorelines along Victoria, South Australia, and King Island. Coastal habitats which have the potential to be contacted by MDO spill include sandy shorelines, rocky shorelines, and saltmarsh. Mangroves are not present along the west coast of Victoria or King Island where the Environmental Planning Area. Coastal resources, specifically shell middens and flint, have been identified as having cultural value to the Gunditjmara and Eastern Maar people (Appendix F3, Section 3.16.1). Sandy and rocky shorelines are the dominant the coastal habitats within the Environmental Planning Area. The PMST Report (Appendix B5) for the Environmental Planning Area identified the following Threatened Ecological Communities that are present on the shoreline: • Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community. • Subtropical and Temperate Coastal Saltmarsh. • King Island Scrub Complex The Subtropical and Temperate Coastal Saltmarsh TEC occurs in a relatively narrow strip along the Australian coast, within the boundary along 23°37' latitude along the east coast and south from Shark Bay on the west coast of WA (TSSC 2013). The community is found in coastal areas which have an intermittent or regular tidal influence. The coastal saltmarsh community consists mainly of salt-tolerant vegetation including grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses generally dominate, and vegetation is generally less than 0.5 m in height (Adam 1990). In Australia, the vascular saltmarsh flora may include many species, but is dominated by relatively few families, with a high level of endism at the species level. The saltmarsh community is inhabited by a wide range of infaunal and epifaunal invertebrates and low and high tide visitors such as fish, birds and prawns (Adam 1990). It is often important nursery habitat for fish and prawn species. Insects are also abundance and an important food source for other fauna. The dominant marine residents are benthic invertebrates, including molluscs and crabs (Ross et al. 2009). Saltmarsh communities are threatened by clearing and fragmentation, land reclamation, altered hydrology and tidal restriction, invasive species, climate change, mangrove encroachment, recreation, eutrophication, grazing, insect control and inappropriate fire regimes (TSSC 2013). The coastal saltmarsh community provides extensive ecosystem services such as the filtering of surface water, coastal productivity and the provision of food and nutrients for a wide range of adjacent marine and estuarine communities and stabilising the coastline and providing a buffer from waves and storms. Most importantly, the saltmarshes are one of the most efficient ecosystems globally in sequestering carbon, due to the biogeochemical conditions in the tidal wetlands being conducive to long-term carbon retention. A concern with the loss of saltmarsh habitat is that it could release the huge pool of stored carbon to the atmosphere. The Assemblages of species associated with open-coast salt-wedge estuaries of western and central KEF are an assemblage of native plants, animals and micro-organisms associated with the dynamic salt-wedge estuary systems that occur within the temperate climate, microtidal regime (< 2 m), high wave energy coastline of western and	

Coastal Habitats and Communities
central Victoria. The ecological community currently encompasses 25 estuaries in the region defined by the border between South Australia and Victoria and the most southerly point of Wilsons Promontory (DoEE 2018a). Salt-wedge estuaries are usually highly stratified, with saline bottom waters forming a 'salt-wedge' below the inflowing freshwater layer of riverine waters. The dynamic nature of salt-wedge estuaries has important implications for their inherent physical and chemical parameters, and ultimately for their biological structure and ecological functioning. Some assemblages of biota are dependent on the dynamics of these salt-wedge estuaries for their existence, refuge, increased productivity and reproductive success. The ecological community is characterised by a core component of obligate estuarine taxa, with associated components of coastal, estuarine, brackish and freshwater taxa that may reside in the estuary for periods of time and/or utilise the estuary for specific purposes (e.g. reproduction, feeding, refuge, migration) (DoEE 2018a). The King Island Scrub Complex threatened ecological community is listed as endangered, and is the assemblage of plants, animals and other organisms associated with a type of scrub or tall shrubland that is found on King Island, Tasmania. At the time of listing, the King Island scrub complex occurs in the Cradle Coast Natural Resource Management (NRM) region. King Island scrub complex typically occurs on acidic sandy soils (with or without an organic rich A-horizon) on flats or undulating plains in the north-east, central and south-east coast, and centre of the island, with significant occurrences also in the far south-west of the island, where it lies between the New Dunes and the more fertile plateau country to the east (DCCEEW 2024j). The Conservation Advice for this threatened community also mentions the Sea Elephant Conservation Area as a relevant listed ecological community on King Island, and is described as providing a suitable habitat for a range of threatened flora and fauna species including the critically endangered Orange-bellied Parrot and endemic subspecies of bush birds. Southern Elephant Seals (*Mirounga leonine*) once bred on King Island but were wiped out because of the sealing industry in the 19th century. The closest breeding area for the Southern Elephant Seals (listed as vulnerable) to the EPA is Macquarie Island (TSSC 2016c). Oil is listed in this species recovery plan as a potential threat, but no known colonies currently live on King Island, thus impacts to this species and its habitat from oil are not predicted (DEH 2003b).
Predicted Level of Risk
Sandy beaches are regularly exposed to wave action and have low sediment total organic carbon and therefore generally a low abundance of marine life (Hook et al. 2016). The low concentration of total organic carbon and large particle size of sand means that any MDO deposited on the beach would not be retained. However, sandy beaches are important socio-economically, so an MDO spill reaching this type of shoreline may attract attention that is disproportionate to its sensitivity (Hook et al. 2016). Depth of penetration in sandy sediment is influenced by: • Particle size – penetration is great in coarser sediments (such as beach sand) compared to mud (in estuaries and tidal flats). • Oil viscosity – MDO quickly penetrates sandy sediments. • Drainage – coarse beach sands allow for rapid drainage (it may reach depths greater than one metre in coarse well-drained sediments). • Animal burrows and root pores – penetration into fine sediments is increased if there are burrows of animals such as worms, or pores left where plant roots have decayed. Areas of heavy oiling (>1,000 g/m^2 threshold) would likely result in acute toxicity, and death, of many invertebrate communities, especially where oil penetrates sediments through animal burrows (IPIECA 1999). However, these communities would be likely to rapidly recover (recruitment from unaffected individuals and recruitment from nearby areas) as oil is removed from the environment. The results of exposure to oil may be acute (e.g., die off of amphipods and replacement by more tolerant species such as worms or chronic (i.e., gradual accumulation of oil and genetic damage) (Hook et al. 2016).

Coastal Habitats and Communities
Cracks and crevices, rock pools, overhangs and other shaded areas provide habitat for soft bodied animals such as sea anemones, sponges, and sea- squirts, and become places where hydrocarbons can become concentrated as it strands ashore. The same is true on stable boulder shores where the rich animal communities underneath the rocks are also the most vulnerable to hydrocarbon pollution. The vulnerability of a rocky shoreline to oiling is dependent on its topography and composition as well as its position. A vertical rock wall on a wave- exposed coast is likely to remain unoiled if an oil slick is held back by the action of the reflected waves (IPIECA-IOGP 2016). At the other extreme, a gradually sloping boulder shore in a calm backwater of a sheltered inlet can trap enormous amounts of hydrocarbons, which may penetrate deep down through the substratum. The complex patterns of water movement close to rocky coasts also tend to concentrate oil in certain areas. Some shores are well known to act as natural collection sites for litter and detached algae and oil is carried there in the same way. As on all types of shorelines, most of the oil is concentrated along the high tide mark while the lower parts are often untouched. As MDO is less sticky than other oils it is less likely to adhere to rocky shorelines and creates stains. Saltmarshes are considered to have a high sensitivity to hydrocarbon exposure. Saltmarsh vegetation offers a large surface area for oil absorption and tends to trap oil. Evidence from case histories and experiments shows that the damage resulting from oiling, and recovery times of oiled marsh vegetation, are very variable. In areas of light to moderate oiling where oil is mainly on perennial vegetation with little penetration of sediment, the shoots of the plants may be killed but recovery can take place from the underground systems. However, many case studies have shown good recruitment of annual species in the year following a spill (IPIECA-IOGP 2016). Sections of the King Island Scrub Complex community and the Sea Elephant Conservation Area occur on the shorelines along the eastern side of King Island, indicating that a small area of this community is at risk of impact from a worst-case scenario hydrocarbon spill. The majority of this community is located inland within terrestrial ecosystems and is not expected to be impacted by hydrocarbons in the event of a spill. No key threats were identified for these communities as relevant to the proposed activity. The distance to the nearest King Island (western) coastal areas from the Operational Area is ~ 70 km, and the coastal elements of these communities are located on the east coast of King Island, thus, impacts to these communities are not predicted. Due to the exposed nature of the coastal areas within the Environmental Planning Area and the nature of MDO, long-term toxicity or smothering effects in areas of moderate MDO exposure are not expected and natural weathering should result in rapid recovery of communities. MDO shoreline loading at the high threshold is not predicted due to the low spill volume. Potential risks arising from a MDO spill on socio-economic receptors (tourism, cultural and/or other social values) are more likely to occur as a result of visual/ aesthetic impacts, rather than ecological impacts. The predicted level of consequence to coastal habitats and communities from a 250 m^3 MDO spill is assessed as moderate as consequences could be longer lasting (> 30 days) if saltmarsh communities are exposure to oil above the low threshold level the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of medium.

9.5 Changes to Functions, Interests and Activities and Change in Aesthetic Value

9.5.1 Commercial Fisheries

Commercial Fisheries	
Sensitivity Rating	**Medium**
Predicted Level of Risk	**Medium**
Environmental Planning Area Existing Environment	

The Environmental Planning Area overlaps the following fisheries that have catch effort. A description of these fisheries is provided in the Regia MSS Commercial Fishery Review in Appendix B6.
Commonwealth:
• Bass Strait Central Zone Scallop Fishery
• Eastern Tuna and Billfish Fishery
• Small Pelagic Fishery (Western sub-area)
• Southern and Eastern Scalefish and Shark (SESS) Fishery SESSF following sectors:
  ○ Shark Gillnet and Hook
  ○ Scalefish Hook
  ○ Trawl – otter board
• Southern Squid Jig Fishery
• Western Tuna and Billfish Fishery
Victorian:
• Abalone
• Giant Crab
• Multi-species Ocean
• Octopus
• Rock Lobster	

Commercial Fisheries
• Wrasse Tasmanian: • Abalone • Giant Crab • Octopus • Rock Lobster South Australian: • Abalone • Charter Boat • Giant Crab • Marine Scalefish Fishery • Rock Lobster
Predicted Level of Risk
Commercial fishing has the potential to be impacted through exclusion zones associated with the spill, the spill response and subsequent reduction in fishing effort. Exclusion zones may impede access to commercial fishing areas, for a short period of time, and nets and lines may become oiled. The impacts to commercial fishing from a public perception, however, may be much more significant and longer term than the spill itself. Fishing areas may be closed for fishing for shorter or longer periods because of the risks of the catch being tainted by oil. Concentrations of petroleum contaminants in fish and crustacean and mollusc tissues could pose a significant potential for adverse human health effects, and until these products have been cleared by the health authorities, they could be restricted for sale and human consumption. Toxicity in adult fish has been reported in response to crude oils, HFO and diesel (Holdway 2002, Shigenaka 2011). Uptake of hydrocarbons has been demonstrated in bony fish after exposure to water-accommodated fraction hydrocarbons of between 24 and 48 hours. Davis et al (2002) report detectable tainting of fish flesh after a 24-hour exposure at crude concentrations of 0.1 ppm, marine fuel oil concentrations of 0.33 ppm and diesel concentrations of 0.25 ppm. The majority of studies, either from laboratory trials or of fish collected after spill events (including the Hebei Spirit, Macondo, and Sea Empress) find evidence of elimination of PAHs in fish tissues returning to reference levels within two months of exposure (Challenger and Mauseth 2011, Davis et al. 2002, Gagnon & Rawson 2011, Gohlke et al. 2011, Jung 2011, Law 1997, Rawson et al. 2011). Should there be impacts to fish stocks associated with impacts to plankton life phase there is the potential for reduction in profits for commercial fisheries over a longer period of time, and potential for reduced fishing quotas or exclusion zones exclude fishing effort, associated with sustainable fisheries management. The Montara spill of a light gas condensate, (as the most recent [2009] example of a large hydrocarbon spill in Australian waters) occurred over an area fished by the Northern Demersal Scalefish Managed Fishery (with 11 licences held by 7 operators), with Goldband Snapper, Red Emperor, Saddletail Snapper and Yellow Spotted Rockcod being the key species fished (PTTEP 2013). As a precautionary measure, the WA Department of Fisheries advised the commercial fishing fleet to avoid fishing in oil-affected waters. Testing of fish caught in areas of visible oil slick (November 2009) found that there were no detectable petroleum hydrocarbons in fish muscle samples, suggesting fish were safe for human consumption. In the short-term, fish had metabolised petroleum hydrocarbons. Limited ill effects were detected in a small number of individual fish only

Commercial Fisheries
(PTTEP 2013). No consistent effects of exposure on fish health could be detected within two weeks following the end of the well release. Follow up sampling in areas affected by the spill during 2010 and 2011 (PTTEP 2013) found negligible ongoing environmental impacts from the spill. Similarly, the Macondo well blowout in the Gulf of Mexico (2010), began testing a month after the event showing levels of oil contamination residue in seafood consistently tested 100 to 1,000 times lower than safety thresholds established by the USA FDA, and every sample tested was found to be far below the FDA's safety threshold for dispersant compounds (BP 2015). FDA testing of oysters found oil contamination residues to be 10 to 100 times below safety thresholds (BP 2014). Sampling data shows that post-spill fish populations in the Gulf of Mexico since 2011 were generally consistent with pre-spill ranges and for many shellfish species, commercial landings in the Gulf of Mexico in 2011 were comparable to pre-spill levels. In 2012, shrimp (prawn) and blue crab landings were within 2.0% of 2007-09 landings. In the event of a MDO spill, a temporary fisheries closure may be put in place by the fishing authority or voluntarily by the fishers themselves. A temporary fisheries closure, combined with oil tainting of target species (actual or perceived), may lead to financial losses to fisheries and economic losses for individual licence holders. Fisheries closures and the flow on losses from the lack of income derived from these fisheries are likely to have short-term but potentially widespread socio-economic consequences, such as reduced employment in the fisheries and fisheries service industries, such as tackle and bait supplies, fuel, marine mechanical services, accommodation and so forth. Oiling of fishing vessel hull and fishing equipment is not predicted given the light nature of MDO and that surface oil is predicted to have evaporated or entrained with 24 hours. A spill event may result in a short-term fishing exclusion zone (days to weeks) being implemented by the appropriate fishing authority. Areas of moderate dissolved and high entrained exposure thresholds are expected to be very small as MDO is predicted to weather quickly and the area would return to pre-spill conditions rapidly. MDO is not predicted to accumulate among benthic sediments due to the significant mixing of waters and dilution of the low concentration of hydrocarbons in the water column, as such reducing impacts to habitats in 10 m depth, which are likely slower to recover. The predicted level of consequence to commercial fisheries from a 250 m^3 MDO spill is assessed as moderate as consequences could be longer lasting (> 30 days) if fishery closures and public perception of fishing tainting occur, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of medium.

9.5.2 Marine Industries

Marine Industry	
Sensitivity Rating	**Medium**
Predicted Level of Risk	**Low**
Environmental Planning Area Existing Environment	
Marine industries identified within the Environmental Planning Area are: Defence A defence practice area is located within the Environmental Planning Area. There is also a number of potential unexploded ordnance areas, however, these are not predicted to be impacted by oil exposure and is not assessed further. Desalination Plant The Victorian Desalination Plant, located at Wonthaggi, is outside of the Environmental Planning Area. Offshore Energy Within the Environmental Planning Area there is the Beach Energy Otway Development consisting of subsea infrastructure and an unmanned platform and the Cooper Energy Casino Henry Netherby Development consisting of subsea infrastructure. During the Regia MSS design envelope (1 April 2024 to 31 December 2028) there is the potential for exploration and development activities such as infrastructure inspection, maintenance and repairs campaigns, seabed surveys, seismic surveys, drilling and infrastructure installation to be undertaken with vessels and drill rigs to support the ongoing energy supply of oil and gas and potentially renewables within the Otway Basin. Shipping The South East Marine Region is one of the busiest shipping regions in Australia and Bass Strait is one of Australia's busiest shipping routes. Commercial vessels use the route when transiting between ports on the east, south and west coasts of Australia, and there are regular passenger and cargo services between mainland Australia and Tasmania. Ports Australia provide statistics for port operations throughout Australia's main commercial ports. Based on the latest information (2021) the majority of commercial shipping traffic transiting to and from Victorian ports were container (3,682), general cargo (2,663), bulk liquid carriers (2,019), dry bulk (1,715), car carrier (1,342), bulk gas (220), other cargo (47) and livestock (9). Submarine cables INDIGO-Central submarine cable which at a depths greater than 100 m is not predicted to be affected by oil exposure and is not assessed further.	
Predicted Level of Risk	
Marine industries have the potential to be impacted through exclusion zones associated with the spill and the spill response. Exclusion zones may impede access to shipping lanes, defence practice areas and offshore energy infrastructure, for a short period of time. Oiling of vessel hulls or the Thylacine-A platform is not predicted given the light nature of MDO and that surface oil is predicted to have evaporated or entrained with 24 hours.	

Marine Industry
Thus, the predicted level of consequence to seaweed industries from a 250 m^3 MDO spill is assessed as minor as exposure is likely to be below low thresholds and any consequences would be short-term (days to weeks), recoverable and affect a small portion of marine industries, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of low.

9.5.3 Coastal Developments

Coastal Developments	
Sensitivity Rating	**High**
Predicted Level of Risk	**Medium**
Environmental Planning Area Existing Environment	
Local government areas within the Environmental Planning Area are detailed below. Victoria *Mornington Peninsula Shire* Mornington Peninsula Shire coastal areas within the environmental planning area are St Andrews Beach, Rye, Blairgowrie, Sorrento, and Portsea. These towns are popular tourist areas with a variety of beaches and tourist attractions. The area was originally home to the Mayone-bulluk and Boonwurrung-Balluk clans and formed part of the Boonwurrung nation's territory prior to European settlement. *Greater Geelong City* Greater Geelong City coastal areas within the environmental planning area are St Leonards, Swan Bay, Point Lonsdale, Ocean Grove, Barwon Heads, Connewarre, and Breamlea. The largest of these towns is Ocean Grove with a population of 14,714 (ABS 2021). These towns are popular tourist areas with a variety of beaches and access to Port Phillip Bay. *Surf Coast Shore* Within the environmental planning area are the world-famous surfing beaches Bells Beach and Torquay Beach. In addition, the Great Ocean Road follows the coast from Anglesea past Lorne. *Colac Otway Shire* Within the environmental planning area, the Great Ocean Road follows the coast past Apollo Bay and then goes inland at Marengo. The Great Otway National Park coastal areas, including the Aire River outlet, which is a popular campaign area, are within the environmental planning area. The Apollo Bay Port is home to a local fishing industry and commercial fleet which employs more than 70 people and boasts 16 boats, including trawlers, crayfish, and charter boats (Colac Otway Shire 2023). *Corangamite Shire* The main Corangamite Shire coastal areas within the environmental planning area are Princetown and Port Campbell. The Great Ocean Road follows the coast within the shire and the Twelve Apostles Marine National Park abouts the coastal area. Port Campbell is one of the main ports for the Eastern Zone Rock Lobster Fishery (VFA 2023). *Moyne Shire* The main Corangamite Shire coastal areas within the environmental planning area are Peterborough, Warrnambool, and Port Fairy. The three towns are on the Great Ocean Road and are popular tourist areas for sightseeing, beaches and whale watching.	

Coastal Developments
Glenelg Shire Within the Glenelg Shire the main coastal town is Portland which is the oldest European settlement in Victoria. In 2021, the population was 10,016 (ABS 2021). The Great South West Walk, a 250 km walking track, begins in Portland. Portland has become known as 'Tuna Town' because of its reliable tuna fishing and the importance of the species to the tourist economy (VFA 2023a). Portland harbour exists for commercial boats and ships that support export industries and doubles as a first-class boating facility. South Australia *District Council of Grant* The area along the South Australian coast of the environmental planning area is known as the limestone coast. The main town is Port MacDonnell, originally known as *Ngaranga,* which is the southernmost town in South Australia. The area was originally inhabited by the Bungandidj Aboriginal people. The 2021 Census reports that the locality of Port MacDonnell had a population of 859 (ABS 2021). Once a busy shipping port, the town now relies heavily on its fishing and summer tourism industries, particularly rock lobster harvest industry, proclaiming itself "Australia's Southern Rock Lobster Capital". Tasmania *King Island Council* King Island is at the western entrance to Bass Strait and is 64 km long by 27 km wide. The 2021 Census reports that the King Island had a population of 1,617 (ABS 2021). King Island was originally part of a land bridge linking Tasmania with the Australian mainland, which was submerged around 12,000 years ago due to rising sea levels. A human skeleton was discovered in a cave on the island in 1989, which was dated to approximately 14,000 years ago. However, previous examinations had revealed no "shell heaps, bones, charcoal or other remains which might indicate Aboriginal occupation", suggesting that the area was passed through by the ancestors of Aboriginal Tasmanians but not permanently inhabited (Sim 1990). The island is a popular tourist location and produces cheese, lobsters, kelp, and beef.
Predicted Level of Risk
Due to the distance to the South Australian and King Island coastal areas from the Operational Area (~130 km and ~ 70 km respectively) impacts to coastal areas above the low thresholds are not predicted. As the Operational Area is as close as ~7 km to the Victorian coast, there is the potential for diesel above the low threshold to be visible on the ocean surface in coastal waters and as a sheen on shoreline areas. Most of the diesel will be concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA 1995) and expected to be visible. Visible nearshore and shoreline hydrocarbons have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities this can have a knock-on effect to local businesses if beaches are required to be closed to allow for the clean-up of any oil. Due to the low volumes, light nature of marine diesel and substantial wave action with the nearshore area's impacts are likely to be short term and not require intrusive clean-up response. The predicted level of consequence to coastal developments from a 250 m^3 MDO spill is assessed as moderate as exposure to oil above low thresholds could occur areas nearshore of the Operational Area, though if consequences occurred, they are likely to only affect a small portion of the coastal area for a short duration (hours to days) due to the low spill volume and short duration of any exposure, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of medium.

9.5.4 Indigenous Culture

Indigenous Culture	
Sensitivity Rating	**High**
Predicted Level of Risk	**Medium**
Environmental Planning Area Existing Environment	
The information provided below has been sourced from publicly available information and from consultation undertaken in preparing the EP. Within the Environmental Planning Area key values and sensitivities in relation to First Nations have been identified and described, through consultation and desktop research, documented in Appendix F3, Section 3.16. These include both tangible and intangibles, for example, Nyamat Mirring Indigenous Protected Area [currently under consultation], Deen Maar, Point Nepean & Mornington Peninsula, Southern Right Whales, Glass Eel, kelp and songlines. The relevant section of this document concerning the value is outlined in the Cultural Features Table, located in Appendix F3, Section 3.16.1. The Environmental Planning Area overlaps King Island which was part of a land bridge linking Tasmania with the Australian Mainland and was submerged around 12,000 years ago with rising sea levels. While uninhabited at the time of European discovery by Captain Reed in 1799 the first Tasmanians were a very mobile people, especially by water. They had a wide-ranging territory, travelling in season for hunting, gathering and ceremonial purposes. They built and used several different types of seaworthy boats and research suggests that they passed through but did not permanently inhabit King Island (KIC 2023). The Environmental Planning Area overlaps with the following Native Title determinations (Appendix B12 MAP-REG-EPM-92_A): Gunditj Mirring Traditional Owners Aboriginal Corporation (GMTOAC) on behalf of the Gunditjmara people. Eastern Maar Aboriginal Corporation (EMAC) on behalf of the Eastern Maar people. The Environmental Planning Area overlaps with the following Registered Aboriginal Parties' coastal areas in Victoria: Wadawurrung Traditional Owners Aboriginal Corporation (WTOAC) on behalf of the Wadawurrung people. Bunurong Land Council Aboriginal Corporation (BLCAC) on behalf of the Bunurong people. Non-exclusive rights linked to Native Title determinations, include access to the land and waters and resources therein, the use and enjoyment of lands and waters, camping, and the protection of areas of importance, such as the 'Convincing Grounds; (Appendix F3, Section 3.16.1). As per the Offshore Petroleum and Greenhouse Gas Storage Act 2006, Section 280, Requirement 2(e), offshore activities must carry out the activities in a manner that does not interfere with the enjoyment of native title rights and interests beyond what is necessary for the reasonable exercise of the rights granted under exploration titles.	

Indigenous Culture
Predicted Level of Risk
Due to the distance to the South Australian and King Island coastal areas from the Operational Area (~130 km and ~ 70 km respectively) impacts to coastal areas above the low thresholds are not predicted. As the Operational Area is as close as ~7 km to the Victorian coast, there is the potential for diesel above the low threshold to be visible on the ocean surface in coastal waters and as a sheen on shoreline areas. Most of the diesel will be concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA 1995) and expected to be visible. Visible nearshore and shoreline hydrocarbons have the potential to reduce the visual amenity of the area but impacts to cultural values are not predicted due to the low volumes, light nature of marine diesel and substantial wave action with the nearshore areas impacts are likely to be short term and not require intrusive clean-up response, with access, enjoyment and use of Native Title land and waters able to continue. The predicted level of consequence to coastal developments from a 250 m^3 MDO spill is assessed as moderate as exposure to oil above low thresholds could occur areas nearshore of the Operational Area, though if consequences occurred, they are likely to only affect a small portion of the coastal area for a short duration (hours to days) due to the low spill volume and short duration of any exposure, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of medium.

9.5.5 Protected Areas

Protected Areas	
Sensitivity Rating	**High**
Predicted Level of Risk	**Medium**
Environmental Planning Area Existing Environment	

There is one World Heritage Property adjacent to the Environmental Planning Area:

Budj Bim Cultural Landscape

The Budj Bim Cultural Landscape, located in the traditional Country of the Gunditjmara Aboriginal people in south-eastern Australia, is recognized for its world heritage values due to its ancient and sophisticated aquaculture systems. The Budj Bim lava flow is recognised as an attribute contributing to the Outstanding Universal Value of the Budj Bim World Heritage Site which extends into Portland Bay (Wheeler et al., 2023). The Gunditjmara people utilized the lava flows from the Budj Bim volcano to create an extensive network of channels, weirs, and dams. This network was designed to manage water flow for the systematic trapping, storing, and harvesting of Kooyang (short-finned eel - *Anguilla australis*), providing a sustainable economic and social base for their society over millennia. The Budj Bim Cultural Landscape connects to the coast through waterways and hence these waterways could theoretically be affected by surface oil. Surface oils are not however expected to travel upstream, nor be transported far enough inland to have an impact on the landscape. The coastal waterway that has the potential to be associated with oiling on a small scale is not predicted to impact the cultural values of this World Heritage Property.

The PMST Report for the Environmental Planning Area (Appendix B5) identified the following for protected areas.

National Heritage Places

Four places of National Heritage were identified in the Environmental Planning Area:

Great Ocean Road and Scenic Environs (Historic)

Point Nepean Defence Sites and Quarantine Station Area (Historic)

Quarantine Station and Surrounds (Historic)

Budj Bim National Heritage Landscape – Tyrendarra Area (Indigenous)

The Point Nepean Defence Sites and Quarantine Station Area is above the shoreline and hence would not be directly affected by oil. It is on the bay side of the Mornington Peninsula which is not predicted to be impacted by a spill.

The Quarantine Station and Surrounds is located towards the western end of the Nepean Peninsula on the shore of Port Phillip Bay. The building is on the bay side of the Mornington Peninsula which is not predicted to be impacted by a spill. To the east and south of the main building area the land rises to a height of about 40 metres which is not predicted to be impacted by a spill.The Tyrendarra Area of the Budj Bim Cultural Landscape in Western Victoria contains the remains of a complex system of natural and artificially created wetlands, channels, the stone bases of weirs and stone fish traps that were used by Gunditj Mara people to grow and harvest eels and fish. The remains on Tyrendarra are part of the same system as the remains in the Mt Eccles/Lake Condah area. The Budj Bim Cultural Landscape connects to the coast through waterways and hence these waterways could theoretically be affected by surface oil. Surface oils are not however expected to travel upstream, nor be transported far enough

Protected Areas
inland to have an impact on the landscape. The coastal waterway that has the potential to be associated with oiling on a small scale is not predicted to impact the cultural values of this World Heritage Property. The Great Ocean Road and Scenic Environs is above the shoreline and hence would not be directly affected by oil. However, the scenic environs could be impacted by surface or shoreline oil. The Australian Heritage Council found the Great Ocean Road and its scenic environs road from Torquay to Allansford, a journey of 242 kms, as a place of outstanding national heritage significance. Constructed by workers, including more than 3000 returned servicemen, as a memorial to First World War servicemen, the Great Ocean Road is a significant reminder of the participation of Australian servicemen in the First World War, the Australian community's appreciation of their service, and the support provided for the welfare of servicemen and women upon returning to Australia. The scenic environs include all views from the Great Ocean Road and Great Ocean Walk, including the Twelve Apostles, the Bay of Islands and Bay of Martyrs. The coastline from Lorne to Kennett River is among the world's most dramatic cliff and ocean scenery able to be viewed from a vehicle. Along the length of the Great Ocean Road, the pullover points and lookouts beside or nearby the road provide travellers with spectacular views of the coastline, hinterland, and Bass Strait seascape, framed only by cliffs, lighthouses and unencumbered by intrusive built structures. The place is also listed for its; outstanding rocky coastline, dinosaur fossil sites, geomorphological monitoring sites, its association with the pioneering landscape architect Edna Walling, and for the significance of Bells Beach to surfing. Commonwealth Heritage Places Six places of National Heritage were identified in the Environmental Planning Area Cape Northumberland Lighthouse SA (Historic, Listed place) Cape Wickham Lighthouse TAS (Historic, Listed place) Fort Queenscliff VIC (Historic, Listed place) Sorrento Post Office VIC (Historic, Listed place) Swan Island Defence Precinct VIC (Historic, Listed place) Swan Island and Naval Waters VIC (Natural, Listed place) Only the Swan Island and Naval Waters includes coastal areas within the Environmental Planning Area and is described. Swan Island is the largest emergent sand accumulation feature in Port Phillip Bay. The island, which has been built principally by wave actions rather than by aeolian forces, has played a major role in determining the pattern of sedimentation in Swan Bay and preserves geomorphological evidence of changing Quaternary sea levels. The eastern and northern shores of the eastern arm of Swan Island are of regional significance as an example of active coastal depositional and erosional processes (DCCEEW 2023c). Swan Island and adjacent naval waters provide important habitat for 46 water bird species, of which 26 species are listed under the Japan-Australia and China-Australia migratory bird agreements, and 8 species are listed under the Bonn Convention on Migratory Species (DCCEEW 2023c). During the migration season Swan Bay supports internationally significant populations of the Eastern Curlew, Ruddy Turnstone, Red-necked Stint, Sharp-tailed Sandpiper, Curlew Sandpiper, and Grey Plover (DCCEEW 2023c). Nationally significant populations of the Greenshank, Pacific Golden Plover, Double-banded Plover, and Lesser Sand Plover also occur (DCCEEW 2023c). Sand Island is the most important high tide roosting area in Swan Bay and at high tide regularly supports half of the shorebirds in the Swan Bay - Mud Islands complex.

Protected Areas
Ramsar Wetlands Four Ramsar Wetlands were identified in the Environmental Planning Area. Glenelg Estuary and Discovery Bay Key features of the site (DCCEEW 2023d): The Glenelg Estuary and Discovery Bay Ramsar Site is situated in western Victoria. It covers approximately 22,289 hectares and comprises portions of the Lower Glenelg National Park, the Discovery Bay Coastal Park and the Nelson Streamside Reserve. The Glenelg River estuary is the longest in the bioregion, extending 75 kilometres. The Ramsar site comprises three broad systems that support different wetland types: freshwater wetlands, the Glenelg Estuary and the beach and dune system. The site contains several regionally (and internationally) rare wetland types: intact fen peatlands and a humid dune slack system. The site: Supports the nationally vulnerable coastal saltmarsh ecological community and eight nationally / internationally listed threatened flora and fauna species. Provides habitat for 95 waterbird species including 24 species listed under international agreements. Beach nesting birds such as Hooded Plover (*Thinornis rubricollis*) and Red-capped Plover (*Charadrius ruficapillus*) are regularly recorded nesting on the dunes of the Discovery Bay Coastal Park. Supports 14 species of native fish which are diadromous, migrating between habitats for part of their lifecycle by providing food, spawning grounds and nurseries. It also acts as a migration path on which diadromous fishes of the region depend. Provides habitat for obligate aquatic species in the permanent wetlands of the Long Swamp complex and Bridgewater Lakes when the surrounding landscape is dry and during drought conditions. Supports > 1% of the population of the wetland dependent invertebrate species the Ancient Greenling (*Hemiphlebia mirabilis*) in the Baumea sedgelands. The area is popular for recreational and tourism activities, including sightseeing, walking, camping, and recreational fishing. Importantly, the Gunditjmara Indigenous people have a living association with the Ramsar site, which has great cultural significance for them, as it is part of their Koonang (sea) and Bocara Woorrowarook (river forest) country. Lavinia Key features of the site (DCCEEW 2023e): The Lavinia Ramsar site is located on the north-east coast of King Island, Tasmania. The boundary of the site forms the Lavinia State Reserve, with major wetlands in the reserve including the Sea Elephant River estuary area, Lake Martha Lavinia, Penny's Lagoon, and the Nook Swamps. The shifting sands of the Sea Elephant River's mouth have caused a large back-up of brackish water in the site, creating the saltmarsh which extends up to five kilometres inland. The present landscape is the result of several distinct periods of dune formation. The extensive Nook Swamps, which run roughly parallel to the coast, occupy a flat depression between the newer parallel dunes to the east of the site and the older dunes further inland. Water flows into the wetlands from the catchment through surface channels and groundwater and leaves mainly from the bar at the mouth of the Sea Elephant River and seepage through the young dune systems emerging as beach springs.

Protected Areas
The Lavinia State Reserve is one of the few largely unaltered areas of the island and contains much of the remaining native vegetation on King Island. The vegetation communities present on the site include Succulent Saline Herbland, Coastal Grass and Herbfield, Coastal Scrub and King Island Eucalyptus globulus Woodland. The freshwater areas of the Nook Swamps are dominated by swamp forest. Nook Swamps and the surrounding wetlands contain extensive peatlands. The site is an important refuge for a collection of regional and nationally threatened species, including the nationally endangered Orange-bellied Parrot. This parrot is heavily dependent upon the samphire plant, which occurs in the saltmarsh, for food during migration. They also roost at night in the trees and scrub surrounding the Sea Elephant River estuary. Several species of birds which use the reserve are rarely observed on the Tasmanian mainland, including the Dusky Moorhen, Nankeen Kestrel, Rufous Night Heron and the Golden-headed Cisticola. The site is currently used for conservation and recreation, including boating, fishing, camping and off-road driving. There are artefacts of Indigenous Australian occupation on King Island that date back to the last ice age when the island was connected to Tasmania and mainland Australia via the Bassian Plains. Piccaninnie Ponds Karst Key features of the site (DCCEEW 2023f): The Piccaninnie Ponds Karst Wetlands Ramsar Site is located in south-east South Australia, near Mount Gambier. It is an exceptional example of karst spring wetlands, with the largest and deepest of the springs reaching a depth of more than 110 m. The majority of the water comes from an unconfined regional aquifer and is consistently 14-15 degrees Celsius. The karst springs support unique macrophyte and algal associations, with macrophyte growth extending to 15 m below the surface as a result of exceptional water clarity. A number of different wetland types exist on the site, including a large area of peat fens. There are four distinct areas of the Ramsar site. Piccaninnie Ponds (also known as Main Ponds) consists of three interconnected bodies of water - First Pond, The Chasm and Turtle Pond - rounded by an area of shrub dominated swamp. Western Wetland consists of dense closed tea-tree and paperbark shrubland over shallow dark clay on limestone soils. Eastern Wetland includes the spring-fed Hammerhead Pond. Pick Swamp, on the extreme west of the site, includes areas of fen, marshes and sedgelands as well as the spring-fed Crescent Pond on peat soils. The system is an important remnant of an extensive system of wetlands that once occupied much of the south-east of South Australia. The major groundwater discharge points are Main Ponds, Hammerhead Pond and Crescent Pond. Water principally leaves the site via Outlet Creek and the Pick Swamp drain outlet, which connect the site to the sea. There are a number of fresh groundwater beach springs located on the site. The geomorphic and hydrological features of the site produce a complex and biologically diverse ecosystem which supports considerable biodiversity, including a significant number of species of national and/or international conservation value. These include the orange-bellied parrot, Australasian bittern and Yarra pygmy perch. The site attracts 20,000 visitors annually for cave diving, snorkelling, bushwalking, educational activities and birdwatching. The site also has spiritual and cultural value. The Traditional Owners of the land, the Bunganditj (Boandik) and local Indigenous people have a strong connection with the site. Traditionally the site provided a good source of food and fresh water, and evidence of previous occupation still exists. Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Key features of the site (DCCEEW 2023g): The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site is located in the western portion of Port Phillip Bay, near the city of Geelong in Victoria. The site comprises six distinct areas that include Point Cook/Cheetham, Werribee/Avalon, Point Wilson/Limeburners Bay, Swan Bay, Mud Islands, and the Lake Connewarre Complex.

Protected Areas
The Ramsar site is a low-lying area and a natural discharge point for the rivers draining southern central Victoria. The tidal amplitude within the bay is reduced compared with Bass Strait due to the narrow opening of the Bay (Port Phillip Heads). Port Phillip Bay (Western Shoreline) and Bellarine Peninsula support a variety of wetland types ranging from shallow marine waters to seasonal freshwater swamps and extensive sewage ponds. Wetland areas include freshwater lakes, estuaries, some with White Mangrove, saltmarshes, intertidal mudflats and seagrass beds. The Ramsar site supports some plants species threatened in Victoria, such as Small Scurf-pea and Rare Bitter-bush. This Ramsar site is the sixth most important area in Australia for migratory waders and the most important in Victoria. Large numbers of bird species including Pied Oystercatchers, Banded Stilts, Red-necked Stint, Sharp-tailed Sandpiper, Fairy Tern, Australasian Shoveler, Red-necked Avocets, Blue-billed Duck, and Freckled Duck, have been recorded at the site. Furthermore, the Melbourne Water Corporation Sewage Farm and Western Treatment Plant at Werribee support many waterbirds on its retention ponds. Port Phillip Bay (Western Shoreline) and Bellarine Peninsula provides important habitat for threatened species such as the Little Tern and Striped Legless Lizard. In particular, large numbers of the nationally threatened Orange-bellied Parrot utilise Port Phillip Bay during the winter after their summer migration to Tasmania to breed. Swan Bay and Limeburners Lagoon are also valuable fish breeding grounds for many of the commercial species caught in Port Phillip Bay. There are a number of important indigenous sites within the wetlands, including burial sites, middens and artefacts, with the oldest midden in the area being at least 5000 years old. Currently over three million people live around Port Phillip Bay, which is used intensively for recreation, nature conservation, sewage treatment, aquaculture, fishing, and salt production. Nationally Important Wetlands Information on Nationally Important Wetlands is from the DCCEEW Directory of Important Wetlands. The following wetlands have a coastal intersect. Aire River and Lower Aire River The Aire River is located in south-western Victoria. The Aire River reach is of high value for its flora and fauna which is of national and state significance, particularly its large continuous stands of cool temperate rainforest. There are fourteen threatened flora species within the Aire reach and its associated corridor of which two are listed nationally. There are twenty-seven threatened fauna species within the Aire River reach and its associated corridor of which five are listed nationally. Significant fauna species in the reach are the Cape Barren Goose, Ground Parrot, Rufous Bristlebird, Eastern Barred Bandicoot, and the Australian Grayling. Social values are trout fishing, picnicking, camping, and scenic driving are. Hopetoun Falls Scenic reserve is the most popular area for sight-seeing along the reach. There are approximately eighteen archaeological sites in the area, most of which are Aboriginal shell middens. The area also contains the site of the 1848 Katabanuut Aboriginal massacre. Glenelg River and Estuary The Glenelg River reach begins at Dartmoor, on the southern side of the Grampians National Park, and flows through the Lower Glenelg National Park to the sea at Nelson, near the Discovery Bay Coastal Park. There are 25 threatened flora species found within the Glenelg River reach and its associated corridor of which ten are listed nationally. The river reach provides an important habitat link between the inland woodland environments and coastal environments. There are seventy-two threatened flora species found within the Glenelg River reach and its associated corridor of which 12 are listed nationally. The river was a source a food supplies for the Dhauwurd Wurrung Aboriginal Group. Shell middens and surface scatters as well as isolated artefacts and a scarred tree around the coastal dunes have been found just outside the river reach. The Princess Margaret Rose Caves are of significant historical values and are listed as an historic place

Protected Areas
of regional significance. Patterson's Canoe Camp recreation area is also of regional significance. Tourism in the river reach is increasing in Nelson and the caves. Other attractions are bushwalking such as the Great South West Walk, camping, sight-seeing, picnicking, canoeing, fishing, motor-boating, house-boating and water-skiing. Lavinia Nature Reserve – see Lavinia Ramsar Wetland Description above. Lower Merri River The Lower Merri River Wetlands consist of two connected wetlands developed in a swale between calcareous dune ridges and fed by the Merri River. Lower Merri River Wetland is of high value for its avifauna. There are large areas of Common Reed Phragmites australis with Spiky Club-sedge, saltmarsh and mudflats. Also, of high value for its geomorphology and are a well-preserved example of interdunal wetlands fed by a small drainage system. The wetlands are used for hunting, walking and bird watching. The Mahogany Trail follows the edge of these wetlands. The Mahogany Ship is reputed to be buried under sand dunes adjacent to Saltwater Swamp. Surface scatters exist at Kelly Swamp indicating a history of Aboriginal occupation. Princetown Wetlands These wetlands consist of swamps of varying salinity on the floodplains of the Gellibrand River and its tributary, the Serpentine (Latrobe) Creek. Wetlands types present are a deep freshwater marsh, semi- permanent saline marshes and a shallow freshwater marsh. The Princetown Wetlands have extensive beds of Common Reed (Phragmites australis) and meadows dominated by Beaded Glasswort which can support large numbers of waterbirds. The saltmarsh habitat surrounding these swamps is likely to be important for migration of the Orange-bellied Parrot. Australasian Bittern and Lewin's Rail have been recorded. Camping, fishing, boating, and duck hunting occur within the wetlands. Swan Bay Swan Bay is a shallow marine embayment partly enclosed by spits and barrier islands such as Swan Island. It is generally <2 m in depth, with 700-1,000 ha of mudflats exposed at low tide, and has extensive seagrass beds. The bay is fringed with saltmarsh including some extensive flats and there are some stands of remnant woodland. The bay is of high value for its avifauna and flora. It is very productive for birds, molluscs, and fish. The saltmarsh and intertidal seagrass meadows are regionally significant. The avifauna is particularly diverse, with 190 bird species recorded. Swan Bay is a high value wetland for its ecological, recreational, and educational features. Swan Bay is an unusual shallow embayment with a mixture of seagrass species which is relatively undisturbed and in good ecological condition. Australian Marine Parks Four Australian Marine Parks (AMPs) were identified in the Environmental Planning Area (Appendix B12 MAP-REG-EPM-078). No direct impacts were predicted for any marine park, with the risk of accidental release of fuel being the only cause-effect pathway identified for these parks. Apollo The Apollo AMP is located off Apollo Bay on Victoria's west coast in waters 80 m to 120 m deep on the continental shelf. The reserve covers 1,184 km2 (DNP 2013). The reserve encompasses the continental shelf ecosystem of the major biological zone that extends from South Australia to the west of Tasmania. The area includes the Otway Depression, an undersea valley that joins the Bass Basin to the open ocean. Apollo AMP is a relatively shallow reserve with big waves and strong tidal flows; the rough seas provide habitats for fur seals and school sharks (DNP 2013). The major conservation values of the Apollo AMP (DNP 2013) are:

Protected Areas
Ecosystems, habitats, and communities associated with the Western Bass Strait Shelf Transition and the Bass Strait Shelf Province and associated with the seafloor features: deep/hole/valley and shelf. Important migration area for blue, fin, sei and humpback whales. Important foraging area for black-browed and shy albatross, Australasian gannet, short-tailed shearwater and crested tern. Cultural and heritage site - wreck of the MV City of Rayville. Franklin The Franklin AMP covers an area of 671 km2 west of the north-western corner of Tasmania and south-east of King Island (DNP 2013). At its northern end, the waters are only 40 m deep, and in much of the reserve the sea floor slopes gently and is covered by fine and coarse sediments. At the southern end of the reserve there is a valley where the water is up to 150 m deep. The major conservation values for the Franklin AMP (DNP 2013) are: Examples of ecosystems, habitats and communities associated with the Tasmanian Shelf Province and Western Bass Strait Shelf Transition and associated with sea-floor features shelf, deep/hole/valley, escarpment and plateau. Important foraging area for Shy Albatross, Short-tailed Shearwater, Australasian Gannet, Fairy Prion, Little Penguin, Common Diving petrel, Black-faced Cormorant and Silver Gull. Black Pyramid Rock, 6 km north of the reserve supports the largest breeding colony of the Australasian gannet in Tasmania, and one of only eight breeding sites for this species in Australia. White shark also forages in the reserve. Nelson The Nelson AMP spans the deepwater ecosystems (greater than 3,000 m depth) extending from South Australia to the west of Tasmania (DNP 2013). The reserve spans a range of geological features including plateaus, knolls, canyons and the abyssal plain (a large area of extremely flat or gently sloping ocean floor just offshore from the continent). The knoll features provide a rocky substrate above the abyssal plain. Little is known about the benthic biodiversity of this reserve; however, marine mammals are known to occur here. The major conservation values of the Nelson AMP (DNP 2013) are: Examples of ecosystems, habitats and communities associated with the West Tasmanian Transition and associated with the seafloor features including the abyssal plain/deep ocean floor, canyon, knoll/abyssal hill, plateau, and slope. Important migration area for Blue, Fin, Humpback and Sei whales. Zeehan The Zeehan AMP covers an area of 19,897 km2 to the west and south-west of King Island in Commonwealth waters surrounding north-western Tasmania (DNP 2013). It covers a broad depth range from the shallow continental shelf depth of 50 m to the abyssal plain which is over 3,000 m deep. The reserve spans the continental shelf, continental slope and deeper water ecosystems of the major biological zone that extends from South Australia to the west of Tasmania. Four submarine canyons incise the continental slope, extending from the shelf edge to the abyssal plains. A rich community made up of large sponges and other permanently attached or fixed invertebrates is present on the continental shelf, including Giant Crab. Concentrations of larval Blue Wahoo and Ocean Perch demonstrate the role of the area as a nursery ground.

Protected Areas
Rocky limestone banks provide important seabed habitats for a variety of commercial fish and crustacean species including the Giant Crab. The area is also a foraging area for a variety of seabirds such as Fairy Prion, Shy Albatross, Silver Gull, and Short Tail Shearwater (DNP 2013).
The major conservation values for the Zeehan AMP (DNP 2013) are:
Examples of ecosystems, habitats and communities associated with the Tasmania Province, the West Tasmania Transition and the Western Bass Strait Shelf Transition and associated with the seafloor features: abyssal plain/deep ocean floor, canyon, deep/hole/valley, knoll/abyssal hill, shelf and slope.
Important migration area for Blue and Humpback whales.
Important foraging habitat for Black-browed, Shy and Wandering albatrosses, and Great-winged and Cape Petrels.
Victorian Marine Parks and Sanctuaries
Four Victorian Marine National Parks (Appendix B12 MAP-REG-EPM-079) and six Marine Sanctuaries were identified in the Environmental Planning Area. In addition, two Conservation Parks, two Wildlife Reserves and three National Parks were identified as having coastal areas within the Environmental Planning Area.
The Narrwong Coastal Reserve and Yambuck Coastal Reserve are long stretches of beach between Narrawong and Porty Fairy, however, no information on the reserves could be found.
Barwon Bluff Marine Sanctuary
Barwon Bluff Marine Sanctuary (17 ha) is located at Barwon Heads, approximately 100 km south-west of Melbourne. The Barwon Bluff Marine Sanctuary Management Plan (Parks Victoria 2007a) identifies the environmental, cultural and social values as:
Intertidal reef platforms with a high diversity of invertebrate fauna and flora.
Subtidal reefs that support diverse and abundant flora, including kelps, other brown algae, and green and red algae.
Calcarenite and basalt reefs extending from The Bluff that are of regional geological significance.
Intertidal habitats that support resident and migratory shorebirds, including threatened species.
Subtidal habitats that support sedentary and mobile fish and are also used by migratory marine mammals.
Marine habitats and species that are of scientific interest and valuable for marine education.
Underwater recreation, including visits to subtidal communities that are easily accessible from the shore.
Coastal vistas, seascapes and underwater scenery.
Important landmark and area for gathering fish and shellfish for the Wathaurong people.
Strong historic and ongoing connection with marine education.
Remnants from the Earl of Charlemont, a heritage-listed shipwreck.
Bay of Islands Conservation Park

Protected Areas
This coastal park has outstanding ocean views and geological features and covers an extensive area of the coastline (~32 km in length and 950 ha), stretching east from Warrnambool to Peterborough. Sheer cliffs and rock stacks dominate the bays, and the heathlands contain wildflowers. Beaches are accessible at some points (Parks Victoria 1998). This park protects the terrestrial environment above the low water mark of this coastline. This Coastal Park is managed under the Port Campbell National Park and Bay of Islands Coastal Park Management Plan (Parks Victoria 1998). Discovery Bay Marine National Park and Coastal Park The Discovery Bay Marine National Park is situated 20 km west of Portland and covering 2,770 ha. It covers part of the largest coastal basalt formation in western Victoria. In deep water (30 – 60 m) there are low reefs from ancient shorelines or dunes. There is a rich diversity of marine life within this park due to the cold, nutrient rich waters of the area. The deep calcarenite reefs support diverse sponge gardens whilst the shallower reefs support the brown alga Ecklonia radiata. The offshore waters support a diverse array of invertebrates including southern rock lobster, black-lip abalone, and gorgonians. The waters also support great white sharks and blue whales during the summer breeding season. The Discovery Bay Marine National Park abuts the Discovery Bay Coastal Park which are managed via the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan (Parks Victoria 2015). The Plan describes some key values of the Discovery Bay Marine National Park and Coastal Park, namely: Important shorebird habitat for migratory species listed under international agreements. Two Important Bird Areas, Lawrence Rocks Wildlife Reserve, which consists of two rocky islets off the coast from Portland with a resident Australasian Gannett population, and the Discovery Bay Coast through to Picaninnie Ponds in South Australia with resident populations of Australasian Bittern, Hooded Plover, Rufous Bristlebird and Striated Fieldwren, and non-breeding Orange-bellied Parrot. The Bonney Coast, which extends from Robe in South Australia to Discovery Bay, is a productive area because of a nutrient rich cold water upwelling, known as the Bonney Upwelling. This high productivity provides an important feeding ground for seabirds, fur seals and whales. It also greatly influences primary productivity and maintains commercially important fisheries species such as Blacklip Abalone and Southern Rock Lobster. The continental shelf and the Bonney Upwelling draws close to the coast near the township of Portland, and this makes the area a highly significant recreational fishery for Southern Bluefin Tuna. The Bonney Upwelling is also identified as culturally significant to the Gunditjmara People (Appendix F3, Section 3.16.1), with its current bringing cold nutrient-rich waters that support culturally significant species such as phytoplankton, fish, squid, seals, dolphins, whales, penguins, gannets and other sea birds (GMTOAC, 2023). Subtidal Reefs with six key natural assets – Brown macroalgae dominated beds, large mobile fish including sharks and rays, motile macroinvertebrates, Giant Kelp Forest communities, sessile invertebrate dominated communities such as thick growths of sponges, ascidians, bryozoans and gorgonians, and mixed red algae sessile invertebrate dominated communities. Great Otway National Park The Great Otway National Park (103,185 ha) is located near Cape Otway and stretches from the low water mark inland on an intermittent basis from Princetown to Apollo Bay (approximately 100 km). Landscapes within the park are characterised by tall forests and hilly terrain extending to the sea with cliffs, steep and rocky coasts, coastal terraces, landslips, dunes and bluffs, beaches and river mouths. There is a concentration of archaeological sites along the coast, coastal rivers and reefs. The park contains many sites of international and national geological and geomorphological significance including Dinosaur Cove (internationally significant dinosaur fossil site), Lion Headland and Moonlight Head to Milanesia Beach (internationally significant coastal geology and fossils). The park provides habitats for the conservation of the Rufous Bristlebird, Hooded Plover, White-bellied Sea Eagle, Fairy Tern, Caspian Tern and Lewin's Rail and native fish such as the Australian Grayling.

Protected Areas
The park contains significant Aboriginal cultural sites adjacent to rivers, streams and the coastline including over 100 registered archaeological sites, particularly shell middens along the coast, as well as non-physical aspects such as massacre sites, song lines, family links and stories. The park also contains four sites listed on the Victorian Heritage Register including the Cape Otway Light Station and several shipwreck features along the coast (Parks Victoria and DSE 2009). This park protects the terrestrial environment above the low water mark of this coastline. The Park is protected under the Great Otway National Park and Otway Forest Park Management Plan (Parks Victoria and DSE 2009) and relevant values are: Large area of essentially unmodified coastline, linking the land to marine ecosystems and marine national parks. Diverse range of lifestyle and recreation opportunities for communities adjacent to the parks – for local permanent residents and holiday homeowners Regionally, nationally and internationally. Significant tourist attractions, close to access routes and accommodation, such as spectacular coastal scenery along the Great Ocean Road, access to beautiful beaches, clifftop lookouts, picnic areas, historic sites, waterfalls and walking tracks such as the Great Ocean Walk. Basis for continued growth of nature-based tourism associated with the parks and the region, providing economic opportunities for accommodation providers, food and services providers, and recreation, tourism and education operators. Lady Julia Percy Island Wildlife Reserve Lady Julia Percy Island is off the coast of Victoria 22 km south-west of Port Fairy. It is one of the two largest breeding sites for the Australian fur seal species in Australia (DCCEEW 2023h) and provides habitat to migratory seabirds. Lawrence Rocks Wildlife Reserve Lawrence Rocks Wildlife Reserve consists of two small islets about 6.8 ha and 1.5 ha in area that lie about 2 km offshore from Point Danger and about 6 km south-east of Portland in western Victoria (BirdLife International 2023). The islets are composed of basaltic and tuff rock. The habitat on the islets consists of exposed rock and some patches of exotic grasses and native and exotic herbs. The Australasian Gannet breeds on both islets in the IBA. Lawrence Rocks supports a small population of the Australian Fur Seal. BirdLife International have deemed Lawrence Rocks an Important Bird Area (BirdLife International 2023). Marengo Reefs Marine Sanctuary The Marengo Reefs Marine Sanctuary (12 ha) is in Victorian State waters near Marengo and Apollo Bay, which are on the Great Ocean Road, approximately 220 km south-west of Melbourne. The sanctuary protects two small reefs and a wide variety of microhabitats. Protected conditions on the leeward side of the reefs are unusual on this high wave energy coastline and allow for dense growths of bull kelps and other seaweed. There is an abundance of soft corals, sponges, and other marine invertebrates, and over 56 species of fish have been recorded in and around the sanctuary. Seals rest on the outer island of the reef and there are two shipwrecks (the Grange and Woolamai) in the sanctuary (Parks Victoria 2007). The Marengo Reefs Marine Sanctuary Management Plan (Parks Victoria 2007) identifies the environmental, cultural and social values as: Subtidal soft sediments, subtidal rocky reefs and intertidal reefs. High diversity of algal, invertebrate and fish species. Australian fur seal haul out area. Evidence of a long history of Indigenous use, including many Indigenous places and objects nearby.

Protected Areas
Wrecks of coastal and international trade vessels in the vicinity of the sanctuary.
Spectacular underwater scenery for snorkelling and scuba diving.
Intertidal areas for exploring rock pools.
Opportunities for a range of aquatic recreational activities including seal watching.
Merri Marine Sanctuary
The Merri Marine Sanctuary is on the Victorian south-west coast near Warrnambool, approximately 260 km west of Melbourne. Merri Reefs Marine Sanctuary (25 ha) is located at the mouth of the Merri River, west of Warrnambool Harbour. Merri Marine Sanctuary contains a mixture of habitats, including intertidal reef, sand, shallow reef and rocky overhang. These areas provide a nursery for many fish species and a habitat for many algae species, hardy invertebrates and shorebirds. Bottlenose dolphins and fur seals are regular visitors to the shore (Parks Victoria 2007c).
The Sanctuary is protected with the Merri Marine Sanctuary Management Plan (Parks Victoria, 2007c) identifies the environmental, cultural and social values as:
Culturally significant to indigenous communities that have a long association with the area.
Merri River, wetlands and islands and headlands provide a variety of habitats.
Provision of nursery for many fish species and habitat for algal species, hardy invertebrates and shorebirds.
Mornington Peninsula National Park
Mornington Peninsula National Park is situated about 70 km south of Melbourne. Mornington Peninsula National Park runs along the coast from Point Nepean, at the western tip of the Mornington Peninsula, to Bushrangers Bay, where it turns inland along the Main Creek valley, still as a narrow band, until it joins the more expansive Greens Bush section of the Park. This park protects the terrestrial environment above the low water mark of this coastline. The Park is managed under the Mornington Peninsula National Park and Arthurs Seat State Park Management Plan, which has identified the key environmental, social and cultural values as (Parks Victoria 2016):
Largest and most significant remaining areas of native vegetation on the Mornington Peninsula. Numerous sites and features of geomorphic significance, particularly along the coast (cliffed calcarenite coast sandy forelands and basalt shore platforms).
Only representation in the Victorian conservation reserve system of four land systems formed within the Southern Victorian Coastal Plains and the Southern Victorian Uplands.
Many significant native plants and vegetation communities, especially in Greens Bush and former McKellar Flora Reserve, and the most extensive remnant coastal grassy forest habitat on the Mornington Peninsula.
Highly scenic landscape values along the ocean coast and at Port Phillip heads and the prominent landscape feature of Arthurs Seat.
Many significant fauna species, including populations of the nationally significant hooded plover, over 30 species of State significance and many species of regional significance.
High quality marine and intertidal habitats, with some pristine areas within Point Nepean.
Nationally significant and fascinating historic sites at Point Nepean.
Historic Seawinds Gardens in Arthurs Seat State Park.

Protected Areas
One of the highest recorded densities of Aboriginal archaeological sites along the Victorian Coast
South Channel Fort is an important component of the historic fortification defence system of Port Phillip (and an important bird nesting and roosting site).
Spectacular scenery and popular surf beaches associated with a wild and rugged coastline.
Local and regional economic benefits.
Intensively used recreational nodes, e.g. at Portsea, Sorrento, Cape Schanck and Arthurs Seat.
Point Addis Marine National Park, Point Danger Marine Sanctuary and Eagle Rock Marine Sanctuary
The three protected areas are managed under the Management Plan for Point Addis Marine National Park, Point Danger Marine Sanctuary and Eagle Rock Marine Sanctuary (Parks Victoria 2005).
Point Addis Marine National Park lies east of Anglesea and covers 4,600 hectares. The park protects representative samples of subtidal soft sediments, subtidal rocky reef, rhodolith beds and intertidal rocky reef habitats. The park also provides habitat for a range of invertebrates, fish, algae, birds and wildlife. The world-famous surfing destination of Bells Beach is within the park.
Point Danger Marine Sanctuary is 20 km south-west of Geelong, close to the township of Torquay and nearby Jan Juc and covers 25 ha. It extends from the high-water mark at Point Danger offshore for approximately 600 m east and 400 m south, encompassing an offshore rock platform.
Eagle Rock Marine Sanctuary is about 40 km south-west of Geelong, close to Aireys Inlet and covers 17 ha. The sanctuary extends from high water mark around Split Point between Castle Rock and Sentinel Rock. It extends offshore for about 300 m and includes Eagle Rock and Table Rock. The main habitats protected by the sanctuary include intertidal and subtidal soft sediment, intertidal and subtidal reefs, and the water column.
The management plan identifies the following environmental, cultural, and social values for the parks and sanctuaries:
Sandy beaches, subtidal soft sediments, subtidal rocky reefs, rhodolith beds and intertidal reefs.
High diversity of algal, invertebrate and fish species.
High diversity of sea slugs (opisthobranchs) and other invertebrate communities within Point Danger Marine Sanctuary.
Evidence of a long history of Indigenous use, including many Indigenous places and objects adjacent to the park and sanctuaries near dunes, headlands, estuaries and creeks.
Surf breaks, including those at Bells Beach, which are culturally important to many people associated with surfing.
Coastal seascapes of significance for many who live in the area or visit.
Recreational and tourism values
Spectacular underwater scenery for snorkelling and scuba diving.
Intertidal areas for exploring rock pools.
Opportunities for a range of recreational activities.
Spectacular seascape complementing well-known visitor experiences on the Great Ocean Road.

Protected Areas
Port Campbell National Park
Port Campbell National Park is slightly west of Twelve Apostles Marine National Park and 10 km east of Warrnambool. The park is 1,750 ha that presents an extraordinary collection of wave-sculptured rock formations. Port Campbell National Park is home to various fauna such as the little penguin, short-tailed shearwater, and various whale species (Parks Victoria 1998).
Port Phillip Heads Marine National Park
Port Phillip Heads Marine National Park is an area of 35.8 km2 that is located at the southern end of Port Phillip Bay. Many areas within the Port Phillip Heads Marine National Park are popular for a range of recreational activities. The habitats that are found within the park are seagrass beds, sheltered intertidal mudflats, intertidal sandy beaches and rocky shores, subtidal soft substrate and rocky reefs. The bay has a high diversity and abundance of marine flora and fauna that provides a migratory site for wader birds (Visit Victoria 2019). The land adjacent to the Port Phillip Heads Marine National Park is within the Port Nepean National Park.
Twelve Apostles Marine National Park and The Arches Marine Sanctuary
The Twelve Apostles Marine Park is managed in conjunction with the Arches Marine Sanctuary under the Twelve Apostles Marine National Park and The Arches Marine Sanctuary Management Plan (Parks Victoria 2006).
The Twelve Apostles Marine National Park (7,500 ha) is located south-east of Port Campbell between Broken Head and Pebble Point and extends offshore 3 nautical miles to the limit of Victorian waters (Parks Victoria 2006).
The area is representative of the Otway Bioregion and is characterised by a submarine network of towering canyons, caves, arches, and walls with a large variety of seaweed and sponge gardens plus resident schools of reef fish. The park contains areas of calcarenite reef supporting the highest diversity of intertidal and sub-tidal invertebrates found on that rock type in Victoria (Parks Victoria 2006).
The Arches Marine Sanctuary (45 ha) is approximately 600 m offshore from Port Campbell. It has a spectacular dive site of limestone formations, rocky arches, and canyons. The sanctuary is also ecologically significant, supporting habitats such as kelp forests and a diverse range of sessile invertebrates on the arches and canyons. These habitats support schools of reef fish, seals and a range of invertebrates such as lobster, abalone and sea urchins.
The Twelve Apostles Marine Park is managed in conjunction with the Arches Marine Sanctuary under the Management Plan for Twelve Apostles Marine National Park and The Arches Marine Sanctuary (Parks Victoria 2006b) and is classified as IUCN II. The Plan describes the key environmental, cultural, and social values as:
Unique limestone rock formations, including the Twelve Apostles.
Range of marine habitats representative of the Otway marine bioregion.
Indigenous culture based on spiritual connection to sea country and a history of marine resource use.
Wreck of the Loch Ard (shipwreck).
Underwater limestone formations of arches and canyons.
Diverse range of encrusting invertebrates.
Spectacular dive sites.
South Australian Marine and Coastal Conservation Parks
Lower South East Marine Park

Protected Areas
The Lower South East Marine Park Management Plan 2012 (DEWNR 2012) details the following values:
High diversity of plants and animals, including blue whales, due to the influence of the Bonney coast upwelling, an ocean current that supplies nutrient-rich water to the area.
Diverse range of habitats ranging from high-energy sandy beaches and freshwater springs, various reef types (shore platforms, fringing and limestone),
Kelp forests and algal communities and is strongly influenced by natural processes such as the Bonney coast upwelling.
Spring lakes such as Ewen Ponds and Piccaninnie Ponds (both Wetlands of National Importance) emerge from the beaches and are unusual in South Australia.
Habitat for several threatened or potentially threatened species that require freshwater and marine environments during their lifecycle, including the pouched lamprey, short-headed lamprey and shortfinned eel.
Feeding and resting grounds for migratory and resident shorebirds.
Recreational activities including fishing, diving and snorkelling.
Commercial fisheries including the Southern Zone Abalone Fishery, the Southern Zone Rock Lobster Fishery, the Marine Scalefish Fishery, the Charter Fishery and the Miscellaneous Giant Crab Fishery.
Buandig Aboriginal people have traditional associations with areas of the marine park.
Douglas Point Conservation Park
Douglas Point Conservation Park provides scenic views of the coastline and is home to a rare daisy that is only found in three other sites in Australia. The coastal park features areas of exposed limestone, sea cliffs, small sandy beaches and dense coastal vegetation, and provides for fishing, diving and bushwalking. The park is managed under the Douglas Point Conservation Park Management Plan (DEH 2003a).
Values of the park (DEH 2003) are:
The only reserved population of Sand Ixodia in Australia.
Conserves vulnerable (SA) Rufous Bristlebird and rare (SA) Beautiful Firetail, regionally uncommon coast velvet-bush and drooping velvet-bush.
Nationally endangered Orange-bellied Parrot recorded in the Park.
The Park is located within the traditional lands of the Boandik people. The remains of scattered middens are evidence of Aboriginal habitation in the past.
Shipwrecks.
Nene Valley Conservation Park
Nene Valley Conservation Park preserves an area of vegetation typical of sandy coasts in the south-east of South Australia. This vegetation complex has suffered through the effects of clearing and grazing throughout much of its former range.
Piccaninnie Ponds Conservation Park
The Piccaninnie Pond covers an area of 8.64 km2, that has a wide diversity of fauna and flora with 60 bird species and six vegetation communities. Other vegetation found within the park includes reeds, sedge swamp, open heath and tussock grassland.

Protected Areas
Tasmanian Marine and Coastal Parks and Reserves
Black Pyramid Rock Nature Reserve
Black Pyramid Rock Nature Reserve, situated of Hunter Island has a land mass of 40 ha. Black Pyramid Rock was proclaimed a Wildlife Sanctuary on 30 June 1964 due to it being the largest known breeding ground for Australasian gannets in Australia (DPIWE 2020). The Nature Reserve is managed under the Small Bass Strait Island Reserves Draft Management Plan (DPIWE 2020).
Cape Wickham State Reserve
The Cape Wickham State Reserve is on the northern tip of King Island and contains Cape Wickham lighthouse and the gravesites of the crew of Loch Leven, a ship that was wrecked nearby. It is designated as IUCN Category V which is a protected landscape/seascape.
Christmas Island Nature Reserve
Christmas Island is located off the west coast of King Island. It is designated IUCN 1a which is a strict nature reserve, which allows minimal human use. It is a BIA for both breeding and foraging for the little penguin (Commonwealth of Australia, 2015a). It is also a known nesting site of the Little Tern. Christmas Island Nature Reserve is a priority site for management under the King Island Biodiversity Management Plan (TSS 2012).
Councillor Island Nature Reserve
Councillor Island Nature Reserve is a 10.53 ha granite reserve east of Tasmania approximately 2.5 km off the mainland coastline of Tasmania within the Bass Strait. The island forms part of the King Island Important Bird Area because of its importance for breeding seabirds and waders.
Disappointment Bay State Reserve
The Disappointment Bay State Reserve is located on the north coast of King Island near Cape Wickham.
Lavinia State Reserve
Lavinia State Reserve is located on the north-east coast of King Island. The reserve contains a number of rare birds, including the endangered orange-bellied parrot (DELWP 2016). It includes the Lavinia Ramsar site and two freshwater lakes. Lavinia Beach is a popular location for surfing and fishing. The Lavinia Nature Reserve (Ramsar Site) Management Plan draft (2000) is not available online. The Sea Elephant Estuary which is within the Lavinia State Reserve is a priority site for management under the King Island Biodiversity Management Plan (TSS 2012).
Reid Rock Nature Reserve
Reid Rocks are situated approximately 21.5 km east-south-east of Stokes Point at the southern extremity of King Island in western Bass Strait. The main islet is approximately 500 m long and rises to 13 m above sea level. Reid Rocks became a Nature Reserve on 5 April 1978 due to their importance as an Australian fur seal breeding colony (DPIWE 2020). The Nature Reserve is managed under the Small Bass Strait Island Reserves Draft Management Plan (DPIWE 2020).
Seal Rock State Reserve
Seal Rock State Reserve is located on the south-east coast of King Island. Species and vegetation communities are seabird rookeries, shining dogwood, triggerplants and coastal complex on King Island. Seal Rock State Reserve is a priority site for management under the King Island Biodiversity Management Plan (TSS 2012).
Predicted Level of Risk

Protected Areas
Due to the distance to the South Australian and King Island coastal areas from the Operational Area (~130 km and ~ 70 km respectively) impacts to coastal areas above the low thresholds are not predicted. As the Operational Area is as close as ~7 to the Victorian coast, there is the potential for diesel above the low threshold to be visible on the ocean surface in coastal waters and as a sheen on shoreline areas. Most of the diesel will be concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA 1995) and expected to be visible. Visible nearshore and shoreline hydrocarbons have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities within protected areas. Due to the low volumes, light nature of marine diesel and substantial wave action with the nearshore areas impacts are likely to be short term and not require intrusive clean-up response. The predicted level of consequence to protected areas and their values from a 250 m^3 MDO spill is assessed as moderate as exposure to oil above low thresholds could occur in protected areas nearshore of the Operational Area, though if consequences occurred, they are likely to only affect a small portion of coastal areas or marine areas for a short duration (hours to days) due to the low spill volume and short duration of any exposure, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of medium.

9.5.6 Seaweed Industries

Seaweed Industry	
Sensitivity Rating	**Medium**
Predicted Level of Risk	**Low**
Environmental Planning Area Existing Environment	
The Australian seaweed industry is small: currently valued at an estimated GVP of AUD $3 million. Of this, the majority is from one company, Kelp Industries Pty Ltd on King Island in Tasmania, who hand collect plants cast bull kelp (*Durvillea pototorum*) on the beaches from predominantly the west coast of the island, predominantly for export to a large alginate manufacturer and for use in biofertiliser products (Australian Seaweed Institute 2023). Australia Bureau of Statistics (ABS) data shows seaweed exports from Australia are valued at $1.5 million for non-human consumption and it is assumed that this is almost entirely from Kelp Industries exports. Besides Kelp Industries, other seaweed collectors in Tasmania include Kelpomix and TasKelp. There are also licenses for wild harvest of the invasive species of *Undaria* in Tasmania (KaiHo Ocean Treasure) and some in Victoria (Australian Seaweed Institute 2023). The harvesting of native seaweed in Victorian marine waters is prohibited without a permit (s. 112(2) Fisheries Act 1995) and licences enabling seaweed aquaculture are not currently available in Victoria (VFA 2023b). While there are numerous research projects taking place or being planned, currently there are two projects in Tasmania (Australian Seaweed Institute 2023). The first, is a CRC-P project involving collaboration with Tassal, Spring Bay Seafoods and University of Tasmania (UTAS). This project aims to demonstrate the benefits of Kelps as part of an integrated multitrophic aquaculture approach. The second is a research collaboration between UTAS and Huon Aquaculture in Storm Bay that will also yield its first harvest in late 2020. The west coast of King Island where bull kelp is collected is within the Environmental Planning Area.	
Predicted Level of Risk	
Experiments verified the susceptibility of *Nereocystis luetkeana* (bull kelp – north America) tissue to the direct exposure to several petroleum types. Antrim et al (1995) showed that petroleum treatments resulted in visible tissue damage, with a distinct bleached line being the most visible indication of plant contact with the petroleum. Moderate to heavy colour loss, which was generally followed by rapid decay of tissue, was most pronounced in 24 h exposures to unweathered and weathered diesel. The study did not look at how this would affect the productivity of bull kelp. Bull kelp affect by oil would not be suitable for collection and processing which could result in a temporary closure to the industry and a perception of tainting of product. This could lead to financial losses to kelp collection and processing businesses. However, given the distance to King Island from the Operational Area oil exposure above low threshold levels are not predicted and thus impacts are unlikely to be a significant to seaweed collection and associated income. The relatively short duration and low volume means there may be short-term and localised consequences, which are ranked as Moderate. Thus, the predicted level of consequence to seaweed industries from a 250 m^3 MDO spill is assessed as minor as exposure is likely to be below low thresholds and any consequences would be short-term (days to weeks), recoverable and affect a small portion of bull kelp, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of low.	

9.5.7 Tourism Including Diving and Recreational Fishing

Tourism including Diving and Recreational Fishing	
Sensitivity Rating	**High**
Predicted Level of Risk	**Medium**
Environmental Planning Area Existing Environment	
The coastal areas of the Environmental Planning Area offer a wide and diverse range for marine based tourism and recreational activities, including snorkelling, scuba diving, surfing, kayaking, whale, and wildlife watching, sailing and charter boat cruises. Popular tourist destinations in the Environmental Planning Area include Portland, Port Fairy, Warrnambool, the Great Ocean Road, Great Otway National Park, and King Island. The west coast of Victoria from Warrnambool to Portland is known as reliable spots to catch tuna, kingfish, and trevalla in areas such as Lawrence Rock, the North Shore, Lady Julia Percy Island, Killarney, The Crags, Minerva Reef, Julia Reef and the Horseshoe off Cape Bridgewater (VFA 2023a). May, June, and July are reliable months to find schools of bluefin tuna (VFA 2023c). The Arches Marine Sanctuary and Twelve Apostles Marine National are well known locally for excellent scuba diving sites (Parks Victoria 2006) Seal and Dolphin watching occur within Discovery Bay Marine National Park and Deen Maar (Lady Julia Percy Island).	
Predicted Level of Risk	
Due to the distance to the South Australian and King Island coastal areas from the Operational Area (~130 km and ~ 70 km respectively) impacts to coastal areas above the low thresholds are not predicted. As the Operational Area is as close as ~7 km to the Victorian coast, there is the potential for diesel above the low threshold to be visible on the ocean surface in coastal waters and as a sheen on shoreline areas. Most of the diesel will be concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA 1995) and expected to be visible. Visible nearshore and shoreline hydrocarbons have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities. Due to the low volumes, light nature of marine diesel and substantial wave action with the nearshore areas impacts are likely to be short term and not require intrusive clean-up response. The predicted level of consequence to tourism and recreation from a 250 m^3 MDO spill is assessed as moderate as exposure to oil above low thresholds could occur in areas nearshore of the Operational, though if consequences occurred, they are likely to only affect a small portion of the coastal area for a short duration (hours to days) due to the low spill volume and short duration of any exposure, the likelihood is assessed as rare (based on the absence of any reported seismic vessel collisions in Australia) resulting in a predicted level of risk of medium.	

Circumstances resulting in a loss of containment of MDO such as a vessel collision and subsequent fuel tank rupture) are low probability events in open ocean areas without restricted navigation. Though shipping activity is relatively high within the Operational Area, modern navigational aids assist in reducing the likelihood of a collision event.

There have been no vessel collisions during a seismic survey in Australia. While undertaking the survey the seismic and support vessels will be moving at a slow speed of up to 10 km/hr and the seismic vessel will always have at least one vessel with it to observe and respond to any vessels that come to close to the seismic vessel, thereby further reducing the risk of collision with third-party vessels. Therefore, the likelihood of a vessel collision resulting in a loss of a full tank of MDO is rare.

9.6 Measures Adopted to Manage Environmental Risks

The following measures have been adopted to ensure that the risks associated with potential accidental release of fuel from the survey and support vessels will be of an acceptable level.

These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

Measure	Measure Type	Details and Justification
Consultation Management System	System	CGG will implement the Consultation Management System to ensure that pre and during survey communications will be undertaken so that other marine users know when, where and how the Regia MSS will be undertaken so they can undertake their activities in a manner that avoids any interactions or can engage with CGG so that both parties can plan activities in a manner that minimises potential displacement to each party.
CGG Marine Assurance System	System	The marine assurance system, amongst other requirements, ensures compliance of contract vessels with MARPOL, COLREGS, and Marine Orders 21, 30, 59 70,71,72, 91, 95, 96, 97, 98.
Vessel Bunkering Procedure	Procedure	A procedure which ensures that good practice and industry standards are applied to bunkering operations at sea, including the use of standard bunkering equipment such as dry-break couplings and prior-to-use inspections of bunkering hoses, equipment maintenance records, and certification. The procedure outlines how to undertake a safe transfer (e.g. safety, communication, monitoring, inventory, emergency shut down, spill response and incident reporting).
CGG Technical Operations Manager	Person	CGG will notify any incidents in accordance with the procedures in the OPEP and OSMP and execute the response strategies outlined in the OPEP and OSMP.
OVID Style Inspection	Practice	OVID-Style inspections confirm that the seismic vessel has procedures for streamer inspection, maintenance, deployment, and retrieval.
Petroleum SIMOPS Plan	Resource	A simultaneous operations plan will be developed if the seismic vessels or any equipment will enter the 500 m Petroleum Safety Zone of the Thylacine-A platform.
Oil Pollution Emergency Plan	Resource	The Oil Pollution Emergency Plan (OPEP) for the Regia MSS is a comprehensive document designed to address potential oil spill incidents during operations. This OPEP are crafted to align with the national system for oil spill preparedness and response, ensuring consistency with established protocols and coordination mechanisms. It outlines specific procedures, responsibilities, and resources necessary to respond to any oil spill event promptly and effectively. The OPEP must be submitted as part of the Implementation Strategy and must therefore be accepted by NOPSEMA prior to the activity commencing.
Oil Spill Monitoring Plan	Resource	The Operational and Scientific Monitoring Program (OSMP) for the Regia MSS is a comprehensive document designed to address potential oil spill incidents during operations. This OSMP are crafted to align with the national system for oil spill preparedness and response, ensuring consistency with established protocols and coordination mechanisms. It outlines specific procedures, responsibilities, and resources necessary to respond to any oil spill event promptly and effectively. The OSMP must be submitted as part of the Implementation Strategy and must therefore be accepted by NOPSEMA prior to the activity commencing.

10 Demonstration Risks Will Be of An Acceptable Level

10.1 Discussion on Principles of ESD

Temporary, Reversible, Small Scale and Natural variation

The accidental release of fuel during the petroleum activity is considered highly unlikely due to the presence of robust vessel management systems and stringent operational procedures. In the unlikely event of a release, the environmental consequences are expected to be temporary, reversible, and of low intensity, with the scale of potential impact limited by emergency response measures. The activity includes proactive controls to prevent releases and comprehensive response frameworks to ensure impacts remain small-scale and within acceptable environmental thresholds.

Based on sufficient information

The risk assessment process for fuel release incorporates expert judgment, incident history, and site-specific operational data. Modelling of potential spill scenarios, along with knowledge of fuel behaviour in marine environments, informs the assessment. The application of the precautionary principle and alignment with national planning frameworks ensures the evaluation is both conservative and scientifically valid. Monitoring plans are in place to verify assumptions and measure real-world environmental responses.

Activity not inconsistent with EPBC Act

The planned activity and its response measures are not inconsistent with relevant EPBC Act recovery and management plans. The implementation of a scientifically defensible Operational and Scientific Monitoring Plan (OSMP), as well as alignment with the National Plan for Maritime Environmental Emergencies, ensures compliance with applicable legislation and guidance. These measures support a structured and legally consistent approach to managing environmental risk.

10.2 Biological and Ecological Categories

Accidental fuel release poses a potential risk to marine species and habitats. However, due to comprehensive prevention systems and spill response capabilities, impacts and risks to biological and ecological features are expected to be low. In the event of a release, the affected area would be limited and short-term, with natural recovery likely and no predicted population-level impacts. Ecosystem structure, diversity, and function are expected to remain intact, with no long-term or irreversible ecological consequences.

10.3 Discussion on Economic, Cultural and Social Categories

Fuel spills have the potential to disrupt fishing, tourism, and culturally important marine resources. However, the likelihood of such outcomes is minimal due to CGG's effective control systems and rapid-response plans. Economic activities dependent on the marine environment are not expected to suffer long-term impacts. Culturally significant practices and community access to marine areas will not be interrupted or diminished in their value. The social fabric of coastal communities and stakeholders reliant on the marine environment will remain unaffected in any lasting way.

10.4 Discussion on Consistency with Company Processes

The risk of fuel release has been assessed in line with CGG's internal environmental risk framework, which incorporates global industry best practice and aligns with national emergency response protocols. Fuel management and emergency preparedness are embedded into CGG's standard operations, with no previous record of significant releases. The company's risk matrix, when applied to this activity, confirms the likelihood of unacceptable impacts is very low. CGG's history of operational integrity and environmental performance underpins the credibility of its risk assessments and supports its ability to deliver environmentally responsible operations.

This chapter predicts the levels of risk to environmental receptors within the Environment Planning Area of the Regia MSS. The survey vessels and support vessels will carry an inventory of oils and fuel and though it is unlikely that a spill will occur during operations the risk is part of carrying out the activity. A summary of the outcomes of the risk assessment is provided in Table D4-3.

Table D4-3 - Summary of Risk Assessment Outcome for Accidental Release of Fuel.

Receptor	Sensitivity	Consequence	Likelihood	Predicted Level of Risk
Water Quality	Medium	Minor	Rare	Low
Sediment Quality	Low	Minor	Rare	Low
Benthic Assemblages	Medium	Moderate	Rare	Medium
Coastal Habitats & Communities	Medium	Moderate	Rare	Medium
Plankton	Low	Minor	Rare	Low
Invertebrates	Low	Minor	Rare	Low
Fish	Low	Minor	Rare	Low
Birds	Medium – seabirds	Minor	Rare	Low – seabirds, aquatic birds
	High – aquatic birds, shorebirds	Moderate	Rare	Medium - Shorebirds
Marine Reptiles	Medium	Minor	Rare	Low
Marine Mammals	Medium	Moderate	Rare	Medium
Coastal Developments	High	Moderate	Rare	Medium
Indigenous Culture	High	Moderate	Rare	Medium
Commercial Fisheries	Medium	Moderate	Rare	Medium
Seaweed Industry	Medium	Minor	Rare	Low
Marine Industries	Medium	Minor	Rare	Low
Tourism (inc. Diving and Recreational Fishing	High	Moderate	Rare	Medium
Protected Areas	High	Moderate	Rare	Medium

11 Environmental Performance Outcomes

Defined Acceptable Level (From Section 6)	Environmental Performance Outcome	Rationale
Prevent any accidental release of fuel to the marine environment.	No accidental release of fuel to the marine environment.	Preventing fuel release at the source is the most effective way to protect the marine environment. Implementation of preventative measures, such as robust fuel handling procedures and regular maintenance of equipment, ensures environmental integrity and compliance with relevant legislation.
Have comprehensive emergency response plans, aligned with the National Plan for Maritime Environmental Emergencies, in place to mitigate consequences.	Maintain arrangements to respond to an unplanned release of fuel in accordance with the OPEP.	The development and maintenance of an Oil Pollution Emergency Plan (OPEP) ensures preparedness to manage and contain any unplanned releases. Alignment with the National Plan for Maritime Environmental Emergencies supports a rapid and coordinated response, limiting environmental harm.
Have an Operational and Scientific Monitoring Plan in place to monitor the effects of a release of fuel to the marine environment.	Maintain arrangements to monitor the effects of a release of fuel to the marine environment in accordance with the OSMP. Monitor any accidental release of fuel until termination criteria are met.	Monitoring the environmental impacts of any fuel release allows for evidence-based decision-making and adaptive management. The Operational and Scientific Monitoring Plan (OSMP) supports compliance with regulatory requirements and ensures environmental outcomes are understood and appropriately managed.
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption. **Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.** **Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.**	Social, cultural, and economic features are protected, sustaining their value for people and communities.	Preventing or effectively managing accidental fuel releases protects marine ecosystems and ensures continuity of access to marine resources, which underpin social, cultural, and economic values. By avoiding contamination of culturally significant areas and species, and minimising disruption to fisheries, tourism, and other livelihoods, the measures in place sustain community well-being, cultural heritage, and economic resilience.

12 Recommendations

As demonstrated in this risk assessment, the predicted level of risk to each receptor has either been assessed as medium or low. The predicted levels of risk are clearly below the pre-defined acceptable levels of risk and the mitigation and management measures in place provide reliable prevention to have confidence in the predicted likelihood levels, thus there are no further recommendations.

13 Document Control

Date	Revision	Update
6 July 2023	A	Draft prepared for initial comment
23 August 2023	B	Update based on comments and relevant person feedback
11 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
14 May 2024	2	Updated following public comment and rerun of the PMST search.
31 October 2024	3	Updated following NOPSEMA assessment.
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
6 December	5	Updated following NOPSEMA OMR 2 Letter

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table D4-4 shows how this feedback has been incorporated into the environmental assessments.

Table D4-4 - Public comment input.

Matter	Matter ID	Changes made arising from public comment
Matter: Failure of EP to address coastal erosion due to loss of seaweed	E14	EP Appendix D4 (Accidental Release of Fuel), Section 9.4.1 (Benthic Assemblages) has been updated in response to these claims to reflect that, impacts resulting in the loss of coastal seaweed to the extent that coastal erosion could be affected, are not predicted.
Matter: Geographic range and all species need to be defined and considered	I16	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table D4-5. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table D4-5 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4042	Concern about fuel spillage and its impact on the natural environment.	This has been thoroughly assessed in D4 and the risks determined to be of an acceptable level, with preventative and mitigative measures applied.	832
4168	Risks of oil spills impacting marine life, including endangered species like the Southern Right Whale and the Tasmanian Rock Lobster.	Titleholder has conducted a thorough risk assessment relating to accidental release of fuel (D4), wherein which both receptors of concern mentioned in this feedback have been assessed. An OPEP and OSMP have also been designed and incorporated into the EP to establish a clear and systematic framework for preventing, managing and mitigating oil pollution incidents on the vessels deployed during the Regia MSS (G3).	2278
4307	The stakeholder was concerned about the environmental impact of gas released during seismic testing and production.	No impact assessment relating to the release of hydrocarbons has been conducted by CGG because hydrocarbon release is not an expected aspect of the activity. CGG has however conducted a thorough risk assessment relating to accidental release of fuel (D4). An OPEP and OSMP have also been designed and incorporated into the EP to establish a clear and systematic framework for preventing, managing and mitigating oil pollution incidents on the vessels deployed during the Regia MSS (G3).	2273
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation	1673

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4103	Expresses strong opposition to the proposed plans for potential oil spills, highlighting significant concern for environmental risks in the area. The individual identifies as a local resident.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. This includes an assessment of all risks associated with marine spills. There is a comprehensive Oil Pollution Emergency Plan and management, and mitigation plans for accidental release of materials or waste overboard.	1022
4104	Feedback expresses that the proposed drilling is close to a marine park, threatening this area. An oil spill could cause irreversible damage, similar to the harm already experienced along much of the coast.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. This includes an assessment of all risks associated with marine spills. There is a comprehensive Oil Pollution Emergency Plan and management, and mitigation plans for accidental release of materials or waste overboard. Regia MSS is a seismic program not a drilling one.	1022
4128	Lack of adequate monitoring of species present or likely to be impacted.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions regarding species that may be affected by the Regia MSS. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	3237
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4158	Reference to the destruction and degradation of the marine	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed	2830

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	environment observed during diving trips.	in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	
4163	Request to explicitly consider protection for bird colonies on the north of King Island.	The only effects to the bird colonies on King Island arise from an accidental release of fuel. This has been assessed thoroughly in D4 and consultation with the EPA Tasmania identified protection measures to be adopted for birds on King Island in the event of a spill.	2033
4166	Risk to the marine environment with the plan.	Titleholder has conducted a series of thorough risk assessments including the following aspects: Accidental release of waste (D1), Fauna Interactions (D2), Invasive Marine Species (D3) and Accidental release of fuel (D4), wherein which relevant receptors have been assessed.	2677
4168	Risks of oil spills impacting marine life, including endangered species like the Southern Right Whale and the Tasmanian Rock Lobster.	Titleholder has conducted a thorough risk assessment relating to accidental release of fuel (D4), wherein which both receptors of concern mentioned in this feedback have been assessed. An OPEP and OSMP have also been designed and incorporated into the EP to establish a clear and systematic framework for preventing, managing and mitigating oil pollution incidents on the vessels deployed during the Regia MSS (G3).	2278
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work	2963

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation	1659

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and	1665

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049
4253	The possible effects to marine life and ecosystems are my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work	2117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice	The titleholder publicly responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and	2107

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	due to its perceived harmful effects on the marine ecosystem.	of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747
4307	The stakeholder was concerned about the environmental impact of gas released during seismic testing and production.	No impact assessment relating to the release of hydrocarbons has been conducted by CGG because hydrocarbon release is not an expected aspect of the activity. CGG has however conducted a thorough risk assessment	2273

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		relating to accidental release of fuel (D4). An OPEP and OSMP have also been designed and incorporated into the EP to establish a clear and systematic framework for preventing, managing and mitigating oil pollution incidents on the vessels deployed during the Regia MSS (G3).	
4315	The statement suggests that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	"A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments is covered below in response to concern 6."	2886
4452	Stakeholder claims that potential impacts on World Heritage Values of Budj Bim and the life-cycle of Kooyang have not been properly assessed or addressed.	Regia team responded by referencing the relevant impact assessments in the Environment Plan (EP) (EVT070), this information was also provided in Event ID 7363. Previously provided in Event ID 2521, 2356, 2357, 2358, 2359, 2360, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417.	7136
4453	Stakeholder claims that potential impacts on World Heritage Values of Budj Bim and the life-cycle of Kooyang have not been properly assessed or addressed.	Regia team responded by referencing the relevant impact assessments in the Environment Plan (EP) (EVT070), this information was also provided in Event ID 7363. Previously provided in Event ID 2521, 2356, 2357, 2358, 2359, 2360, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417.	EVT070
4487	Claims that CGG's proposed activities are inconsistent with the Recovery Plans made under the EPBC Act, the Southern Right Whale Recovery Plan and the Blue Whale Recovery Plan. GMTOAC states that these activities pose known physical and behavioural risks to the Eastern Population of Southern Right Whales and to	CGG maintains that its approach aligns with statutory obligations and industry best practice. It asserts that all regulatory requirements under Regulation 34 have been met, and that its environmental performance outcomes and control measures are grounded in the best available science and tailored to the ecological and cultural sensitivities revealed through	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	Pygmy Blue Whales. These risks include impacts from anthropogenic underwater noise, particularly seismic noise, vessel strikes, climate-driven changes in prey availability, and the cumulative effects of these pressures, all of which have the potential to injure or kill individuals and affect populations. GMTOAC notes that under the EPBC Act Program and NOPSEMA's decision-making guidelines, an Environment Plan cannot be accepted if it is inconsistent with a recovery plan. It emphasises that both Recovery Plans contain "Very High" importance actions requiring that Blue Whales and Southern Right Whales must be able to continue using their Biologically Important Areas (BIAs) without auditory impairment, injury, or displacement. The plans also call for preventing disruption and displacement of Karntubul (Southern Right Whales) from BIAs due to anthropogenic noise such as seismic surveys.	consultation. The Regia MSS Environment Plan (EP) was designed to ensure impacts and risks are reduced to As Low As Reasonably Practicable (ALARP) and to an acceptable level. Regarding whale protection, CGG highlights that the EP includes specific mitigation measures for culturally and ecologically significant marine fauna, including species noted in relevant Recovery Plans. Early correspondence in February 2023 identified Southern Right Whales and Pygmy Blue Whales as key sensitivities, and the EP commits to spatial and temporal avoidance measures, sound-source shutdowns, and exclusion zones to protect them. These measures explicitly consider cultural significance, such as timing restrictions to avoid the Karntubul (Southern Right Whale) birthing period. The whales, Karntubul and Wuuloc, are identified in the EP as sensitive receptors with dedicated protective measures. CGG confirms that these cultural and ecological sensitivities were incorporated into the environmental assessment. The EP acknowledges the sacred cultural status of Koontapool (Southern Right Whale) and Wuuloc (Pygmy Blue Whale) for the Gunditjmara people and includes them in impact and cumulative risk assessments. Appendix F3 references the Nyamat Mirring Plan 2023–2033 and recognises Gunditjmara spiritual connections, including to Karntubul. CGG substantively addresses the relevant issues, including underwater noise, vessel interactions, and cumulative effects. The EP sets out noise-management frameworks, timing restrictions, and cumulative impact analyses consistent with the concerns raised.	
4490	CGG has failed to adequately assess the impacts of its proposed activity on the Budj Bim World Heritage Cultural Landscape. GMTOAC further states that CGG did not sufficiently evaluate impacts on Kooyang, a culturally significant species whose lifecycle and migration underpin the world heritage values of the Budj Bim Cultural Landscape and extend well beyond its physical boundaries.	Culturally significant features, including the Budj Bim landscape, were included in both impact and cumulative risk assessments using a methodology that blends scientific evidence with cultural narratives. Regarding Kooyang (Eel), CGG maintains that this culturally important species, whose lifecycle is central to the world heritage values of Budj Bim, was addressed within the EP's impact and cumulative assessments. These assessments include both Kooyang's cultural significance and ecological role. CGG reiterates that its EP is consistent with statutory obligations, based on best-available science, and	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		tailored to the cultural and ecological sensitivities identified. CGG maintains that the Budj Bim Cultural Landscape and Kooyang have been incorporated into the EP and that this inclusion meets regulatory standards for demonstrating ALARP and acceptable levels of impact.	
4493	Claims that CGG's proposed seismic activities contribute both directly and indirectly to broader threats faced by Southern Right Whales, including industrialisation of the marine environment, climate change, and pollution or contamination from vessel discharges.	Broader threats such as climate change and industrialisation fall outside the scope of the Environment Plan, as outlined in the response to Statements 156–166. The EP assesses only the environmental risks directly associated with the proposed activity. These risks are evaluated in the D Appendices, which demonstrate that any residual risks have been reduced to an acceptable level.	EVT352

Annex 3

Loss of Containment Sensitive Species

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Fish							
Australian Grayling	Species or species habitat known to occur within area	Vulnerable				None identified	Conservation Advice *Prototroctes maraena* Australian Grayling (TSSC 2021)
Blue Warehou	Species or species habitat known to occur within area	Conservation Dependent				None identified	Commonwealth Listing Advice *Seriolella brama* Blue Warehou (TSSC 2015)
Eastern Dwarf Galaxias, Dwarf Galaxias	Species or species habitat known to occur within area	Endangered				None identified	National Recovery Plan for the Dwarf Galaxias (*Galaxiella pusilla*) (Saddlier et al. 2010) Conservation Advice for *Galaxiella pusilla* (Dwarf Galaxias) (DCCEEW 2023j)
Eastern Gemfish	Species or species habitat known to occur within area	Conservation Dependent				None identified	Commonwealth Listing Advice on *Rexea solandri* (TSSC 2009)
Orange Roughy, Deep-sea Perch, Red Roughy	Species or species habitat likely to occur within area	Conservation Dependent				None identified	None identified
Yarra Pygmy Perch	Species or species habitat known to occur within area	Endangered				None identified	National Recovery Plan for the Yarra Pygmy Perch (*Nannoperca obscura*) (Sadler and Hammer 2010) Conservation Advice for *Nannoperca obscura* (Yarra Pygmy Perch) (DCCEEW 2023k)
Sharks							
Little Gulper Shark	Species or species habitat likely to occur within area	Conservation Dependent (listed as *Centrophorus zeehaani)*				None identified	Commonwealth Listing Advice on *Centrophorus zeeha* (southern dogfish) (TSSC 2013)
Porbeagle, Mackerel Shark	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark	Species or species habitat likely to occur within area	Conservation Dependent				None identified	Commonwealth Listing Advice on *Galeorhinus galeus (*TSSC 2009a)
Shortfin Mako, Mako Shark	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	Listing Advice *Isurus oxyrinchus* shortfin mako shark (TSSC 2014)
White Shark, Great White Shark	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		Distribution and foraging	Recovery Plan for the White Shark (*Carcharodon carcharias*). (DSEWPaC 2013b)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Syngnathidae							
Australian Smooth Pipefish, Smooth Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse	Species or species habitat may occur within area				Listed	None identified	None identified
Brushtail Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Bullneck Seahorse	Species or species habitat may occur within area				Listed	None identified	None identified
Common Seadragon, Weedy Seadragon	Species or species habitat may occur within area				Listed	None identified	None identified
Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Deepbody Pipefish, Deep-bodied Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Hairy Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Halfbanded Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Javelin Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Knifesnout Pipefish, Knife-snouted Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Leafy Seadragon	Species or species habitat may occur within area				Listed	None identified	None identified
Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Mollison's Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Mother-of-pearl Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Port Phillip Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Pugnose Pipefish, Pug-nosed Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Red Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Ringback Pipefish, Ring-backed Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Robust Pipehorse, Robust Spiny Pipehorse	Species or species habitat may occur within area				Listed	None identified	None identified
Sawtooth Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Short-head Seahorse, Short-snouted Seahorse	Species or species habitat may occur within area				Listed	None identified	None identified
Spiny Pipehorse, Australian Spiny Pipehorse	Species or species habitat may occur within area				Listed	None identified	None identified
Spotted Pipefish, Gulf Pipefish, Peacock Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Trawl Pipefish, Bass Strait Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Tucker's Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Seabirds							
Antipodean Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Australasian Gannet	Breeding known to occur within area				Listed	Foraging: year round 40 km buffer around coast off Portland	Wildlife Conservation Plan for Seabirds (CoA 2020a)
Black-browed Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on Black-browed Albatross (*Thalassarche melanopris*) (TSSC 2005)
Blue Petrel	Species or species habitat may occur within area	Vulnerable			Listed	None identified	Conservation Advice *Halobaena caerulea* Blue Petrel (TSS 2015)
Buller's Albatross, Pacific Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Campbell Albatross, Campbell Black-browed Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Common Diving-Petrel	Breeding known to occur within area				Listed	Foraging: year round Breeding: July – January Buffer around Tasmania and Victoria	None identified
Fairy Prion	Species or species habitat known to occur within area	Vulnerable			Listed	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a)
Fairy Prion (southern)	Species or species habitat known to occur within area	Vulnerable				None identified	Conservation Advice *Pachyptila turtur subantarctica* fairy prion (southern) (TSSC 2015)
Flesh-footed Shearwater, Fleshy-footed Shearwater	Species or species habitat known to occur within area		Migratory	Migratory Marine Birds	Listed (as *Puffinus carneipes*)	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a) Commonwealth Listing Advice on *Ardenna carneipes* (Flesh-footed Shearwater) (TSSC 2014)
Gould's Petrel, Australian Gould's Petrel	Species or species habitat may occur within area	Endangered				None identified	Gould's Petrel (*Pterodroma leucoptera leucoptera*) Recovery Plan (DEC NSW 2006)
Greater Crested Tern	Breeding known to occur within area		Migratory	Migratory Wetlands Species	Listed (as *Sterna bergii*)	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a)
Grey-headed Albatross	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Approved Conservation Advice for *Thalassarche chrysostoma* (Grey-headed Albatross) (DEWHA 2009)
Indian Yellow-nosed Albatross	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Most of the South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Little Penguin	Breeding known to occur within area				Listed	Breeding and foraging BIAs occur at Black Pyramid, Christmas Island and Councillor Island	Wildlife Conservation Plan for Seabirds (CoA 2020a)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Northern Buller's Albatross, Pacific Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable			Listed (as *Thalassarche sp. nov.)*	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Northern Giant Petrel	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on *Macronectes halli* (Northern Giant-Petrel) (TSSC 2001)
Northern Royal Albatross	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Salvin's Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Short-tailed Shearwater	Breeding known to occur within area		Migratory	Migratory Marine Birds	Listed (as *Puffinus tenuirostris*)	Foraging Breeding Buffer around Tasmania including Bass Strait	None identified
Shy Albatross	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)) Conservation Advice *Thalassarche cauta* Shy Albatross (TSS 2020)
Silver Gull	Breeding known to occur within area				Listed (as *Larus novaehollandiae*)	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a)
Soft-plumaged Petrel	Species or species habitat may occur within area	Vulnerable			Listed	None identified	Conservation Advice *Pterodroma Mollis* Soft-plumaged Petrel (TSS 2015a)
Sooty Albatross	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Sooty Shearwater	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed (as *Puffinus griseus*)	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a) Conservation Advice for *Ardenna grisea* (Sooty Shearwater) (DCCEEW 2023i)
Southern Giant-Petrel, Southern Giant Petrel	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on *Macronectes giganteus* (Southern Giant-Petrel) (TSSC 2001a)
Southern Royal Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Wandering Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Wedge-tailed Shearwater			Migratory Marine Birds	Migratory Marine Birds	Listed	Foraging: Breeding: August - May 160 km around breeding area on Mutton Bird Island	Wildlife Conservation Plan for Seabirds (CoA 2020a)
White-bellied Sea-Eagle	Breeding known to occur within area				Listed	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a)
White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian)	Species or species habitat likely to occur within area	Vulnerable				None identified	Lord Howe Island Biodiversity Management Plan (DECC 2007) – not relevant to Environmental Planning Area
White-capped Albatross	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Shorebird							
Australasian Bittern	Species or species habitat known to occur within area	Endangered				None identified	Conservation Advice *Botaurus poiciloptilus* Australasian Bittern. Threatened Species Scientific Committee (TSSC 2019a)
Australian Fairy Tern	Species or species habitat known to occur within area	Vulnerable				None identified	Approved Conservation Advice for *Sternula nereis nereis* (Fairy Tern) (DSEWPaC. 2011) National Recovery Plan for the Australian Fairy Tern (*Sternula nereis nereis*) (DAWE 2020)
Australian Painted Snipe	Species or species habitat known to occur within area	Endangered			Listed - overfly marine area (as *Rostratula benghalensis (sensu lato)*)	None identified	Approved Conservation Advice for *Rostratula australis* (Australian Painted Snipe) (DSEWPaC 2013) National Recovery Plan for the Australian Painted Snipe (*Rostratula australis*) (CoA 2022a)
Bar-tailed Godwit	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Black-eared Cuckoo	Species or species habitat known to occur within area				Listed - overfly marine area (as *Chrysococcyx osculans*)	None identified	None identified
Black-faced Cormorant	Breeding known to occur within area				Listed	Breeding Foraging	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Black-faced Monarch	Species or species habitat may occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	None identified
Black-tailed Godwit	Roosting known to occur within area	Endangered	Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	Conservation Advice for *Limosa limosa* (Black-tailed Godwit) (DCCEEW 2024i) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Blue-winged Parrot	Species or species habitat known to occur within area	Vulnerable			Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Neophema chrysostoma* (Blue-winged Parrot) (DCCEEW 2023l)
Cape Gannet	Breeding known to occur within area				Listed	None identified	None identified
Cattle Egret	Species or species habitat may occur within area				Listed - overfly marine area (as *Ardea ibis*)	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Common Greenshank, Greenshank	Species or species habitat known to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice for *Tringa nebularia* (Common Greenshank). (DCCEEW 2024e) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Common Noddy	Species or species habitat likely to occur within area		Migratory	Migratory Marine Birds	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Common Sandpiper	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Curlew Sandpiper	Species or species habitat known to occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DCCEEW 2023m)
Double-banded Plover	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed – overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Eastern Curlew, Far Eastern Curlew	Species or species habitat known to occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed	None identified	Conservation Advice for *Numenius madagascariensis* (Far Eastern Curlew) (DCCEEW 2023n)
Hooded Plover, Hooded Dotterel	Species or species habitat known to occur within area				Listed - overfly marine area (as *Thinornis rubricollis)*	None identified	None identified
Fork-tailed Swift	Species or species habitat likely to occur within area		Migratory	Migratory Marine Birds	Listed - overfly marine area	None identified	None identified
Great Knot	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice for *Calidris tenuirostris* (great knot) (DCCEEW 2024f) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Brown Skua	Species or species habitat may occur within area				Listed (as *Catharacta skua*)	None identified	None identified
Greater Sand Plover, Large Sand Plover	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed	None identified	Conservation Advice for *Charadrius leschenaultii* (Greater Sand Plover) (DCCEEW 2023o) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Grey Plover	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice for *Pluvialis squatarola* (Grey Plover) (DCCEEW 2024h) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Grey-tailed Tattler	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed (as *Heteroscelus brevipes*)	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Hooded Plover, Hooded Dotterel	Species or species habitat known to occur within area				Listed - overfly marine area (as *Thinornis rubricollis)*	None identified	None identified
Latham's Snipe, Japanese Snipe	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice for *Gallinago hardwickii* (Latham's snipe) (DCCEEW 2024d) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Lesser Sand Plover, Mongolian Plover	Roosting known to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed	None identified	Conservation Advice *Charadrius mongolus* Lesser Sand Plover (TSSC 2016c) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Little Curlew, Little Whimbrel	Roosting likely to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Little Tern	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed (as *Sterna albifrons*)	None identified	Commonwealth Listing Advice on *Sterna albifrons sinensis* (Little Tern (Western Pacific)) (TSSC 2002) Conservation Advice for *Sternula albifrons* (Little Tern) (DCCEEW 2025)
Magpie Goose	Species or species habitat may occur within area				Listed - overfly marine area	None identified	None identified
Marsh Sandpiper, Little Greenshank	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	Species or species habitat known to occur within area	Endangered				None identified	Conservation Advice for Limosa lapponica baueri Bar-tailed Godwit (western Alaskan) (DCCEEW 2024b)
Orange-bellied Parrot	Species or species habitat known to occur within area	Critically Endangered			Listed - overfly marine area	None identified	Commonwealth Listing Advice on *Neophema chrysogaster* (TSSC 2006). National Recovery Plan for the Orange-bellied Parrot, *Neophema chrysogaster* (DEWLP 2016)
Osprey	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Pacific Golden Plover	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Pectoral Sandpiper	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Pied Stilt, Black-winged Stilt	Roosting known to occur within area				Listed - overfly marine area	None identified	None identified
Pin-tailed Snipe	Roosting likely to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Plains-wanderer	Species or species habitat likely to occur within area	Critically Endangered				None identified	Conservation Advice *Pedionomus torquatus* Plains-wanderer (DoE 2015a) National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*) (DoE and SA DEWNR 2016)
Rainbow Bee-eater	Species or species habitat may occur within area				Listed - overfly marine area	None identified	None identified
Red Knot, Knot	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice *Calidris canutus* Red Knot (DCCEEW 2024) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Red-capped Plover	Roosting known to occur within area				Listed - overfly marine area	None identified	None identified
Red-necked Avocet	Roosting known to occur within area				Listed - overfly marine area	None identified	None identified
Red-necked Phalarope	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Red-necked Stint	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Ruddy Turnstone	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed	None identified	Conservation Advice for *Arenaria interpres* (Ruddy Turnstone) (DCCEEW 2024c) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Rufous Fantail	Species or species habitat known to occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	None identified
Sanderling	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	None identified
Satin Flycatcher	Breeding known to occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Sharp-tailed Sandpiper	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Calidris acuminata* (Sharp-tailed Sandpiper) (DCCEEW 2024a)
Swift Parrot	Species or species habitat likely to occur within area	Critically Endangered			Listed - overfly marine area	None identified	National Recovery Plan for the Swift Parrot (*Lathamus discolor*) (Saunders & Tzaros 2011) Conservation Advice *Lathamus discolor* Swift Parrot (TSSC 2016b)
Swinhoe's Snipe	Roosting likely to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Terek Sandpiper	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice for *Xenus cinereus* (Terek Sandpiper) (DCCEEW 2024g) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Whimbrel	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
White-throated Needletail	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	Conservation Advice *Hirundapus caudacutus* White-throated Needletail (TSSC 2019)
Wood Sandpiper	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Yellow Wagtail	Species or species habitat may occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	None identified
Turtles							
Green Turtle	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017)
Leatherback Turtle, Leathery Turtle	Breeding likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017) Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle*)* (DEWHA 2008)
Loggerhead Turtle	Breeding likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017)
Dolphins							
Bottlenose Dolphin	Species or species habitat may occur within area						None identified
Common Dolphin, Short-beaked Common Dolphin	Species or species habitat may occur within area						None identified
Dusky Dolphin	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species			None identified
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin	Species or species habitat likely to occur within area						None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Risso's Dolphin, Grampus	Species or species habitat may occur within area						None identified
Southern Right Whale Dolphin	Species or species habitat may occur within area						None identified
Whales							
Andrew's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Antarctic Minke Whale, Dark-shoulder Minke Whale	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Arnoux's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Blainville's Beaked Whale, Dense-beaked Whale	Species or species habitat may occur within area					None identified	None identified
Blue Whale	Foraging, feeding or related behaviour known to occur within area	Endangered	Migratory	Migratory Marine Species		Foraging (annual high use area)	Conservation Management Plan for the Blue Whale (DoE 2015c)
Cuvier's Beaked Whale, Goose-beaked Whale	Species or species habitat may occur within area					None identified	None identified
Dwarf Sperm Whale	Species or species habitat may occur within area					None identified	None identified
False Killer Whale	Species or species habitat likely to occur within area					None identified	None identified
Fin Whale	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		None identified	Conservation Advice *Balaenoptera physalus* Fin Whale (TSSC 2015b)
Gray's Beaked Whale, Scamperdown Whale	Species or species habitat may occur within area					None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Hector's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Humpback Whale	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	Listing Advice *Megaptera novaeangliae* Humpback Whale (DAWE 2022a)
Killer Whale, Orca	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Long-finned Pilot Whale	Species or species habitat may occur within area					None identified	None identified
Minke Whale	Species or species habitat may occur within area					None identified	None identified
Pygmy Right Whale	Foraging, feeding or related behaviour likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Pygmy Sperm Whale	Species or species habitat may occur within area					None identified	None identified
Sei Whale	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		None identified	Conservation Advice *Balaenoptera borealis* sei whale (TSSC 2015c)
Shepherd's Beaked Whale, Tasman Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Short-finned Pilot Whale	Species or species habitat may occur within area					None identified	None identified
Southern Bottlenose Whale	Species or species habitat may occur within area					None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Southern Right Whale	Breeding known to occur within area	Endangered	Migratory (as Balaena glacialis australis)	Migratory Marine Species		Reproduction and Migration BIAs	Conservation Management Plan for the Southern Right Whale (CoA 2012) National Recovery Plan for the Southern Right Whale (DCCEEW 2024)
Sperm Whale	Species or species habitat may occur within area		Migratory	Migratory Marine Species		None identified	None identified
Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
True's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Pinnipeds							
Australian Fur-seal, Australo-African Fur-seal	Breeding known to occur within area				Listed	None identified	None identified
Australian Sea-lion, Australian Sea Lion	Species or species habitat known to occur within area	Endangered			Listed	None identified	Conservation Advice *Neophoca cinerea* Australian Sea Lion (TSSC 2020b) Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaC. 2013a)
Long-nosed Fur-seal, New Zealand Fur-seal	Species or species habitat may occur within area				Listed	None identified	None identified

REGIA
Marine Seismic Survey

Impact Assessment
Physical Presence

Appendix E1: REG-EP-020-E1

Rev 4

December 2025

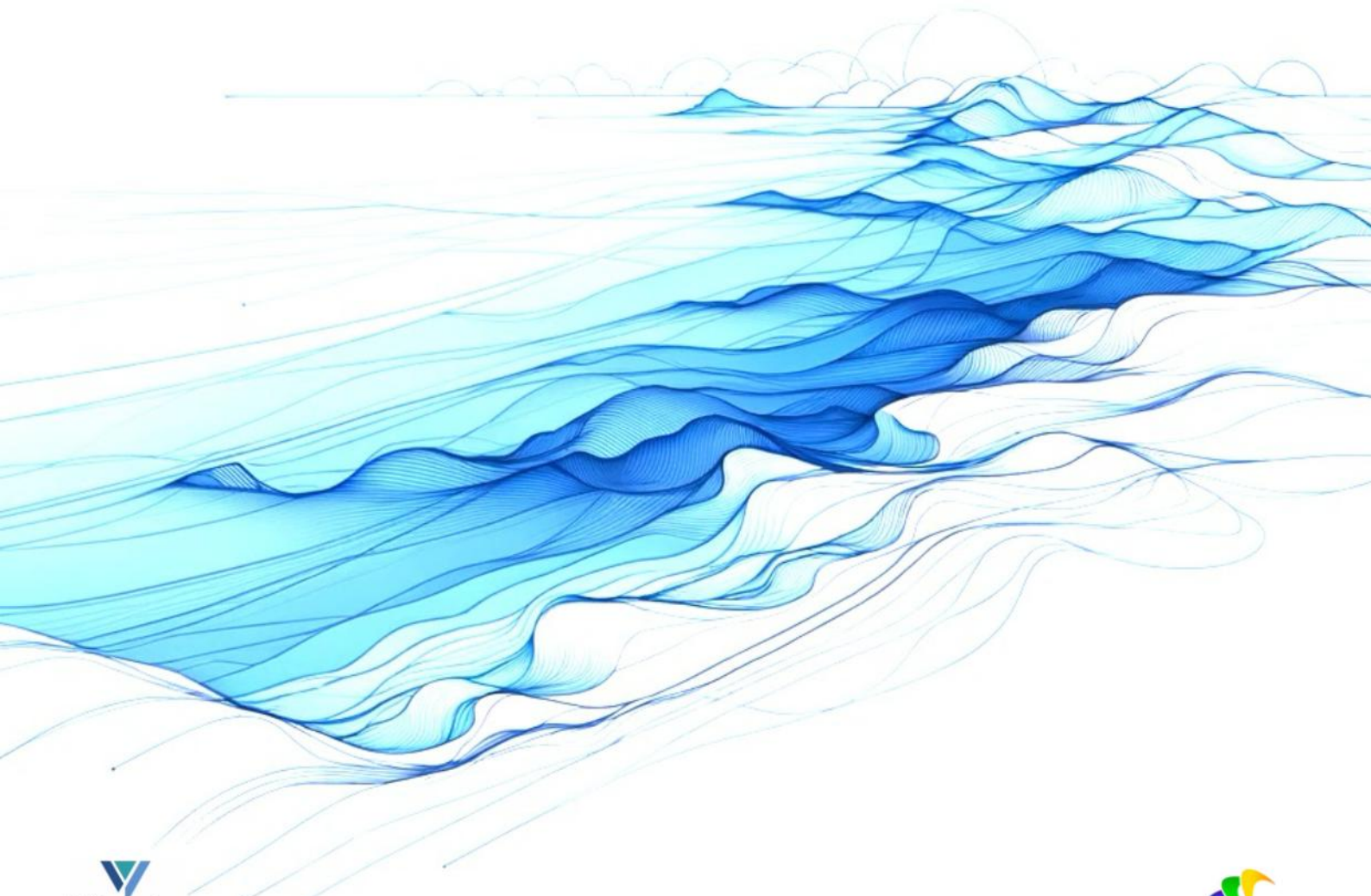

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Table of Contents

1 Introduction 4
1.1 Purpose and Scope 4
1.2 Consultation in Preparation of the EP 4
1.3 Modifications Arising from Further Assessment 4
2 Aspect – Physical Presence 5
2.1 How the Aspect Occurs 5
2.2 Extent and Duration of the Aspect 5
3 Cause-Effect Pathway 6
4 Description of the Existing Environment that May be Affected by the Activity 7
4.1 Commercial Fishing and Aquaculture 7
4.2 Offshore Energy 13
4.3 Commercial Shipping 13
4.4 Marine Tourism 13
4.5 Recreational Fishing 14
4.6 Defence Activities and UXOs 14
4.7 People and Communities 16
5 Relevant Legislative and Other Requirements 18
6 Defining Acceptable Levels of Impact 19
7 Consultation Input 22
8 Minimisation of Impacts Through Activity Design 23
8.1 Elimination 23
8.2 Substitution 25
9 Predicted Levels of Impact 27
9.1 Changes to the functions, interests, or activities of other users 27
9.2 Predicted Levels of Impacts 32
9.3 Industry Standard Mitigation Measures 33
9.4 Measures Adopted to Manage Environmental Impacts 33
10 Demonstration Impacts Will Be of an Acceptable Level 35
10.1 Principles of ESD, Biological and Ecological Categories 35
10.2 Economic Category 35
10.3 Cultural and Social Categories 35
10.4 Consistency with Company Processes 35
11 Environmental Performance Outcomes 37
12 Recommendations 39
13 Document Control 40

14 References 41
Annex 1 42
Input from Public Comment 42
Annex 2 43
Objections and Claims Raised from Consultation 43
Annex 3 61
Fishery Overlap Data 61

1 Introduction

Physical presence of the seismic survey vessel and support vessels was identified through the Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4) as an environmental aspect needing further assessment. Hence this document presents a detailed examination of **Physical Presence**, as will typically be produced during the proposed Regia Marine Seismic Survey (**Regia MSS**), and its interaction with the environmental receptor we are collectively calling **Other Marine Users.**

This document also uses information in three preceding studies that should be understood before reading this report.

1. PEIRA.
2. Commercial Fisheries Analysis Report (Appendix B6).
3. Cultural Heritage Assessment Report (Appendix B10).

1.1 Purpose and Scope

The purpose of this document is to assess all acceptable sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document was first published in draft form to the Document Library of the Regia MSS Consultation Hub on 11 September 2023. This was done to acknowledge that the final full Environment Plan (**EP**) can be a large document that is difficult for readers to digest in the 30-day public comment period. As such, the public and relevant persons were invited to comment on the document with an explicit request for readers to provide feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

1.3 Modifications Arising from Further Assessment

To ensure this environmental assessment remains contemporary, accurate, and reflects feedback from the regulator and relevant persons, this document will be updated from time-to-time. In particular, the CGG environmental assessment process requires consideration of whether further assessment was needed to verify, or dive deeper into a topic, to further improve the predictive quality of the assessment. When this has occurred, reference to such changes will be communicated in the Recommendation section and identified at relevant points in the assessment.

2 Aspect – Physical Presence

2.1 How the Aspect Occurs

The physical presence of the survey vessel with the towed sound source and streamers and the support vessels operating in marine waters may interfere with other marine users' activities.

The aspect does not cover the risk of a vessel collision with other marine users as this is assessed in the Accidental Release of Fuel section.

2.2 Extent and Duration of the Aspect

Duration: 90 days

Extent: Operational Area

The extent of the area where the physical presence of vessels and towed equipment will occur is within the Operational Area and the impact (of interference with other marine user's activities) could occur while the activity is undertaken.

3 Cause-Effect Pathway

The PEIRA (Appendix B4) identified a cause-effect pathway for the physical presence of vessels and towed equipment for the following environmental components and their social, cultural, and economic features:

- Commercial fishing and aquaculture
- People and communities
- Marine industries
- Diving
- Marine tourism
- Recreational fishing

Via the relevant person consultation process the Department of Defence confirmed the Operational Area is located outside of any Defence Training Areas and restricted airspace thus interference with defence activities is not assessed further.

Based on relevant person consultation, an activity limitation has been put in place to have no vessel movement within 4 nautical miles of the coast, except in case of emergency**,** to reduce impacts to commercial and recreational fishers, surfers, swimmers, and coastal users. No impacts are therefore predicted from the physical presence of vessels and towed equipment to swimmers and coastal users, and they are not assessed further.

The limited manoeuvrability of the seismic survey vessel while towing the source array and streamers means that other marine users in the same water space will have to avoid the seismic survey vessel and towed equipment while in operation. Commercial fishing vessels may also be asked to remove fishing gear such as traps and lines to avoid interaction with the seismic survey vessel and towed equipment.

4 Description of the Existing Environment that May be Affected by the Activity

As detailed in the Section 2.2, the Operational Area has been adopted as the extent of the area where other marine users' activities may be affected by the physical presence of vessels and towed equipment associated with the Regia MSS.

4.1 Commercial Fishing and Aquaculture

In August 2023 a review of commercial fisheries was undertaken to identify Commonwealth and State (Victorian, Tasmanian, and South Australian) fisheries that fish or potentially fish within the Activity Planning Area and is available in Appendix B6: Commercial Fisheries Analysis Report. In March 2025, a further review was undertaken of the commercial fisheries to include the 2023 Commonwealth fishery data and the updated Operational Area. The outcomes of this latest review are detailed in Table E1-1.

The review identified the following commercial fisheries that have catch-effort, and hence are likely to be fish within the Operational Area:

- Commonwealth
    - Bass Strait Central Zone Scallop Fishery
    - Eastern Tuna and Billfish Fishery
    - Small Pelagic Fishery
    - Southern and Eastern Scalefish and Shark Fishery following sectors:
        - Commonwealth Trawl Sector – Danish Siene
        - Commonwealth Trawl Sector – Otter-board
        - Shark Gillnet Sub-sector
        - Shark Hook Sub-Sector
    - Southern Squid Jig Fishery
    - Western Tuna and Billfish Fishery
- Victorian:
    - Giant Crab
    - Multi-species Ocean
    - Octopus
    - Southern Rock Lobster
    - Wrasse
- Tasmania: No fisheries identified.

A summary of these fisheries is provided in Table E1-1.

For the Commonwealth fisheries ABARES Annual Fishery Status Reports and map data has been used to determine activity within the Operational Area. ABARES Annual Fishery Status Reports Map Data are digital representations of the two thematic components of the maps in the ABARES Fishery Status Reports: relative fishing intensity and the maximum area of waters fished. In Feedback ID 1237, AFMA confirmed the reliability of the ABARES data, stating it uses logbook and other AFMA collected data.

Relative fishing intensity shows areas where five or more fishing vessels operated, and the relative effort expended or the catch. Maximum area fished shows the total area where fishing occurred at a resolution of one degree (approximately 111 x 111 km) the relative effort expended, or the catch is not publicly available for the maximum area fished due to confidentiality associated with four or less vessel.

For the Victorian fisheries, data (2011-2022) from the Victorian Fishing Authority has been used to determine activity within the Operational Area.

Table E1-1 - Summary of Level of Fishing Activity within the Operational Area

Fishery	Activity within the Operational Area	Activity Level
Commonwealth Fisheries		
Bass Strait Central Zone Scallop Fishery (BSCZSF)	The Operational Area overlaps a small area (0.29%) of the fishery where there have been less than 5 fishers during 2010 to 2023. This overlap is due to the grid size used for reporting (111 km × 111 km) as historical and current scallop beds are to the east and north of King Island outside of the Operational Area. See Appendix B12 MAP-REG-EPM-097 and Annex 3 for overlap calculation. As detailed in the Bass Strait and Central Zone Scallop Fishery - 2024 Survey (Koopman and Knuckey 2024) scallop fishing only occurs within commercially viable scallop beds. All beds surveyed since 2015 and new beds in 2024 are to the east and north of King Island. Based on this the likely activity level for the BSCZSF within the Operational Area is assessed as none.	None
Eastern Tuna and Billfish Fishery (ETBF)	The Operational Area overlaps the fishery (0.22%) where there have been less than 5 fishers during 2010 to 2023. See Appendix B12 MAP-REG-EPM-126 and Annex 3 for overlap calculation. Fishery effort is typically concentrated along the NSW coast and southern Queensland coast with some fishing effort in Victoria. See Appendix B12 MAP-REG-EPM-126. The number of active longline vessels in the fishery has decreased substantially in the past 2 decades from around 152 in 1999 to 34 in 2023 (Butler et al. 2024). Primary landing ports are Bermagui, Coffs Harbour and Ulladulla (New South Wales); Cairns, Mooloolaba and Southport (Queensland) (Butler et al. 2024). There is a 12-month season. One fishing reporting grid that the Operational Area overlaps has been fished in 2023 with no other activity within the Operational Area in the last 6 years (2018 – 2023). The grid fished in 2023 is the closest to the SA border and is overlapped by a small area of the Operational Area (See Appendix B12 MAP-REG-EPM-098). Based on there has only been fishing in one grid in one year in the last 6 years within the Operational Area, no landing ports in Victoria and fishing effort is concentration off the east coast of Australia, the likely activity level for the ETBF within the Operational Area is assessed as low.	Low
Small Pelagic Fishery (Western sub-area) (SPF)	The Operational Area overlaps a small area of the fishery (0.12%) where there have been less than 5 fishers during 2010 to 2023. See Appendix B12 MAP-REG-EPM-127, Appendix B12 MAP-REG-EPM-099 and Annex 3 for overlap calculation. In 2023, there were 8 boats active in the fishery (Butler et al. 2024). Midwater trawling has been the primary fishing method in the fishery in more recent years and most effort now occurs off the south coast of New South Wales (Butler et al. 2024). Primary landing ports are Eden and Ulladulla (New South Wales) (Butler et al. 2024). There is a 12-month season. Based on the last year there was active fishing in the fishing reporting grid that overlaps the Operational Area was 2015, no landing ports in Victoria and fishing effort is concentration off the south coast of NSW, the likely activity level for the WTBF within the Operational Area is assessed as low.	Low

Fishery	Activity within the Operational Area	Activity Level
Southern and Eastern Scalefish and Shark Fishery (SESSF) - Commonwealth Trawl Sector, Danish Seine Sub-sector (SCDS)	The Operational Area overlaps the fishery (2.32%) where there have been less than 5 fishers during 2010 to 2023. See Appendix B12 MAP-REG-EPM-132, Appendix B12 MAP-REG-EPM-104 and Annex 3 for overlap calculation. Danish-seine effort has been slowly declining since 2019. In 2023, there were 18 vessels active in the fishery (Butler et al. 2024). Primary landing ports are Eden, Sydney and Ulladulla (New South Wales); Hobart (Tasmania); Lakes Entrance and Portland (Victoria) (Butler et al. 2024). There is a 12-month season. Though only four or less fishers have fished within the Operational Area the relative fishing intensity is not known as it is confidential where there are less than 5 fishers. As the landing port of Portland is within the Otway area (west of King Island to the Vic/SA border) and the relative fishing intensity within the Operational Area is not known the likely activity level for the SCDS within the Operational Area is assessed as high.	High
Southern and Eastern Scalefish and Shark Fishery (SESSF) - Commonwealth Trawl Sector (SCTR)	The Operational Area overlaps the fishery where there have been low, medium and high levels of fishing intensity during 2010 to 2023. See Appendix B12 MAP-REG-EPM-131 and Appendix B12 MAP-REG-EPM-103. The CTS otter-board level of effort has been slowly declining since 2017 and represents around half the effort recorded in the early 2000s. In 2023, there were 24 vessels with 251 fishing days down from 2022 where there were 30 vessels with 380 fishing days (Butler et al. 2024). Primary landing ports are Eden, Sydney and Ulladulla (New South Wales); Hobart (Tasmania); Lakes Entrance and Portland (Victoria) (Butler et al. 2024). There is a 12-month season. Based on the Operational Area overlaps where there has been low, medium and high level of fishing intensity and the landing port of Portland is within the Otway area (west of King Island to the Vic/SA border) the likely activity level for the SCTR within the Operational Area is assessed as high.	High
Southern and Eastern Scalefish and Shark Fishery (SESSF) - Shark Hook Sub-sector (SSKK)	The Operational Area overlaps the fishery where there have been less than 5 fishers during 2010 to 2023. See Appendix B12 MAP-REG-EPM-129 and Appendix B12 MAP-REG-EPM-101. The SSKK primarily targets four shark species (elephantfish, gummy shark, sawsharks and school sharks) using demersal longlines with most fishing occurring off South Australia (Butler et al. 2024). Spatial closures that have been progressively implemented since 2003 have resulted in an increase in hook effort to replace gillnet effort off South Australia (Butler et al. 2024). In 2023, there were 68 active an increase from 57 vessels in 2022 (Butler et al. 2024). Primary landing ports are Lakes Entrance, Port Welshpool, San Remo (Victoria); Adelaide, Port Lincoln, Robe (South Australia); Devonport, Hobart (Tasmania) (Butler et al. 2024). There is a 12-month season. Based on most fishing using demersal longlines is undertaken off South Australia and there are no landing ports in the Otway area (west of King Island to the Vic/SA border) the likely activity level for the SSKK within the Operational Area is assessed as low	Low

Fishery	Activity within the Operational Area	Activity Level
Southern and Eastern Scalefish and Shark Fishery (SESSF) - Shark Gillnet Sub-sector (SSKN)	The Operational Area overlaps the fishery where there has been a low, medium and high levels of fishing intensity during 2010 to 2023. See Appendix B12 MAP-REG-EPM-130 and Appendix B12 MAP-REG-EPM-102. The SSKN primarily targets four shark species (elephantfish, gummy shark, sawsharks and school sharks) using demersal gillnets. Spatial closures that have been progressively implemented since 2003 have resulted in gillnet effort being concentrated in Bass Strait (Butler et al. 2024). In 2023, there were 31 active vessels and in 2022 there were 30 active vessels (Butler et al. 2024). Primary landing ports are Lakes Entrance, Port Welshpool, San Remo (Victoria); Adelaide, Port Lincoln, Robe (South Australia); Devonport, Hobart (Tasmania) (Butler et al. 2024). There is a 12-month season. Though there are no primary landing ports in the Otway area (west of King Island to the Vic/SA border) there has been recorded low, medium and high levels of fishing intensity within the Operational Area, thus the likely activity level for the SSKN within the Operational Area is assessed as high.	High
Southern and Eastern Scalefish and Shark Fishery (SESSF) -Scalefish Hook Sector (SSCK)	The Operational Area overlaps the fishery where there has been a low level of fishing intensity and where there have been less than 5 fishers during 2010 to 2023. See Appendix B12 MAP-REG-EPM-133 and Appendix B12 MAP-REG-EPM-105. The SSCK is a multispecies fishery, targeting a variety of fish and shark species that uses a variety of longline and dropline hook fishing methods (Butler et al. 2024). In 2023, there were 13 active scalefish hook vessels, a decrease from 2022 when there were 21 active vessels (Butler et al. 2024). Primary landing ports are Eden, Sydney and Ulladulla (New South Wales); Hobart (Tasmania); Lakes Entrance and Portland (Victoria) (Butler et al. 2024). There is a 12-month season. Though a low level of fishing intensity has been recorded in the Operational Area, relative fishing intensity is not known as it is confidential where there are less than 5 fishers. As the landing port of Portland is within the Otway area (west of King Island to the Vic/SA border) and the relative fishing intensity within the Operational Area ranges from not known to low the likely activity level for the SCDS within the Operational Area is assessed as high.	High
Southern Squid Jig Fishery (SSJF)	The Operational Area overlaps the fishery where there have been low, medium and high levels of fishing intensity during 2010 to 2023. See Appendix B12 MAP-REG-EPM-134 and Appendix B12 MAP-REG-EMP-106. The SSJF is a single-method (jigging), single-species fishery, targeting Gould's squid. Australian jig vessels typically operate at night in continental-shelf waters between depths of 60 m and 120 m (Butler et al. 2024). In 2023, there were 8 active jig vessels, an increase from 2022 when there were 6 active jig vessels (Butler et al. 2024). Primary landing ports are Portland and Apollo Bay (Victoria), Port Fairy, Queenscliff, Devonport and Triabunna (Tasmania). There is a 12-month season. Based on the Operational Area overlaps where there has been low, medium and high level of fishing intensity and the landing ports of Portland and Apollo Bay are within the Otway area (west of King Island to the Vic/SA border) the likely activity level for the SSJF within the Operational Area is assessed as high.	High

Fishery	Activity within the Operational Area	Activity Level
Western Tuna and Billfish Fishery (WTBF)	The Operational Area overlaps a small area (0.04%) of the fishery where there have been less than 5 fishers during 2010 to 2023. See Appendix B12 MAP-REG-EPM-138, Appendix B12 MAP-REG-EPM-108 and Annex 3 for overlap calculation. In recent years, fishing effort has concentrated off south-west Western Australia, with occasional activity off South Australia (Butler et al. 2024). See Appendix B12 MAP-REG-EPM-138. Effort in the WTBF was relatively low (<20 vessels) from the mid-1980s to the mid-1990s. Effort increased in the late 1990s, peaking at 50 active vessels in 2000, but then declined rapidly. Since 2005, fewer than 5 vessels have been active in the fishery each year. (Butler et al. 2024). Primary landing ports are Fremantle and Geraldton (Western Australia). Based on the last year there was active fishing in the one fishing reporting grid that overlaps the Operational Area was 2014, no landing ports in Victoria and fishing effort is concentration off south-west Australia, the likely activity level for the WTBF within the Operational Area is assessed as low.	Low
Victorian Fisheries		
Abalone Fishery	The Abalone Fishery operates along most of the Victorian shoreline, generally to 30 m depth where abalone are harvested by divers (VFA 2025). This area is outside the Operational Area. See Appendix B12 MAP-REG-EPM-136.	None
Giant Crab Fishery	Giant crabs are fished commercially in western Victoria. The fishery is a small quota managed fishery that is closely linked with the Rock Lobster Fishery. The majority of vessels are used primarily for rock lobster fishing with giant crab taken as by-product (VFA 2025a). Giant crabs inhabit the continental slope at approximately 200 m depth and are most abundant along the narrow band of the shelf edge (VFA 2025a). Closed seasons are: • Male: 15 September to 15 November to protect males during moult. • Female: 1 June to 15 November to protect females while breeding and in berry (with eggs attached). During 2011 to 2022 the maximum number of vessels that fished in a year within the Operational Area was three and the maximum days fished in a year was 28. See Appendix B12 MAP-REG-EPM-110 and Appendix B12 MAP-REG-EPM-096. Based on the closed seasons, giant crab fishing will only overlap with the seismic survey for 15 days in the September and November period noting that the survey operations are for up to 90 days. In addition, up to 3 vessels may be present during this time thus the likely activity level for the giant crab fishery within the Operational Area is assessed as low.	Low

Fishery	Activity within the Operational Area	Activity Level
Multispecies Ocean Fisheries – Ocean General	The wrasse, inshore trawl, southern rock lobster and giant crab fisheries are able to catch gummy shark and school sharks as part of their fishery. Snapper is caught using lines, nets and haul seine. Over 90% of the catch is from Port Phillip Bay, and around 5% from coastal waters. During 2011 to 2022 the maximum number of vessels that fished in a year within the Operational Area was three and the maximum days fished in a year was 16. See Appendix B12 MAP-REG-EPM-115 and Appendix B12 MAP-REG-EPM-114. Based on the low number of fishing vessels annually (3 vessels) and fishing days (maximum 16 days) within the Operational Area, the likely activity level for the Multispecies Ocean Fisheries – Ocean General fishery within the Operational Area is assessed as low.	Low
Octopus Fishery	Victoria's Octopus (Eastern Zone) Fishery harvests mainly pale octopus in East Gippsland using purpose-built unbaited traps. The fishery may also catch Māori octopus and gloomy octopus. The fishery commenced on 1 August 2020 (VFA 2025b). The Operational Area is within the Western Octopus Zone which is less established and is being managed by the VFA through exploratory, temporary permits (VFA 2025b). During 2020 to 2022 the maximum number of vessels that fished in a year within the Operational Area was one and the maximum days fished in a year was one. See Appendix B12 MAP-REG-EPM-119 and Appendix B12 MAP-REG-EPM-118. Based on the low number of fishing vessels annually (1 vessel) and fishing days (maximum 1 day) within the Operational Area, the likely activity level for the Octopus Fishery within the Operational Area is assessed as low.	Low
Rock Lobster Fishery	The Rock Lobster Fishery is Victoria's most valuable fishery and is based on the southern rock lobster (*Jasus edwardsii*). The fishery is quota managed, with a total allowable commercial catch set annually after the status of the stock has been assessed. There are two commercial zones in the fishery that operate along the entire coastline of Victoria (VFA 2025c). The Operational Area overlaps the Portland Region within the Western Zone of the fishery. Fishing for rock lobsters is prohibited during closed seasons: • Female rock lobsters are from 1 June to 15 November and is designed to protect females in berry (with eggs attached) during the spawning period. • Male rock lobsters are from 15 September to 15 November and is designed to protect males during the moulting period when soft shells increase their vulnerability. During 2011 to 2022 the maximum number of vessels that fished in a year within the Operational Area was nine and the maximum days fished in a year was 212. See Appendix B12 MAP-REG-EPM-111 and Appendix B12 MAP-REG-EPM-095. Based on the closed seasons, rock lobster fishing will only overlap with the seismic survey during for 15 days in September and November, and in December noting that the survey operations are for up to 90 days.. Between 1 to 9 vessels may be present during this time and the maximum days fished in a year ranged from 2 to 212 (See Appendix B12 MAP-REG-EPM-095), thus the likely activity level for the rock lobster fishery within the Operational Area is assessed as high.	High

Fishery	Activity within the Operational Area	Activity Level
Wrasse (Ocean) Fishery	The fishery extends along the entire length of the Victorian coastline and out to 20 nm offshore, except for marine reserves (VFA 2025d). Most wrasse is harvested by hook and line, although commercial rock lobster fishers who also hold a commercial wrasse licences can keep those fish that they catch in their rock lobster pots (VFA 2025d). There are currently 22 licences (VFA 2025d). Wrasse inhabit depths up to 160 m, whereas fishers mostly operate in depths shallower than 30 m to reduce their losses due to barotrauma, where the swim bladder expands and damages the fish as it is hauled to the surface (VFA 2025d). The Operational Area overlaps a small proportion of three fishing blocks where during 2011 – 2022 the maximum number of vessels that fished in a year within the Operational Area was four and the maximum days fished in a year was 102 (See Appendix B12 MAP-REG-EPM-123 and Appendix B12 MAP-REG-EPM-122. Based on fishers mostly operate in depths shallower than 30 m which is outside the Operational Area (See Appendix B12 MAP-REG-EPM-136) and the small area of overlap (6.26%) between the fishery area between Port Campbell and just past Portland and the Operational Area (See Appendix B12 MAP-REG-EPM-122 and Annex 3 for overlap calculation) the likely activity level for the wrasse fishery is assessed as low..	Low

4.2 Offshore Energy

There are offshore energy providers within the Operational Area that could be impacted by the physical presence of the survey vessel and towed equipment. Within the Operational Area is the Beach Energy Otway Development consisting of subsea infrastructure and the Thylacine-A unmanned platform and the Cooper Energy Casino Henry Netherby Development consisting of subsea infrastructure (Appendix B12 MAP-REG-EPM-082). During the Regia MSS design envelope (16th September 2025 to 31 December 2028) there is the potential for exploration and development activities such as infrastructure inspection, maintenance and repairs campaigns, seabed surveys, seismic surveys, drilling, and infrastructure installation to be undertaken with vessels and drill rigs to support the ongoing energy supply of gas and potentially renewables within the Otway Basin. In September 2024 the Spinifex offshore wind farm was granted a preliminary feasibility licence, subject to further consultation with First Nations groups. Once a full feasibility licence is granted, they will be able to undertake detailed environmental and technical studies within their project areas which overlaps the Operational Area.

4.3 Commercial Shipping

There are commercial shipping companies transiting adjacent to and within the Operational Area that could be impacted by the physical presence of the survey vessel and towed equipment. The Southeast Marine Region is one of the busiest shipping regions in Australia and Bass Strait is one of Australia's busiest shipping routes. Commercial vessels use the route when transiting between ports on the east, south and west coasts of Australia, and there are regular passenger and cargo services between mainland Australia and Tasmania. Ports Australia provide statistics for port operations throughout Australia's main commercial ports. Based on the latest information (2021) the majority of commercial shipping traffic transiting to and from Victorian ports were container (3,682), general cargo (2,663), bulk liquid carriers (2,019), dry bulk (1,715), car carrier (1,342), bulk gas (220), other cargo (47) and livestock (9).

4.4 Marine Tourism

No areas of marine tourism were identified within the Operational Area. Areas where marine tourism occurs such as Deen Maar (Lady Julia Percy Island), Australian Marine Parks, Victorian Marine Parks, and Sanctuaries are outside of the Operational Area.

4.5 Recreational Fishing

Recreational fishing from vessels including fishing tour operators, may occur within the Operational Area.

Several fishing tour operators operate from coastal towns including Port Fairy, Warrnambool, Portland, and Port Campbell that fish in offshore waters for species such as Blue Fin Tuna, Shark (Gummy, School and Mako), Yellowtail Kingfish and reef species including Snapper, Morwong, Nannygai.

From relevant person consultation undertaken during preparation of the EP, only a single fishing tour operator was identified as occurring within the Operational Area.

4.6 Defence Activities and UXOs

During consultation, the Department of Defence (DoD) confirmed that the Operational Area was located outside of any Defence Training Areas and restricted airspace, therefore no impact on defence activities from the Regia MSS is expected, as such this will not be assessed further.

The Department of Defence also advised that unexploded ordnance (UXO) may be present in the sea floor and issued the following disclaimers:

a. all activities in the area are conducted at its own risk; and

b. the Commonwealth of Australia, represented by the Department of Defence, takes no responsibility for:

i. reporting the location and type of UXO that may be in the areas;

ii. identifying or removing any UXO from these areas; and

iii. any loss or damage suffered or incurred by Regia MSS or any third party arising out of, or directly related to, UXO in the area.

(Event ID 920, Feedback IDs 1522 – 1526).

As per Figure E1-1, a search of the Department of Defence's UXO map shows the following overlaps:

- Survey Acquisition Area – none
- Active Source Area – overlap with 1052 King Island, this site was used during 1954 as an Air-to-Air Firing Range and is UXO category *'Slight Potential'*
- Operational Area - overlap with 1052 King Island, this site was used during 1954 as an Air-to-Air Firing Range and is UXO category *'Slight Potential'* and SDG110 Sea Dumping – Bass Strait, this site is an area used for the dumping at sea of ordnance and other items. This site was used for the dumping at sea of ammunition including 2331 boxes of detonators and 144 boxes of explosives and is UXO category *'Other Sea Dumping Sites'*.

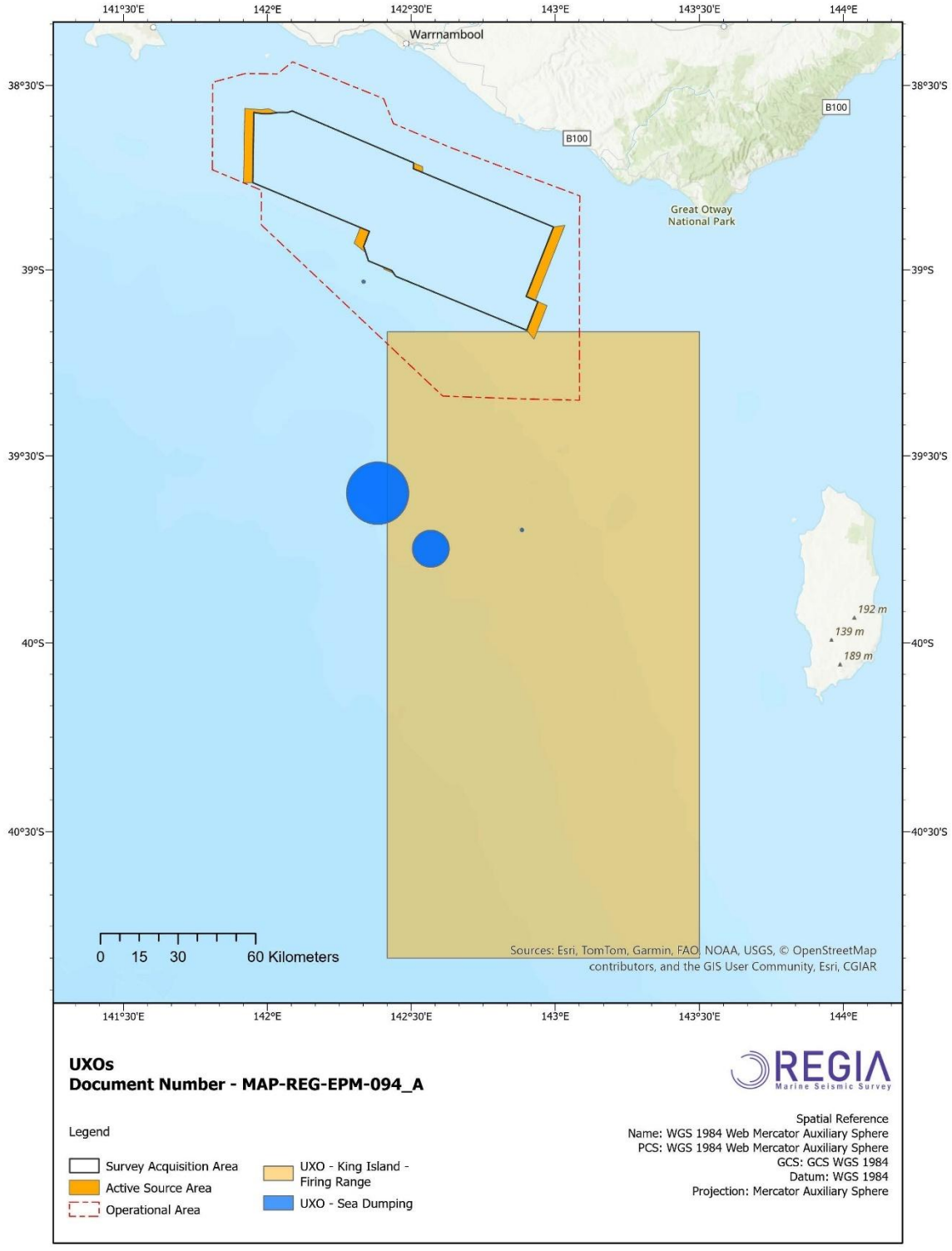

Figure E1-1 – UXOs within the Operational Area

4.7 People and Communities

4.7.1 Social and economic features

During consultation, as presented in Annex 2, objections and claims were raised regarding concerns of impacts on the local economy and environment, including commercial and recreational fishing and tourism. Commercial fishing and aquaculture, Marine Tourism and Recreational Fishing are described above in sections 4.1, 4.4 and 4.5, respectively.

4.7.2 Cultural features

Biosis Pty Ltd (**Biosis**) was commissioned by ConocoPhillips to undertake a cultural heritage desktop assessment for proposed resource exploration in Bass Strait. ConocoPhillips and Biosis gave permission for CGG to utilise this report given the overlap of the study area with the Regia MSS. The report is provided as part of this EP at Appendix B10, and a short summary is included in this document.

The purpose of the report was to explore cultural heritage and cultural heritage landscapes to understand Country, and Sea Country within and surrounding the project area, to provide the project with a grounding in Aboriginal cultural heritage. The report describes the known cultural environment, include a brief ethnohistory and history, and detailed results of register searches.

The study area includes the proposed permit areas (the location of the exploration zone(s)), where the survey is planned to occur. In general, the permit areas are located south of Port Fairy and the Great Otway National Park, and west of King Island. The study area consists of a large geographical area which did not identify any specific physical indigenous cultural features of the benthic environment. As there is no benthic disturbance pathway and no physical cultural values identified in the Operational Area the physical effect to indigenous features of the benthic environment are not assessed further.

Although Native Title has not been identified to occur within the Operational Area, it is considered possible that there may be interests and rights, and cultural values and sensitivities associated with Eastern Maar and Gunditjmara Native Title determinations (Appendix B12 MAP-REG-EPM-076) adjacent to the Operational Area including the currently under consultation Nyamat Mirring (GMTOAC, 2023).. Native title rights and interests include the non-exclusive rights to access, enter and remain on the land and waters, to camp on areas above the high-water mark, to use and enjoy the land and waters, to protect culturally important places, and to take resources from the land and waters. Deen Maar, also known as Lady Percy Island, is a culturally significant site for both the Gunditjmara and Eastern Maar. For the Gunditjmara people, Native Title also includes culturally significant sites such as the 'Convincing Ground' (Appendix F3, Section 3.16.1). In addition, Wadawurrung and Bunurong Registered Aboriginal Parties coastal areas have overlap with the northeastern extent of the Environmental Planning Area, may be affected (Appendix B12 MAP-REG-EPM-091).

4.7.2.1 Sea Country Values

There is the potential for marine ecosystems to include intangible cultural features. This is one aspect of the broader concept of "sea country", which can be defined as the area of sea over which an Indigenous group has interests, cultural value, connection and use. Country refers to more than just a geographical area: it is shorthand for all the values, places, resources, stories and cultural obligations associated with that geographical area. (Smyth, 2007). It necessarily follows that an impact to marine ecosystems has the potential to impact cultural features where the impact is detectable within Sea Country — the seascape which Traditional Custodians view, interact with or hold knowledge of.

The link between environmental protection and cultural heritage protection is illustrated in the Australian Government's Indigenous Protected Areas Program. The Indigenous Protected Areas program provides for "areas of land and sea managed by Indigenous groups as protected areas for biodiversity conservation…IPAs deliver environmental benefits…Managing IPAs also helps Indigenous communities protect the cultural values of their country for future generations…" (IPA Program Evaluation 2024).

Cultural features of coastal areas may include marine species (e.g., whales) that may travel many thousands of kilometres through areas with similar cultural values to multiple Indigenous language groups. For example, Southern Right Whales are a highly mobile migratory species that can travel

thousands of kms between habitats used for these essential life functions (Kenney, 2018) passing Indigenous language groups along the southern and eastern coasts of Australia.

Through consultation and online research, information about cultural features of the environment have been identified, as captured in Appendix F3, section 3.,16. This includes:

- Sacred Sea Country Songlines.
- Sacred Burial grounds of Deen Maar.
- Point Nepean and Mornington Peninsula area of high cultural significance.
- Dreaming and creation stories associated with coast area and sea.
- Connections with the sea and its resources.
- Koontapool (Southern Right Whale):
  - The Gunditjmara's deep connection to Koontapool as a carrier of life and knowledge is emphasized, with the whale being seen as kin, and their survival intertwined with that of the people for millennia.
  - Welcoming Koontapool back to the familiar waters of Sea Country was a significant event for the community, marked by ancient rituals and the first public acknowledgment of this homecoming by the Gunditjmara people.
- Wuulok (Blue Whale).
- Koorn Moorn (Seals).
- Sea Lions.
- Kooyang Short Finned Eels.
- Coastal resources, such as shell middens
- Important birthing and calving grounds at Logan's beach whale nursey.
- A connection to the Koontapool and Sea Country kin.

The scope of advice sought during consultation and research about Sea Country was not limited by reference to any boundaries or limits. These values are of high significance for First Nations groups, including the Gunditjmara, along with the importance of sharing cultural tales in modern times and highlighting the importance of preserving these stories for future generations. CGG also heard about the importance of respecting the past, protecting the present, and ensuring the future.

An impact to marine ecosystems has the potential to impact cultural values where the impact is detectable within Sea Country. CGG considers that impact to cultural values of marine species will be adequately managed in Sea Country, and therefore management of the environmental values will preserve the cultural values of environmental receptors. Management of impacts other than physical presence are found in Appendix E2 to E9.

5 Relevant Legislative and Other Requirements

CGG has considered relevant legislative requirements, that apply to the physical presence of vessels and towed equipment (see Appendix B2). Measures that will be adopted to demonstrate how these requirements will be meet are as follows:

- The CGG Marine Assurance System ensure compliance of contract vessels with Navigation Act, MARPOL, COLREGS and Marine Orders.
- The Communications Management System ensures that survey communications will minimise interference with the activities of the other marine users. This includes mandatory notification of the Australian Hydrographic Service who issue Notices to Mariners.
- An On-Water Communications Plan documents how and when communications with other marine users will occur to minimise interference with their operations and equipment.
- Vessel captains legislated responsibilities to communicate with other marine users and follow the On-Water Communications Plan.

6 Defining Acceptable Levels of Impact

CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that aspect specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, Table E1-2 shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding aspect specific defined acceptable levels established for this assessment. Defining the acceptable levels is the starting point for the required demonstration that environmental impacts and risks of the activity will be of an acceptable level. The defined acceptable levels found in this section are subsequently carried through the prediction of impacts in this document, to the demonstration found in Section 10.[1]

Table E1-2 - General and Aspect Specific Defined Acceptable Levels

Category	Defined Acceptable Level (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	The physical presence of vessels does not cause changes in fishing catch patterns that result in measurable effects to the biomass or recruitment of target species.	This acceptable level ensures that any displacement or exclusion of fishing activity caused by the activity does not result in ecological consequences for target fish stocks through increased concentration of fishing in other areas. Preventing population-level effects is consistent with ecosystem-based fisheries management.
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		

[1] Note: The acceptable levels related to demonstrating ALARP and the adoption of specific measures to ensure the effectiveness of control measures can be found in Appendix F2 and B3 respectively. As they are criteria integral to the acceptance of the Environment Plan, and they are documented elsewhere, these criteria are not discussed further in this assessment.

Category	Defined Acceptable Level (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		
Economic	Affected persons will not be worse off because of the activity.	The activity is carried out in a manner that does not interfere with activities of another person to a greater extent than is necessary for the reasonable exercise of the rights and performance of the duties of the titleholder.	This acceptable level is based on Section 280 of the Offshore Petroleum and Greenhouse Gas Storage Act 2006, which establishes the legal requirement to minimise interference with other marine users. It reflects the principle that petroleum activities must be conducted with consideration for the rights and needs of others, including commercial fishers, shipping operators, and recreational users.
		Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	Reflects Commonwealth and State policy objectives for sustainable resource use and protection of ecosystem services.
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	This level reflects the principle of maintaining cultural values and heritage as protected under national and state legislation. It ensures that activities do not interfere with traditional practices, spiritual connections, or ongoing access to culturally significant areas.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	This level reflects broader social licence to operate, ensuring that environmental activities do not lead to degradation of public amenity, loss of recreational use, or impacts to non-Indigenous heritage values. It aligns with Commonwealth policies promoting public access, well-being, and sustainable use of the marine environment.
	The views of public have been considered in the impact and risk assessment.		

Category	Defined Acceptable Level (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic surveys on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Impacts Through Activity Design

As part of planning and design of the activity several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of impact could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of physical presence, this would require removing the vessels from the environment or conducting the survey in a way that does not result in interference with other marine users. Nine main options were considered:

Removal of vessels from the activity

While this may theoretically eliminate interference with other marine users, it is not practically feasible without eliminating the activity itself. Attempting to eliminate the physical presence of vessels would prevent the survey from occurring, which is inconsistent with the objectives of the Regia MSS. Any reduction in interference from the absence of vessels would come at the cost of not achieving the activity's primary purpose, and no viable alternative designs exist that can avoid all physical presence within the marine environment. For these reasons, this option was ultimately discarded.

In addition, CGG has adopted a set of spatial activity limitations that reduce the likelihood of interference with other marine users. These remaining activity limitations described below have subsequently been adopted:

No vessel movement within 4 nautical miles of the coast, except in case of emergency.

This limitation ensures no overlap with local yacht races. In response to consultation MSS is constrained to >50m depth which equates to minimum 25 km or 13.5 nm from the coast.

No sound source discharges within the Orange Roughy research program areas.

During consultation (Event IDs 2002, 3350, 1649, 2003, Feedback IDs 4125, 4305, 4124, 4337) claims were raised by a fishing association to avoid interference with an Orange Roughy Research Program by ensuring there was no data acquisition, or turns, over the sample collection areas, with a buffer between the acquisition and sample areas, with preferred non-acquisition months to be April to October. As shown in map MAP-REG-EPM-050_B (Appendix B12), the activity was reduced to ensure there is no overlap of sampling areas with the active source area, including turns.
There are no specific studies focused on seismic effects on Orange Roughy, however, inferences can be drawn from research on other species. In particular, multiple studies have investigated the impact of seismic surveys on the spawning behaviour of cod, given this is a period in the life cycle when individuals gather in large numbers (Mcqueen et al 2022, Mcqueen et al 2023). Both studies found cod were not significantly disrupted from their spawning behaviour after exposure treatments representative of a full seismic survey at distances ranging from 5-40km. These distances closely align with the proximity between the Regia MSS acquisition area and the Orange Roughy Study central sampling area, 5.27 km at its nearest point (see Appendix B12, map MAP-REG-EPM-050_B). Based on this, we do not anticipate any significant level of disturbance to Orange Roughy in the sampling area. A small portion of the central sampling area overlaps with the operational area; however, this will not have a greater impact than any other vessel transiting the area. Therefore, there is no break to the time series of the data, due to lack of overlap with the active source area. In addition, the Regia MSS is not prohibiting the ability of the research program to catch the fish required for the study to continue uninterrupted, negating the need for exclusionary months.

No seismic acquisition within 17 km of Deen Maar / Lady Percy Julia Island

The cultural heritage desktop assessment (Appendix B12), consultation, and desktop research identified the cultural significance of Deen Maar/Lady Julia Percy Island. The buffer zone was applied

to provide spatial protection for species utilising this ecologically and culturally important area, thereby reducing potential impacts.

This limitation reduced the overlap with most fishing effort in the region and. This is protective for mobile or short ranging fish species that are more likely to be present in water depth < 50 m. The shallow depths are also where most lobster will settle when ready to do so. This measure was adopted via consultation to avoid disturbance to coastal and nearshore invertebrate communities and to prevent elevated acoustic energy in shallow, sensitive environments. This was confirmed during consultation with commercial fishers who agreed that the data was correct and most fishing activities occurred in shallower waters close to ports (Event ID 4107, Feedback ID 1277).

No vessel movements in between Deen Maar/Lady Percy Julia Island and the mainland.

The cultural heritage desktop assessment (Appendix B12), consultation, and desktop research identified the cultural significance of Deen Maar/Lady Julia Percy Island, including the connection with spirits departing the mainland and travelling to Deen Maar (Appendix F3, section 3.16). As such the activity limitation for no vessel movements in between Deen Maar and the mainland was put in place.

No anchoring permitted within the operational area to eliminate benthic disturbance

This activity limitation is in place to prevent physical disturbance to the seafloor and sensitive benthic habitats within the operational area. By prohibiting anchoring, the risk of damaging benthic communities, such as corals, sponges, or other bottom-dwelling organisms, is eliminated, supporting broader environmental protection goals during the seismic survey.

No activities within a designated Australian Marine Park (State and Commonwealth)

This activity limitation has been adopted to ensure compliance with environmental regulations and to protect the ecological, cultural, and social values of designated Australian Marine Parks (both State and Commonwealth). These areas are established to conserve biodiversity and critical habitats, support the recovery of threatened species, and maintain ecosystem health. Prohibiting activities within these zones helps prevent disturbance to sensitive marine environments, avoids potential harm to protected species, and aligns with the legal frameworks governing marine conservation in Australia.

No MSS acquisition beyond 200 m depth contour

Deepwater habitats may support unique and less-studied fish assemblages that could be sensitive to noise and extending the survey beyond this boundary may increase environmental uncertainty and operational risk. The limitation was applied to confine the activity within a well-characterised depth zone and reduce exposure of deepwater species to anthropogenic sound.

No vessel movements within 700 m of fishing blocks G12, G13, H13, and H14

During consultation concerns were raised by a fisher regarding the use of a smaller vessel which the fisher launches from a pier in Port Cambell. This restricts the fisher to access deeper waters and limits the fisher to fishing blocks G12, G13, H13 and H14 exclusively (see MAP -REG-EPM-037_A in Appendix 12). To ensure this fisher was not worse off as a result of the activity, CGG implemented an activity limitation where the Regia MSS would not operate within 700m of Southern Rock Lobster Fishing Blocks G12, G13, H13, and H14. This activity limitation is based on the underwater sound modelling results where 700m is the no effect distance for invertebrates including Southern Rock Lobster, which is the target species fishers in these blocks.

While these measures do not eliminate physical presence entirely, they were incorporated into the survey design to remove vessel interaction from areas of higher marine user density where practicable. These adopted limitations reflect the application of elimination principles through activity design to the extent feasible within the operational and safety requirements of the survey.

A preference for the survey to occur in the April to June period, as this is after main fishing stock operations and has the least potential to impact any early upwelling events, was also received during consultation (Event ID 4370, Feedback ID 1300). While this has been noted, it was also taken into consideration that the survey already has minimal interference with the fishery, Southern Bluefin Tuna (SBT). As noted by the stakeholder, there is no active fishing within the Operational Area (rather a reliance on stocks that transit the region), the survey is limited to the shallow continental shelf, avoiding deep-sea canyons and the peak upwelling period, reducing potential impacts on pre-

spawning adult tuna in the Otway Basin. Therefore, other possible months for the activity have not been discarded for this preference.

The preference for acquisition to be during February to April was expressed during a group meeting with Southern Rock Lobster commercial fishers (Feedback ID 1064). Seismic acquisition will be undertaken in a north-west to south-east direction with acquisition along a line taking a ~6 hours for the shorter lines and ~10 hours for the longer lines. As pots are generally set and hauled once each day relocation maybe required from an area for a period of days. As the majority of the Operational Area has only up to four fishers there is more potential to be able to relocate to an alternative viable area, therefore other possible months for the activity have not been discarded for this preference.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the impact. Five main options were considered:

Seasonal Avoidance of Peak Fishing Overlaps

The first involved avoiding peak fishing seasons by introducing additional seasonal timing restrictions beyond those already in place. While fishing occurs throughout the year in the Operational Area, peak periods are concentrated in summer months, which have already been excluded from the planned timing of the survey. Avoiding additional, less productive fishing periods was considered, but this would require splitting the survey into multiple non-continuous phases or delaying it significantly. This would at least double the duration of the survey, increasing the total time the vessels are present in the environment. The extended duration would in turn elevate overall risks and impacts, including underwater noise, operational emissions, and prolonged displacement of other users. The marginal benefit of avoiding lower levels of fishing activity during less productive times was not considered sufficient to justify the increased environmental footprint. This option was therefore discarded.

Limiting Equipment Deployment and Retrieval to Defined Areas

The second substitution option considered was to restrict deployment and retrieval of streamers and the seismic source to within the defined Operational Area. While this would provide added certainty to other marine users about the spatial boundaries of the activity, it would also introduce higher operational risks. Deploying and retrieving streamers only while within the Operational Area increases the likelihood of entanglement, particularly during vessel turning manoeuvres. Furthermore, certain operational requirements such as weather avoidance or crew changes may necessitate brief movements outside the Operational Area. Maritime law already regulates safe vessel movement and ensures adequate notice is provided to other users, aligning with the environmental objectives of the activity. Given the limited environmental benefit of this option and the elevated risks associated with it, this measure was also discarded.

Further minimisation of potential interference has been achieved through additional activity limitations that substitute higher-risk spatial configurations with lower-risk alternatives. These spatial adjustments were made during the design phase to reduce conflict with other users without introducing unacceptable operational or environmental trade-offs. While not assessed as control measures under the ALARP framework, these decisions demonstrate the application of substitution principles through the deliberate avoidance of sensitive or high-use areas prior to formal risk assessment.

These considerations demonstrate that reasonable substitution options were evaluated as part of the environmental planning process. However, neither were adopted, as each option introduced operational inefficiencies, elevated environmental risks, or disproportionate trade-offs. The residual impacts associated with the physical presence of vessels remain, and these are addressed through further assessment and targeted management measures. **In waters deeper than 200 m, interfere with commercial fishers to no greater extent than is necessary for the efficient completion of the survey.**

In cooperation with fishers, this activity limitation has been adopted so survey vessel movements in water depths of greater than 200 m will avoid trawling activities.

If the survey occurs in September, October, November or December, the acquisition lines will be acquired working from the deepest lines first.

An operational planning preference of acquisition to start in the shallow and then work towards the deeper areas, was received during consultation (Event ID 4370, Feedback ID 1301). In further consultation (Event ID 4365) it was discussed with the stakeholder that acquisition direction (shallow-to-deep or deep-to-shallow) would depend on the time of year of acquisition. Under the Activity Limitations, no petroleum activity will occur between 1 January and 15 September, so the shallow–deep acquisition is no longer relevant. If the survey occurs in September, October, November or December, the acquisition lines will be acquired working from the deepest lines first, as this will assist in minimising impacts on Southern Right Whale (see Appendix E7, section 8.2). As described above in Section 8.1, the potential impact on Southern Bluefin Tuna is already minimal. To therefore summarise, these are some of the relevant reasons for adoption of both of these activity limitations.

The full list of activity limitations can be found in Section 4 of Appendix A2.

9 Predicted Levels of Impact

9.1 Changes to the functions, interests, or activities of other users

The limited manoeuvrability of the seismic survey vessel while towing the source array and streamers means that other marine users may have to avoid the immediate vicinity of the seismic survey vessel and towed equipment.

9.1.1 Commercial Fishing and Aquaculture

As detailed in Table E1-1 there are several Commonwealth and Victorian commercial fisheries that have fishing effort within the Operational Area. The following fisheries were assessed as having or potentially having a high level of activity within the Operational Area as detailed in Table E1-1:

- Commonwealth Southern and Eastern Scalefish and Shark Fishery
  - Commonwealth Trawl Sector.
  - Shark Gillnet Sub-sector.
  - Scalefish Hook Sector.
- Southern Squid Jig Fishery.
- Victorian Rock Lobster Fishery.

Commercial fishers may be impacted by having to avoid a part of the Operational Area while the survey is undertaken. This may be for hours or days depending on the fishing location within the Operational Area and the type of fishing equipment used. Fishers using pots, nets and traps which can become entangled with the seismic survey equipment may need to avoid an area for longer than trawling and squid jigging when acquisition is occurring.

These impacts are less likely for fisheries that were assessed as having a low activity level within the Operational Area (see Table E1-1). Further analysis and evaluation has been undertaken to assess the impacts to the commercial fisheries detailed above that have or potentially have a high level of activity within the Operational Area.

Table E1-2- Impact Assessment for Commercial Fisheries with High Fishing Intensity within the Operational Area

Fishery	Predicted Level of Impact	
Commonwealth Fisheries		
Southern and Eastern Scalefish and Shark Fishery (SESSF) - Commonwealth Trawl Sector, Danish Seine Sub-sector (SCDS)	Impacts have been assessed as moderate based on: • The fishery uses Danish seine trawl where the gear is deployed with one end of a weighted rope attached to an anchor buoy. As the vessel sweeps in a large circle the rope is deployed sinking to the bottom, followed by the Danish seine net and another weighted rope until the vessel returns to the anchor buoy. Once a full circle has been made the gear is towed for approximately 30 minutes until the ropes come together. The towing operation then ceases, and the net is winched back onto the vessel scooping up fish that have been herded into its path by the ropes coming together on the bottom. The operation, called a shot, takes approximately 1 hour and 20 minutes (AFMA 2025). Thus, to minimise interactions and relocations communications prior to the start of the survey, and daily lookahead information will be provided during the survey. • Seismic acquisition will be undertaken in a north-west to south-east direction with acquisition along a line taking a ~6 hours for the shorter lines and ~10 hours for the longer lines. Thus, the Danish seine trawl vessel would be able to utilise this area during this time. • There are potentially up to four or less fishers that may fish within the Operational Area and the Otway area (west of King Island to the Vic/SA border), thus if relocation is required there is more potential to be able to relocate to an alternative viable area that is still within a suitable range of Portland which is the only landing port within the Otway area. See Appendix B12 MAP-REG-EPM-132. • A measure has been adopted such that in cooperation with fishers, survey vessel movements in water depths of greater than 200 m will avoid trawling activities. Thus, relocation of fishers would be unlikely.	Moderate
Southern and Eastern Scalefish and Shark Fishery (SESSF) - Commonwealth Trawl Sector (SCTR)	Impacts have been assessed as moderate based on: • The fishery uses otter board trawling where the trawl nets are towed through the water usually about 3 knots for a period of time, which is highly variable, 4-6 hours but may be shorter or longer dependant on location or target species, before being hauled up toward the vessel (AFMA 2025a). As both the trawl and seismic vessel are mobile, interactions and relocations can be managed by communications prior to the start of the survey, and daily lookahead information provided during the survey. • Seismic acquisition will be undertaken in a north-west to south-east direction with acquisition along a line taking a ~6 hours for the shorter lines and ~10 hours for the longer lines. Thus, the trawl vessel would be able to utilise this area during that time. • The Active Source Area, where acquisition will be undertaken and where the seismic vessel will tow the streamers along the acquisition lines, overlaps a very small proportion (32 km^2 which equates to 0.73%) of the high intensity fishing area within the Otway/SA area (4,399 km^2). See Appendix B12 MAP-REG-EPM-103 High Intensity Area from ~142°5E to 140°15E. • The Operational Area where the surveys vessels are more likely to be able to avoid interactions overlaps a very small proportion (189 km^2 which equates to 4.3%) of the high intensity fishing area within the Otway/SA area (4,399 km^2). See Appendix B12 MAP-REG-EPM-103 High Intensity Area from ~142°5E to 140°15E. • There are potentially more than four fishers that may fish within the Operational Area and the Otway/SA area (defined above), however if relocation is required there is more potential to be able to relocate to an alternative viable area within the high	Moderate

Fishery	Predicted Level of Impact	
	intensity fishing area within the Otway/SA are off Portland which is the only landing port within the Otway/SA area (defined above). As shown in Appendix B12 MAP-REG-EPM-135 the trawl fishery main fishing area is centred on the 200 m bathymetry line, thus fishers are mainly moving along this line. As the Operational Area overlaps a small proportion (0.73% as detailed above) of the high intensity fishing area it is less likely that a fisher who may have to relocate will be displacing another fisher. • A measure has been adopted such that in cooperation with fishers, survey vessel movements in water depths of greater than 200 m will avoid trawling activities. As shown in Appendix B12 MAP-REG-EPM-135 the 200 m bathymetry line is the centre trawl line of the high intensity fishing area. Thus, relocation of fishers would be unlikely.	
Southern and Eastern Scalefish and Shark Fishery (SESSF) - Shark Gillnet Sub-sector (SSKN)	Impacts have been assessed as low based on: • The Active Source Area, where acquisition will be undertaken and where there is a higher likelihood of interaction with static gear such as gillnets, does not overlap the gillnet high intensity fishing area. See Appendix B12 MAP-REG-EPM-102. • Spatial closures progressively implemented since 2003 have resulted in gillnet effort being concentrated in Bass Strait (Butler et al. 2024). See Appendix B12 MAP-REG-EPM-130. In addition, there are no primary landing ports in the Otway area (west of King Island to the Vic/SA border). Based on this information it is unlikely that gillnet fishing is undertaken in the Operational Area. • The Operational Area overlaps where gillnet high, medium and low intensity fishing has occurred within 2010 to 2023, if fishing does occur in the Operational Area interactions and relocations can be managed by communications prior to the start of the survey, and daily lookahead information provided during the survey.	Low
Southern and Eastern Scalefish and Shark Fishery (SESSF) -Scalefish Hook Sector (SSCK)	Impacts have been assessed as moderate based on: • The fishery uses a variety of longline and drop hook methods. Longlines consist of baited hooks attached to the longline by short lines. The longline can be many kilometres long and can carry thousands of hooks. Pelagic longlines are not anchored and are set to drift near the surface of the ocean with a radio beacon attached so the vessel can track them to haul in the catch. Bottom longlines are held in place with anchors (AFMA 2025b). Each line is normally left to 'soak' for around 6 to 8 hours before being hauled onto the vessel (AFMA 2025b). Thus, to minimise interactions and relocations communications prior to the start of the survey, and daily lookahead information will be provided during the survey. • Droplines use a main line with an anchor at one end and a float at the other. Each hook is individually connected to a short 30-50 cm monofilament or cord 'snood' which is then clipped to the mainline (AFMA 2025c). Droplines are normally left to 'soak' for around 6 hours before being hauled (AFMA 2025c). The number of lines a vessel sets each day will depend on the vessel size and number of crew on board. Smaller vessels will often set less than 5 lines per day, whereas larger vessels with more crew can set more than 10 (AFMA 2025). Thus, to minimise interactions and relocations communications prior to the start of the survey, and daily lookahead information will be provided during the survey. • Seismic acquisition will be undertaken in a north-west to south-east direction with acquisition along a line taking a ~6 hours for the shorter lines and ~10 hours for the longer lines. Thus, the longline and dropline fishing would be able to utilise this area during this time. • The depth which droplines are set in varies depending on the target species but generally ranges from 250 to 600m (AFMA	Moderate

Fishery	Predicted Level of Impact	
	2025c). As shown Appendix B12 MAP-REG-EPM-105, approximately 16% of the Operational Area overlaps with water depths >250 m (OA > 250m = 1095 km^2, OA is 6801 km^2). • There have only been up to four fishers within the Operational Area and the Otway area (west of King Island to the Vic/SA border) from 2018/19 to the 2023/2024 season, thus if relocation is required there is more potential to be able to relocate to an alternative viable area within a suitable range of Portland which is the only landing port within the Otway area. See Appendix B12 MAP-REG-EPM-105.	
Southern Squid Jig Fishery (SSJF)	Impacts have been assessed as moderate based on: • The Operational Area overlaps the fishery where there have been low, medium and high levels of fishing intensity during 2010 to 2023. See Appendix B12 MAP-REG-EPM-106. • The Operational Area overlaps a high proportion of the fishing area that is likely, due to its location (See Appendix B12 MAP-REG-EPM-106), to be fished from the Portland, thus it is unlikely that fishers would relocate to the other main fishing area closer to King Island. • The squid fishery vessels use lights to attract the squid to the vessel where they are caught using barbless lures on monofilament fishing lines which are jigged up and down in the water by machines (AFMA 2025d). Interactions and relocations with these more static vessels can be managed by communications prior to the start of the survey, and daily lookahead information provided during the survey. • Seismic acquisition will be undertaken in a north-west to south-east direction with acquisition along a line taking a ~6 hours for the shorter lines and ~10 hours for the longer lines. Thus, the squid vessel would be able to utilise this area during that time. • As detailed in Stakeholder Record 4249, the timing of peak catches for the fishery has centred around February/March in the Western Victoria fishery hence avoiding undertaking the survey during this period has been implemented and the Activity Limitation, no petroleum activity will occur between 1 January and 15 September, has been introduced. The survey will occur in the September, October, November, and December window, avoiding the peak February/March period.	Moderate
Victorian		
Rock Lobster Fishery	Impacts have been assessed as moderate based on: • During 2011 to 2022 the maximum number of vessels that fished in a year within the Operational Area was nine and ranged from 1 to 9. The highest number of vessels (9, 7, 5) are in grids that are overlapped by a small proportion of the Operational Area (See Appendix B12 MAP-REG-EPM-111). • During 2011 to 2022 the maximum days fished in a year within the Operational Area was 212 days and ranged from 2 to 212 days. The highest days fished (112, 212, 174) are in grids that are overlapped by a small proportion of the Operational Area (See Appendix B12 MAP-REG-EPM-111). • Rock Lobsters are caught with baited pots that are generally set and hauled once each day (VFA 2023). Thus, to minimise interactions and relocations communications prior to the start of the survey, and daily lookahead information will be provided during the survey. • Seismic acquisition will be undertaken in a south-east to north-west direction with acquisition along a line taking a ~6 hours for the shorter lines and ~10 hours for the longer lines. As pots are generally set and hauled once each day relocation maybe required from an area for a period of days. As the majority of the	Moderate

Fishery	Predicted Level of Impact	
	Operational Area has only up to four fishers there is more potential to be able to relocate to an alternative viable area.	

9.1.2 Offshore Energy

ConocoPhillips Australia, Beach Energy and Cooper Energy hold petroleum titles that overlap with the Operational Area. Interference could occur if these companies are undertaking exploration, development, or P&A activities during the Regia MSS. To ensure impacts to ConocoPhillips Australia, Beach, Cooper and CGG are minimised, planning between the companies is ongoing and a Petroleum Simultaneous Operations (SIMOPS) Plan will be developed in the event activities are planned to occur at the same time in the same area.

9.1.3 Commercial Shipping

For vessels that are transiting through the Operational Area, such as shipping, they may be required to move around the seismic vessel when the streamers are deployed. This could result in a detour of 10 km and take approximately 16 minutes for a vessel travelling at 20 knots (38 km/hr). However, avoidance of slow-moving vessels or obstacles are normal practice for shipping vessels and impacts can be avoided by Notification to Mariners that alert ships to slow moving vessels or obstacles such as the survey vessel.

9.1.4 Marine Tourism and Recreational Fishing

Recreation and tourism could be affected by restricted access to an area where recreational fishing or fishing tours occur. Most vessel recreational fishing and fishing tours are day tours with no overnight stays. If a recreational fisher or fishing tour operator plans to fish within the Operational Area an area may need to be avoided for a short period of time (hours) while acquisition occurs in the area. From relevant person consultation undertaken during preparation of the EP, a low level of fishing tour operators (one to date) has been identified to occur within Operational Area. Impacts to recreational and fishing tour operators can be minimised via notifications and lookaheads as part of the On-Water Communications Protocol and the Communications Management System.

9.1.5 UXOs

The Operational Area overlaps with UXO sites 1052 King Island and SDG110 Sea Dumping – Bass Strait (Figure E1-1), however, as there are no planned events in which there is physical interaction between survey equipment and the seabed, impacts are not predicted.

9.1.6 Cultural Assessment

Vessels undertaking the petroleum activity may be observable from shore, however, the distance of the Operational Area from the nearest mainland shore is >17 km at the closest point, meaning that the vessels will not be conspicuous and would only be present for relatively short durations (<90 days). The Operational Area is 5.5 km from Deen Maar at the closest point. The distance of the Active Source Area from the nearest mainland shore is >20.7 km at the closest point and the distance of the Active Source Area from Deen Maar is >17 km (adhering to activity limitation: no discharge of sound source within 17 km of Deen Maar). Consultation and literature review indicated the importance of connection to coastal and marine areas for indigenous culture. The physical presence of vessels and associated potential for displacement of marine users has the potential to impact cultural features and heritage values through the following ways:

- Cultural obligations to care for Country: Environmental impacts may be assumed to impact rights and obligations to care for Sea Country. This distance of the activity offshore means that no Traditional Owners will be excluded from Sea Country.
- Knowledge of Country/customary law and transfer of knowledge: Indirect impacts to communities practicing these skills will inherently occur when threats to Sea Country values are felt. Despite this, there is no threat or impediment from the proposed activity on the

transmission of these skills and knowledge. This is particularly true when there are no predicted effects to species at populations levels, to ecosystem integrity, or biodiversity preservation (as demonstrated in Appendices E2-E9, F3 and F4).

- Connection to Country: Where people are displaced or disrupted (e.g., during colonisation) or where there is a loss of technical skills or environmental knowledge this may damage connection to Country (McDonald and Phillips, 2021). No impacts of this type are anticipated.
- Access to Country: Impacts to access to Country can only occur in areas that were traditionally accessed by First Nations peoples. No access issues are anticipated due to the distance offshore.

9.2 Predicted Levels of Impacts

The predicted level of effect to the functions, interests, or activities of other marine users from the physical presence of the survey vessel and towed equipment and the support vessels is assessed as moderate as there may be displacement, however impacts are temporary and, in most cases, avoidable based on:

- Communications prior to the start of the survey, and daily lookahead information provided during the survey. CGG will work proactively and collaboratively with other marine users so that both parties can plan activities in a manner that minimises potential displacement of each party.
- When the seismic vessel has equipment deployed it will typically move along pre-determined survey lines in the sail line plan in a racetrack pattern at a constant speed of ~ 3-6 knots (~ 5.5 to 11 km/hr). Updates to the sail line plan will be communicated to other marine users so they can proactively avoid the Survey Acquisition Area.
- No marine tourism or diving has been identified to occur within the Operational Area.
- Shipping deviations are predicted to be minor and have a negligible impact on travel times or fuel use. Deviations are normal practice, and impacts can be avoided by providing for Notices to Mariners that alert ships to slow moving vessels or obstacles such as the survey vessel.
- Impacts to Indigenous culture and values are not predicted from the presence of the vessels and equipment.
- A low level of fishing charter operators (one to date) has been identified to occur within Operational Area.
- Commercial fishing intensity within the Operational Area ranges from unknown, due to confidential data where there are less than five fishers, too high for the Victorian Rock Lobster Fishery, Southern and Eastern Scalefish and Shark Fishery Shark Gillnet Sub-sector, Commonwealth Trawl and Southern Squid Jig Fishery. Impacts to fishers is predicted to range from low to moderate based on the proportion of key fishing grounds that could be affected, fishing method and the fisheries' capacities to tolerate the predicted level of relocation to alternative viable areas.
- CGG will implement an adjustment protocol in the event displacement cannot be avoided and there is a financial loss to the marine user.

The uncertainty level in the assessment of impacts associated with of the physical presence of the survey vessel to the functions, interests and activities of other marine users is low given:

- Throughout the seismic survey, at least one support vessel will be in constant attendance to support on-water communication with other marine users.
- Notices to Mariners and lookaheads will alert fishers to slow moving vessels or obstacles such as the survey vessel.
- No planned activities in which there is physical interaction between survey equipment and the seabed.
- A Petroleum SIMOPs Plan will be developed in the event other titleholder's activities are planned to occur at the same time in the same area.

- Extensive relevant person consultation was undertaken during the preparation of the EP to identify other marine users that may be present within the Operational Area.
- Consultation did not identify impact pathways to marine tourism, divers, or physical indigenous culture values.
- For Commonwealth fisheries contemporary historical data up to the 2023/2024 season (2010 – 2023) has been used to inform the impact assessment. This dataset shows consistency in the areas fished. This has been supported by a review of AFMA fishery publications such as Fishery Status Report 2024, AFMA website and stakeholder consultation to identify any potential changes in fishing areas during the period of the Regia MSS (2024 – 2028).
- For Victorian fisheries contemporary historical data from 2011 to 2022 has been used to inform the impact assessment. This dataset shows consistency in the areas fished. This has been supported by a review of Victorian Fisheries Authority website and publications, and stakeholder consultation to identify any potential changes in fishing areas during the period of the Regia MSS (2024 – 2028).
- CGG will communicate with marine users prior to and during the survey to ensure other marine users can undertake their activities in a manner that avoids any interactions or can engage with CGG so that both parties can plan activities in a manner that minimises potential displacement to each party.

The predicted level of impact based on the effect (moderate) and uncertainty (low) is assessed as medium.

9.3 Industry Standard Mitigation Measures

9.3.1 Otway Adjustment Protocol

An adjustment protocol for unavoidable interference between commercial marine users and petroleum titleholders is an industry standard measure. ConocoPhillips, TGS, and CGG were founding members of a collaborative initiative called the Otway Marine Industries Coexistence Cooperative (OMICC). This initiative was in response to requests from commercial fishers, fishing industry associations, other stakeholders, and regulators for greater simplicity in making claims for compensation and to reduce consultation fatigue across the sector. OMICC has developed the Otway Adjustment Protocol (OAP), which originated from the National Energy Resources Australia (NERA) Commercial Fishing Industry Adjustment Protocol (NERA, 2021). The Otway Adjustment Protocol has been amended following feedback from fishers and fishing associations who TGS, CGG and ConocoPhillips have consulted with. It should be noted that following cessation of the planning of their proposed project TGS withdrew from OMICC.

9.4 Measures Adopted to Manage Environmental Impacts

The following measures have been adopted to ensure that the impacts associated with the physical presence of the survey and support vessels on other marine users' functions, interests, and activity will be of an acceptable level. These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

Measure	Measure Type	Details and Justification
CGG Marine Assurance System	System	The CGG Marine Assurance System ensure compliance of contract vessels with legislative requirements including the Navigation Act, MARPOL, COLREGS and Marine Orders.
CGG Technical Operations Manager	Person	Reasonable, evidence-based claims are promptly assessed and paid as per the Otway Adjustment Protocol.
Quality Control and Reporting Representative	Person	Ensures that the contracted vessels follow the contract and deliver the survey as per the permitted activity by using the sail line plan.

Measure	Measure Type	Details and Justification
Support Vessel	Item of Equipment	Throughout the seismic survey, at least one support vessel will be in constant attendance to support on-water communication with other marine users.
Consultation Management System	System	CGG will implement a Consultation Management System which includes pre and during survey communications to ensure other marine users know when, where and how the Regia MSS will be undertaken. This will help them to undertake their activities in a manner that avoids any interactions with the survey. Alternatively, they can engage with CGG so that both parties can plan activities in a manner that minimises potential displacement to each party.
On-Water Communications Plan	Resource	Documents how and when there will be communications with other marine users to minimise interruption with their operations and equipment.
Communicate with other marine users	Responsibility	Vessel captains have legislated responsibilities to communicate with other marine users and follow the On-Water Communications Plan.
Streamer Tail Buoys	Item of Equipment	This item of equipment is used to mark ends of the streamers so that they can be detected by other vessels.
Sail Line Plan	Resource	Ensures that the survey vessel will remain within the scope and boundaries of the EP and reflects the activity limitations.
Adjustment Protocol	Procedure	An adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area. This will extend to fishing cooperatives who can provide an evidence of commercial losses because of the survey.
Fisheries Liaison Officer (FLO)	Person	This is a dedicated competent person available in a local port able to be responsive to any commercial fishers immediate concerns, provide a focal point for queries, and support compensation claims.
Petroleum SIMOPS Plan	Resource	Ensures coordination of activities with other titleholders in the region to minimise interference.
Sea Country Protection Plan	Resource	The SCPP is a mechanism that facilitates the identification and management of new information, relevant to the activity, through collaboration of First Nations people who decide to be part of the program.

10 Demonstration Impacts Will Be of an Acceptable Level

10.1 Principles of ESD, Biological and Ecological Categories

Temporary, Reversible, and Small Scale

The physical presence of survey and support vessels during the Regia MSS is predicted to result in temporary and reversible interference with the functions, interests, or activities of other marine users. The activity will occur over a defined period (up to 90 days) and within a clearly delineated Operational Area, with movement generally restricted to deeper waters and away from high-use zones where practicable. Displacement of other users, including commercial fishers and shipping, is predicted to be short-term and manageable via the measures adopted including the Adjustment Protocol. The assessment found no evidence of long-lasting environmental damage, with impacts characterised as localised and of low intensity.

Based on Sufficient Information

The impact assessment was informed by up-to-date fishery data (Commonwealth data 2010–2023, Victorian data 2011-2022), peer-reviewed sources, consultation input, and relevant persons feedback. Relevant fishery status reports and GIS-based analysis of fishing effort patterns were used to determine the overlap and sensitivity of marine user activities. The application of spatial and temporal constraints to the activity was shaped by known use patterns and seasonal pressures. The analysis confirmed that no irreversible impacts are predicted, and the precautionary principle was not triggered due to low uncertainty in predicted outcomes.

Activity not inconsistent with EPBC Act

No part of the activity's environmental management is inconsistent with relevant EPBC Act provisions or associated plans as it relates to physical presence of the survey.

10.2 Economic Category

The activity has been designed to minimise interference with the rights and functions of other marine users. Communication protocols and a Fisheries Liaison Officer ensure advance notice and real-time coordination with affected parties. Where impacts do occur, the adjustment protocol provides a structured and transparent mechanism to address them. This protocol has been successfully applied in previous activities, offering affected persons a fair and timely pathway to raise and resolve concerns, including loss of equipment, relocation costs, and/or reduction in catch per unit of effort. By documenting impacts, applying evidence-based assessments, and ensuring resolution outcomes are communicated and implemented, the adjustment protocol ensures that no affected person is left worse off because of the activity.

10.3 Cultural and Social Categories

While the vessels may be visible from culturally significant coastal sites such as Deen Maar, the distance offshore and short duration of activity (90 days) limit the potential for interference. Consultation identified connections between marine ecosystems and cultural identity, including species such as Southern Right Whales (Koontapool). As there are no impacts predicted to species at the population level or to physical cultural sites, cultural obligations and connection to Country will not be disrupted. The activity respects cultural protocols by avoiding sound discharge near Deen Maar and adhering to relevant consultation findings. Therefore, culturally significant species, Native Title rights and interests, places, and practices can continue without disruption; and people and communities maintain ongoing access to the natural environment, recreational activities, and heritage values without long-term or irreversible effects.

10.4 Consistency with Company Processes

The impact assessment followed the methodology outlined in Appendix B3 and used up-to-date fishery data, peer-reviewed sources, consultation input, and relevant persons feedback to assess spatial displacement, access restriction, and potential loss of function. The predicted level of effect to other marine users was assessed as moderate, with a low level of uncertainty, resulting in a medium predicted impact level. The activity integrates all mitigation measures recommended through

regulatory guidance and good industry practice, and the consequence ratings remain within CGG's established environmental limits.

This impact assessment has demonstrated that the effect of the physical presence of the survey vessels and towed equipment to marine users has a:

- Predicted level of effect of moderate (3).
- An uncertainty level of low (2).
- Predicted level of impact of medium (6).

11 Environmental Performance Outcomes

Environmental Performance Outcomes (EPOs) are measurable and activity-specific outcomes that describe the environmental performance the titleholder must achieve to ensure impacts and risks are managed to acceptable levels. EPOs are critical to the structure of an Environment Plan because they form the clear link between the defined acceptable level of impact and the predicted level of environmental consequence. Each EPO must be measurable, achievable, and within the control of the titleholder to implement, providing a transparent and enforceable statement against which performance can be assessed.

Table E1-3 - Environmental Performance Outcomes and Justifications

Defined Acceptable Level (From Table E1-2)	Environmental Performance Outcome	Rationale
The physical presence of vessels does not cause changes in fishing catch patterns that result in measurable effects to the biomass or recruitment of target species.	**The activity is scheduled and located to avoid exclusion of commercial fishing from known, high-effort fishing areas for more than 90 consecutive days, with no resulting adverse effects on fish stock status.**	This EPO ensures that the activity does not significantly disrupt commercial fishing operations or contribute to changes in stock status. A 90-day threshold provides a measurable and conservative duration to manage potential displacement, based on typical seasonal fishing patterns and operational windows. Replacing “core harvest areas” with “known, high-effort fishing areas” allows the titleholder to reference publicly available data (e.g. logbooks, AFMA catch records, or consultation feedback) to identify areas of concentrated fishing activity. This approach reflects a precautionary, evidence-based method for managing spatial conflict with other marine users while supporting sustainable fishery access and ecosystem health.
The activity is carried out in a manner that does not interfere with activities of another person to a greater extent than is necessary for the reasonable exercise of the rights and performance of the duties of the titleholder.	**As a result of the activity limitations and the adoption of the Otway Adjustment Protocol, no commercial marine user will be worse off because of the activity.**	This EPO is supported by consultation with marine users, assessment of spatial overlap with active areas of use, application of minimum safety zones, and appropriate notification of the activity. It ensures that any exclusion or restriction is temporary, limited in extent, and necessary to support the safe execution of the titleholder’s rights.
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	**Social, cultural, and economic features are protected, sustaining their value for people and communities.**	No marine tourism or diving has been identified to occur within the Operational Area. A low level of fishing charter operators (one to date) has been identified to occur within Operational Area. Transiting vessels may be required to divert short distances but will be able to plan their journey based on NOTMAs, etc. to minimise disruptions. Impacts to other companies undertaking exploration or development activities during the Regia MSS will be mitigated via a SIMOPs Plan.
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.		
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		This distance of the activity offshore means that no Traditional Owners will be excluded from Sea Country.

Defined Acceptable Level (From Table E1-2)	Environmental Performance Outcome	Rationale
Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	**The activity is conducted such that environmental impacts and risks remain within the range assessed as medium or lower, with mitigation measures in place and functioning as intended.**	This EPO enables ongoing assessment of effectiveness through internal reviews and operational audits. It provides a clear link between the impact and risk assessment process and implementation strategy, supporting regulatory compliance and continuous improvement without requiring environmental outcome monitoring.

12 Recommendations

The predicted level of impact is medium and below pre-defined acceptable levels. The mitigation and management measures in place provide sufficient confidence around the predicted effect levels.

There may be effects to intangible cultural features because of the physical presence of the activity. It is recommended that these are assessed further in the next stage of the assessment process.

13 Document Control

Date	Revision	Update
20 June 2023	A	Draft prepared for initial comment
30 August 2023	B	Update based on comments and relevant person feedback
11 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
23 October 2024	2	Updated following the NOPSEMA assessment process
16 April 2025	3	Updated following NOPSEMA OMR 1 Letter
6 December 2025	4	Updated following NOPSEMA OMR 2 Letter

14 References

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Annex 1

Input from Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. The table below shows how this feedback has been incorporated into the environmental assessments.

Matter	Matter ID	Changes made arising from public comment
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and implement the following Activity limitationthe sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the safety criterion human health safety criterion for recreational divers, surfers and swimmers along the coastline. CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F1 F3, G1 and G2).

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table E1-4. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table E1-4 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4001	Regia team not providing information on tonnes, species or revenue from potentially displaced trawl catch and claim this was titleholder indicating unwillingness to work to reduce the impact. Stakeholder stressed ABARES maps inaccuracies.	CGG obtained and provided the information from another reputable consultancy using ABARES data obtained via AFMA, which SETFIA use, this data is described in Appendix E1, section 4.1. Following feedback from SETFIA this was investigated, with AFMA confirming the reliability of the ABARES data (Feedback ID 1237), stating it uses logbook and other AFMA collected data. They did note that industry associations have previously been critical of the economic aspects of the ABARES data, however this data is based on in field surveying of fishing industry operators. However, the information being requested had no utility in managing impacts on commercial fishers. The stakeholder suggested the relevancy being for CGG to know how much they may need to pay via a compensation plan (Event ID 3382). This was deemed to have no utility for minimising impacts as the reports obtained by CGG allowed for consultation with commercial fishers to identify potential high impact areas and manage these. The data would not improve or add to the minimisation of interactions with SETFIA's members, all concessions possible have already been made, as documented in Appendix A2, section 4. The adoption of the compensation protocol is confirmed. An exclusion of acquisition in water deeper than 200 m was confirmed by local fishers to be workable and removed their concerns.	4786
4005	States a detailed data project could provide precise figures on tonnage and revenue, facilitating a more productive discussion.	CGG obtained and provided the information from another reputable consultancy using ABARES data obtained via AFMA, which SETFIA use, this data is described in Appendix E1, section 4.1. Following feedback from SETFIA this was investigated, with	4934

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		AFMA confirming the reliability of the ABARES data (Feedback ID 1237), stating it uses logbook and other AFMA collected data. They did note that industry associations have previously been critical of the economic aspects of the ABARES data, however this data is based on in field surveying of fishing industry operators. However, the information being requested had no utility in managing impacts on commercial fishers. The stakeholder suggested the relevancy being for CGG to know how much they may need to pay via a compensation plan (Event ID 3382). This was deemed to have no utility for minimising impacts as the reports obtained by CGG allowed for consultation with commercial fishers to identify potential high impact areas and manage these. The data would not improve or add to the minimisation of interactions with SETFIA's members, all concessions possible have already been made, as documented in Appendix A2, section 4. The adoption of the compensation protocol is confirmed. An exclusion of acquisition in water deeper than 200 m was confirmed by local fishers to be workable and removed their concerns.	
4019	Any negative impact on the marine environment would also have the potential to negatively impact my employment prospects in the area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1459
4334	This statement opposes seismic blasting in areas designated as Sacred Birthing Grounds for Southern Right Whales, underlining the cultural and environmental significance of these grounds. It also expresses solidarity with the Gunditjmara Traditional Owners, acknowledging the cultural heritage and environmental stewardship of this region by Indigenous communities. The feedback emphasises the perceived risks to both marine life and Indigenous heritage in the area.	The titleholder acknowledged this concern and confirmed that CGG will not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country (Event ID 2101).	2101
4303	The stakeholder stated that they were concerned about both tangible and intangible cultural heritage, as	Indicated that we will be performing non-invasive work in a site survey and could work with the TO's to help	1891

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	well as submerged underwater archaeology.	identify culturally significant sites (Event ID 1891).	
4332	This statement calls for a respectful approach, urging stakeholders to engage deeply with Indigenous knowledge and perspectives, including the views of Elders and Traditional Owners. It emphasises empathy and a meaningful understanding of the environmental and cultural impact of activities on marine life.	The titleholder acknowledged this concern and confirmed that CGG will not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country.	2101
4280	The stakeholder expresses strong opposition to the exploration for gas near Deen Maar (Lady Julia Percy Island), emphasising its significance to the local Indigenous community, comparable to the cultural importance of Uluru. They highlight its unique status as Australia's only offshore volcano and assert that such an exploration would be inappropriate in a site of sacred significance, arguing against the project's alignment with respecting Indigenous heritage and environmental integrity.	We are aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how we protect and preserve the values of this site (Event ID 2108).	2108
4271	The stakeholder asserts that seismic blasts will have a direct negative impact on marine life, specifically mentioning that an "exclusion zone" will not effectively prevent the effects of the blasts from travelling through the ocean.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable. The titleholder is aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how to protect and preserve the values of this site.	2108
4216	Stated that they feel a sense of reparability to listen to the Gunditjmara people and what they wish for their sea country and ancient song lines.	Titleholder responded to the individual confirming consultation was currently being attempted with First Nations Custodians of Country and to engage with them on the activity. Titleholder requested that the individual encourage any potentially relevant people they may know to contact the consultation team and advised that consultation is an important aspect of the marine seismic survey planning process, community input and feedback will be considered in the planning and execution of the survey.	842

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4052	Concern about the impact of the testing on yacht racing off the coastline of Port Fairy.	Titleholder responded to individual advising that the activity will occur approximately 25km offshore (at the closest point) and that the survey is being refined through the consultation process and the distance might change.	3092
4059	Concern about the potential impact on the Abalone industry and the need for compensation if marine species are killed off.	Titleholder acknowledged this concern and noted that potential impacts to commercial fisheries from physical presence is assessed in E1 of the EP, and potential impacts to marine invertebrates from underwater sound is assessed in E4 of the EP. Advised that control measures to reduce impacts to commercial fishers as a result of loss of catch are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	2089
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration by other companies, particularly regarding the sale of seismic data.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	879
4072	Concerned of impacts to commercial fishing business	Engaged with stakeholder to understand their concern and undertook thorough assessment, including reviewing paper submitted by stakeholder and providing stakeholder references as requested.	4446
4073	Concerns about impacts both reputational and physical to the region if the activity is allowed.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to	1244

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		reduce any impacts to as low as practicable.	
4074	Concerns about implications for the population of Rock Lobsters in the area going forward.	This claim has been thoroughly assessed in E1 and E5, and F3 for southern rock lobsters. The known effects to individual lobsters are not predicted to have any measurable effect on population levels or dynamics.	2773
4081	Concerns about the impact on whale habitat, endangered marine life, and commercial fisheries	Titleholder acknowledged this concern and noted that potential impacts to whales and relevant endangered marine species is assessed in the EP Chapters on underwater sound and light (E2-E7, and E9). Any interactions with seismic are mitigated and managed through spatial boundaries and a comprehensive fauna management plan. Advised that control measures to reduce impacts to commercial fishers because of displacement are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	4551
4083	Concerns about why more seismic needed and what time of the year was the survey going to be done to minimise impacts to fishing for sharks, lobsters, squid	Titleholder acknowledged this concern and each of the species within this claim has been subject to extensive assessment in E1, E3, E4 and F3 with various measure adopted to limit the sound exposure to the lowest level possible to meet geophysical objectives and to protect marine fauna (see G1).	740
4084	Concerns for reduced landed catch during the survey due to displacement. Have historical data going back many years to show if changes.	The titleholder has acknowledged this concern and note that displacement is assessed in the EP E1 and F3 as a potential impact of the physical presence of the activity. Control measures to reduce impacts to commercial fishers as a result of displacement are outline in EP. The Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area. While onshore fish processing is not covered by NERA protocol a claim will	4108

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		be considered based on appropriate historical evidence.	
4096	Environmental Risk: Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artificial light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	2766
4109	Fishers discussed the historical impact of seismic surveys on the fishing industry, specifically noting that the “3 mile” area, which previously supported two vessels’ catches, has become unfishable since seismic activities.	Regia MSS committed to providing a map of historic seismic activity (2D and 3D) across the proposed area. As well as Map of Regia MSS Acquisition Area, Draft Regia Compensation Protocol, Map of all seismic surveys for past 20-25 years in the region, Fishery Report with analysis of all catch rates, draft impact assessment for fishing (Event ID 1892).	1892
4114	I have serious concerns regarding effects to local industry - tourism and fishing in particular.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E1. Measures to minimise adverse impacts on functions, interests and activities on other marine users including commercial and recreational fishers and marine tourism, are outlined in the EP.	2117
4124, 4125 & 4305	Interference with Orange Roughy Research Program: request for no data acquisition, or turns, over the sample collection areas, with buffer between the acquisition and sample areas.	As shown in map MAP-REG-EPM-050_B (Appendix B12), the activity was reduced to ensure there is no overlap of sampling areas with the active source area, including turns. There are no specific studies focused on seismic effects on Orange Roughy, however, inferences can be drawn	1649, 2002 & 3350

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		from research on other species. In particular, multiple studies have investigated the impact of seismic surveys on the spawning behaviour of cod, given this is a period in the life cycle when individuals gather in large numbers (Mcqueen et al 2022, Mcqueen et al 2023). Both studies found cod were not significantly disrupted from their spawning behaviour after exposure treatments representative of a full seismic survey at distances ranging from 5-40km. These distances closely align with the proximity between the Regia MSS acquisition area and the Orange Roughy Study central sampling area, 5.27 km at its nearest point (see Appendix B12, map MAP-REG-EPM-050_B). Based on this, we do not anticipate any significant level of disturbance to Orange Roughy in the sampling area. A small portion of the central sampling area overlaps with the operational area; however, this will not have a greater impact than any other vessel transiting the area. Therefore, there is no break to the time series of the data, due to lack of overlap with the active source area. An activity limitation of No sound source discharges within the Orange Roughy research program areas, is in place.	
4337	Interference with Orange Roughy Research Program: request the exclusion starts a month earlier from April 2024	As shown in map MAP-REG-EPM-050_B (Appendix B12), the activity was reduced to ensure there is no overlap of sampling areas with the active source area, including turns. A small portion of the central sampling area overlaps with the operational area; however, this will not have a greater impact than any other vessel transiting the area. Therefore, there is no break to the time series of the data, due to lack of overlap with the active source area. An activity limitation of No sound source discharges within the Orange Roughy research program areas, is in place. As the Regia MSS is not prohibiting the ability of the research program to catch the fish required for the study to continue uninterrupted, negating the need for exclusionary months.	2003
4153	Presents a historical account of their catch rates over 24 years, indicating that seismic surveys in the past led to a significant decrease in their catch from 10-15 tons per trip to just 5-6 tons per trip for over two years. They now report a catch rate of 10-14 tons	Titleholder acknowledged this concern and noted that potential impacts to molluscs the Regia MSS is assessed in E1, E4 and F3 of the EP. Advised that control measures to reduce impacts to commercial fishers as a result of loss of catch are outlined	5190

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	per 7 days, suggesting lingering concerns about how current seismic activities may similarly affect their fishing operations.	in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	
4165	Risk of losing craypots due to being cut off by vessels during transit.	Titleholder acknowledged this concern and noted that displacement is assessed in the EP Chapter on physical presence (7.4.1.4 and E1) as a potential impact of the physical presence of the activity. Advised that control measures to reduce impacts to commercial fishers as a result of displacement are outlined in the EP and include mitigation measure: Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	4516
4173	Seismic blasting has adverse effects on the marine environment, with critical gaps in understanding the effects on individual species and the marine environment as a whole.	The titleholder responded with an explanation of the information sources used to inform the Regia MSS impact and risk assessments, and explained how these information sources and resulting measures are specific to the potential impact. The titleholder also made reference to documents relevant to this claim within the environment plan (Event ID 4092).	4091
4180	Seismic testing and gas exploration/drilling pose undeniable risks to marine fauna, flora, ecosystems, local fishing, and tourism industries.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2118
4188	Stakeholder expressed concern having other displaced fisherman	Titleholder acknowledged this concern and noted that displacement is assessed in the EP	4516

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	moving into the area they work in has resulted in reduced catch rates.	Chapter on physical presence (7.4.1.4 and E1) as a potential impact of the physical presence of the activity. Advised that control measures to reduce impacts to commercial fishers as a result of displacement are outlined in the EP and include the Adjustment Protocol which stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	
4204	Stakeholder provided feedback post Regia team attendance at AGM regarding OMICC, the report and fishing data. Specifically disputing the claim that the 2019 SETFIA report did not provide an accurate estimation of effects. The feedback asserts that the report is, in fact, highly accurate, detailing the average catch tonnage from fishing operations in the survey area over the past 20 years and using current pricing data. The data was compiled by Fishwell Consulting. It is suggested that CGG may have misunderstood the implications of displacement, believing that all catch would require compensation, while the report indicates that only a portion (20-25%) of catch was affected, emphasising the relevance of these findings for projects in the Otway region.	CGG has already responded to many of these claims in prior correspondence. Avoidance measures and mitigation measures have been adopted to manage interference with commercial fishers. CGG does not misunderstand the importance of historical data, but it is not relevant to the future activities of commercial fishers or have any relevance to the management of interactions.	5231
4213	Stakeholder wanted to enjoy recreational activities without the disruption and destruction caused by the proposed activities.	Titleholder responded advising that displacement of recreational marine users is an assessed impact of the activity that is temporary and recoverable. The activity occurs no closer than 25km to the coastline at its closet point (south of Port Fairy) and lasts for no longer than 90 days.	820
4214	Stakeholder was mainly worried about being displaced from their fishing areas due to the activity.	Titleholder acknowledged this concern and noted that displacement is assessed in the EP Chapter on physical presence (7.4.1.4 and E1) as a potential impact of the physical presence of the activity. Advised that control measures to reduce impacts to commercial fishers as a result of displacement are outlined in the EP and include the Adjustment Protocol which stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the	4516

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		fishery associations that represent the commercial fishers that fish within the Operational Area.	
4219	Survey timing - trawling occurs all year round so shifting timing isn't a protective measure for the economics of the survey.	In addition to the avoidance of the aggregated peak fishing effort in the summer (January, February, and March), the acquisition area has been reduced following consultation to the 200m depth contour, with acquisition in no shallower than 50m water depth. A comprehensive adjustment protocol to pay for evidence-based claims of unavoidable interference with commercial fishers is also in place, along with communications protocols to minimise interference.	4788
4221	The Association expresses concern regarding the potential impacts of the survey, emphasising that the lack of accurate data makes it impossible to determine what those impacts might be. Additionally, members voiced apprehension about CGG's ongoing criticism of the independent consultancy Fishwell, which produced the 2019 report and related BACI study. They view this criticism as a potential tactic to undermine Fishwell's credibility, suggesting that such actions reflect poorly on CGG.	CGG has responded to these claims previously. The accuracy of the historical data has no influence on how the future interactions between commercial fishers and the Regia MSS will be managed. The economic impact to individual fishers will be determined by claims being made through the adjustment protocol and reasonable evidence-based claims will be paid. Further, CGG did not criticise the Fishwell report. CGG did assert that SETFIA/SSIA using the data as an indicator of impact measurement is not appropriate.	5231
4223	The comment states that harming the environment, which is essential for social, cultural, and economic well-being, would be irresponsible. They advocate against the introduction of new gas projects, emphasising the need to prioritise environmental protection.	The titleholder responded indicating Oil and gas activities have occurred in this region for 25 years. The titleholder indicates the industries strong environmental performance. The titleholder ensures impacts will be short-term by maintaining by applying the highest environmental standards for seismic surveying in Australia.	2098
4229	The feedback asserts that CGG's estimation is inaccurate for two main reasons. First, it assumes that fishing activity is uniformly distributed across the fishery, which contradicts the realities of commercial fishing. Second, participants in the meeting expressed concerns about the use of average prices, indicating that it fails to reflect the current value of fish. The feedback points out that it was unclear whether the price data used was from the past 10 or 20 years, suggesting that the average price per kilogram cited by CGG is likely only half of the actual market value. Additionally, it is argued that the average prices may have been	CGG has responded to these claims previously and has outlined the approach to compensation in the OMICC protocol. There have been plenty of opportunities for the relevant person to raise new issues. Further refinements can be made for individual fishers through the evidence-based process which is specific to individuals. The claims made by this person about matters that relate to the whole fishery are irrelevant to compensating displaced fishers.	5231

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	derived from data across the entire fishery rather than being specific to the fish species caught in the Otway Basin and landed fresh in Portland.		
4233, 4234	The feedback provided raises a concern from both SETFIA and SSIA that the titleholder should fulfill its claimed regulatory obligation, and that they remain of the belief, to take reasonable measures to mitigate impacts on stakeholders. They suggest conducting a 20-year data review of catch records across all fisheries, especially their own, to better understand the volume and economic value of catch areas that overlap with the planned activity. By analysing this data, the stakeholders believe that collaborative solutions could be identified to reduce the impact on fisheries with potentially minimal loss to the company's acquisition area.	CGG obtained and provided the information from another reputable consultancy using ABARES data obtained via AFMA, which SETFIA use, this data is described in Appendix E1, section 4.1. Following feedback from SETFIA this was investigated, with AFMA confirming the reliability of the ABARES data (Feedback ID 1237), stating it uses logbook and other AFMA collected data. They did note that industry associations have previously been critical of the economic aspects of the ABARES data, however this data is based on in field surveying of fishing industry operators. However, the information being requested had no utility in managing impacts on commercial fishers. The stakeholder suggested the relevancy being for CGG to know how much they may need to pay via a compensation plan (Event ID 3382). This was deemed to have no utility for minimising impacts as the reports obtained by CGG allowed for consultation with commercial fishers to identify potential high impact areas and manage these. The data would not improve or add to the minimisation of interactions with SETFIA's members, all concessions possible have already been made, as documented in Appendix A2, section 4. The adoption of the compensation protocol is confirmed. An exclusion of acquisition in water deeper than 200 m was confirmed by local fishers to be workable and removed their concerns.	5194
4235	The feedback questions if a strong environmental record includes the severe impacts of seismic activity on fishing industries, like the scallop industry near King Island, which has suffered losses reportedly without compensation.	Seismic survey effects on molluscs, including scallops are well understood and not mortal in our circumstance. There are many environmental pressures that cause fluctuations in fish populations, not just sound. We have a track record of successful co-existence with the fishing industry and of paying reasonable evidence-based claims for compensation - which we will do for the Regia survey.	2083
4239	The feedback raises concerns about the impact of seismic activities on the	It would be unacceptable to have mortal effects on any marine species	2093

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	Abalone industry, suggesting that the industry may be negatively affected by the proposed exploration and seismic testing. This indicates a broader concern for the sustainability of marine life and the economic implications for local fisheries.	from our or any marine seismic survey. We do not predict mortal effects to molluscs (including scallops, abalone, oysters, clams, mussels, limpets, squids, octopus and cuttlefish etc.). Our full assessment of predict impacts on molluscs will be made publicly available as soon as it's completed.	
4242	The fisher expressed concerns due to his smaller vessel, which he launches from the Port Campbell jetty. Unlike larger vessels, his boat's size limits his ability to access deeper or more distant waters.	Understand the constraints on RP and the nature of RP's operations. As a result, confirmed that CGG would consider an exclusion zone around RP's preferred fishing blocks.	2026
4249	The largest jig fishery for squid in Bass Strait operates in the depths and area proposed for the project, raising concerns about the impact on squid reproduction.	As stated in the Commercial Fishers Information Sheet, the Southern squid jig fishery has been identified as present in the area and as such has been assessed in the Impact Assessment and in our Acceptable Levels of Impact and Risk document. From this research and assessment, the following mitigation effectiveness was concluded: While the probability of adverse consequences for squid populations from seismic is extremely low it is appropriate to reduce any probability to as low as possible. The timing of peak catches has centred around February/March in the Western Victoria fishery hence avoiding seismic during this period is advisable. Two windows have been identified for the survey to occur, being April – June and September – December, avoiding the February-March period.	3917
4253	The possible effects to marine life and ecosystems is my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are	2256

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publicly responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4285	The stakeholder noted their concern as a resident of Port Fairy: noise (land and sea), impact on marine life, potential impacts on the	We are also concerned about the welfare of marine fauna. We have undertaken an impact assessment process that includes whale, seals, pelagic and shorebirds. As part of this assessment, we must show that	1747

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	environment and the future potential if gas is found.	impacts to these species will be of an acceptable level. We have determined that it is acceptable to have temporary behavioural changes, such as moving away from the survey vessel, and no injury or long-term impacts. Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We are also publishing environmental impact, risk and mitigation documents as they are completed, in the document library. We are publishing the entire documents in order to remain transparent, but I have also attached a summary document.	
4295	The stakeholder recounted a previous experience where seismic surveys harmed the fishery for two years. They possess catch history data that highlights the decline in fish populations before and after the survey activities took place.	Titleholder acknowledged this concern and noted that potential impacts to commercial fisheries from physical presence is assessed in E1 of the EP. The titleholder advised that control measures to reduce impacts to commercial fishers because of loss of catch are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	5190
4308	The stakeholder was concerned about the environmental impact on Port Fairy residents who have fishing businesses and recreationally fish in the area.	Impacts from physical presence on both commercial and recreational fishing are assessed in the Environmental Plan (EP) and can be found in E1. Measures to minimise adverse impacts on functions, interests and activities on other marine users, including commercial and recreational fishers in the region are outlined in the EP.	2273
4311	The stakeholder, who owns and operates two commercial fishing trawlers based in Portland, Victoria, expressed concern about the potential effects of seismic activities on the southeast trawl operations.	Titleholder acknowledged this concern and noted that potential impacts to commercial fisheries from physical presence is assessed in E1 of the EP. Advised that control measures to reduce impacts to commercial fishers as a result of loss of catch are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that	5190

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		represent the commercial fishers that fish within the Operational Area.	
4336	Threat to coastal aesthetics of Port Fairy and potential impact on property value and tourism income.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will be operating at >25km from the coast and will not impact any aesthetics.	1263
4342	Attendees stated that the fishery has seen significant improvement, marking its best condition in about six years, since the last seismic activity in the region. This feedback highlights concerns regarding the potential negative impacts of upcoming seismic activities on the current health of the fishery.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E1 and F3. Measures to minimise adverse impacts on functions, interests and activities on fisheries are outlined in the EP.	1529
4343	Questions possibility of compensation for the abalone industry if their stocks are depleted as a result of seismic testing, drawing a parallel to the scallop industry near King Island that was adversely affected. It highlights concerns regarding accountability and the financial implications for local fisheries in the event of ecological harm.	The titleholder acknowledged this concern and noted that potential impacts to the abalone industry. It would be unacceptable to have mortal effects on any marine species from our or any marine seismic survey. We do not predict mortal effects to molluscs (including scallops, abalone, oysters, clams, mussels, limpets, squids, octopus and cuttlefish etc.). Our full assessment of predict impacts on molluscs can be found in E1 Section 8, E4 Section 8 and F3 Section 4.	2093
4365	Concerns about the lack of definitive clarification on how seismic testing affects the marine environment and the clash between economic interests and environmental risks.	The titleholder acknowledged the feedback, noting that they have undertaken a thorough analysis and assessment of all relevant literature to inform the impact assessments conducted to assess potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals in the Environmental Plan (EP). These findings can be found in E2, E3, E4, E5, E6, and E7 under Section 8: Predicted Levels of Impact. Additional assessments of key receptors were also completed to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level (F3). Titleholder also conducted an assessment to investigate potential impacts to other marine users from physical presence resulting from the activity (E1).	2383
4537	The stakeholder raised an objection to seismic surveys as they negatively affect the fishing industry, local economy and environment.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of	424

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		commercial fish species and sensitive species within the area of operation. The MSS will also not impact the local economy. Mitigation plans are in place to reduce any impacts to as low as practicable.	
4417	The relevant person was concerned that about the proposed seismic activity effecting the behaviours of certain species.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act.	6880
4433	Seismic impacts can linger longer than the few hours suggested, the insistence on peer-reviewed work to prove this is opportunistic and suits OMICC's agenda.	Event 6724 - OMICC announces that the latest version of the OMICC Otway Adjustment Protocol has been published, along with a video briefing for fishers, which can be accessed through a provided link. In the briefing, OMICC confirms that, following the relevant persons feedback, a "claim period" and a "lodgment period" have been incorporated into the definitions of the protocol. The claim period is set to 30 days after the end of any activity, while the lodgement period extends up to 6 months after the end date of any activity. OMICC further informs the relevant person that the OMICC Founders reviewed the request for claims up to 6 months after an activity. However, the decision was made to adopt a 30-day claim period, as this duration resulted in a positive compensation outcome for fishers affected by the Gippsland survey in 2019.	6749
4434	It is critical that fishers are compensated if their catches are negatively impacted by MSS.	A compensation protocol has been adopted.	6749
4436	The relevant person stated that it was evident what had impacted rock lobsters in the early 2000s.	Event ID 6595 - Titleholder responded to relevant person outlining approach to assessment of fisheries and SRL, including assessment of mitigations in place.	6594
4449	Concerned about unexploded ordinance in the area.	Event ID 6875 - The Regia team responded in-meeting and explained they had worked with the Department of Defence and that anything the fishers may be finding	6875

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		could be the result of munitions dumped post- World War 2.	
4452	Stakeholder claims that potential impacts on World Heritage Values of Budj Bim and the life-cycle of Kooyang have not been properly assessed or addressed.	Regia team responded by referencing the relevant impact assessments in the Environment Plan (EP) (EVT070), this information was also provided in Event ID 7363. Previously provided in Event ID 2521, 2356, 2357, 2358, 2359, 2360, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417.	7136
4453	Stakeholder claims that potential impacts on World Heritage Values of Budj Bim and the life-cycle of Kooyang have not been properly assessed or addressed.	Regia team responded by referencing the relevant impact assessments in the Environment Plan (EP) (EVT070), this information was also provided in Event ID 7363. Previously provided in Event ID 2521, 2356, 2357, 2358, 2359, 2360, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417.	EVT070
4487	Claims that CGG's proposed activities are inconsistent with the Recovery Plans made under the EPBC Act, the Southern Right Whale Recovery Plan and the Blue Whale Recovery Plan. GMTOAC states that these activities pose known physical and behavioural risks to the Eastern Population of Southern Right Whales and to Pygmy Blue Whales. These risks include impacts from anthropogenic underwater noise, particularly seismic noise, vessel strikes, climate-driven changes in prey availability, and the cumulative effects of these pressures, all of which have the potential to injure or kill individuals and affect populations. GMTOAC notes that under the EPBC Act Program and NOPSEMA's decision-making guidelines, an Environment Plan cannot be accepted if it is inconsistent with a recovery plan. It emphasises that both Recovery Plans contain "Very High" importance actions requiring that Blue Whales and Southern Right Whales must be able to continue using their Biologically Important Areas (BIAs) without auditory impairment, injury, or displacement. The plans also call for preventing disruption and displacement of Karntubul (Southern Right Whales) from BIAs due to anthropogenic noise such as seismic surveys.	CGG maintains that its approach aligns with statutory obligations and industry best practice. It asserts that all regulatory requirements under Regulation 34 have been met, and that its environmental performance outcomes and control measures are grounded in the best available science and tailored to the ecological and cultural sensitivities revealed through consultation. The Regia MSS Environment Plan (EP) was designed to ensure impacts and risks are reduced to As Low As Reasonably Practicable (ALARP) and to an acceptable level. Regarding whale protection, CGG highlights that the EP includes specific mitigation measures for culturally and ecologically significant marine fauna, including species noted in relevant Recovery Plans. Early correspondence in February 2023 identified Southern Right Whales and Pygmy Blue Whales as key sensitivities, and the EP commits to spatial and temporal avoidance measures, sound-source shutdowns, and exclusion zones to protect them. These measures explicitly consider cultural significance, such as timing restrictions to avoid the Karntubul (Southern Right Whale) birthing period. The whales, Karntubul and Wuuloc, are identified in the EP as sensitive receptors with dedicated protective measures. CGG confirms that these cultural and ecological sensitivities were incorporated into the environmental	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		assessment. The EP acknowledges the sacred cultural status of Koontapool (Southern Right Whale) and Wuuloc (Pygmy Blue Whale) for the Gunditjmara people and includes them in impact and cumulative risk assessments. Appendix F3 references the Nyamat Mirring Plan 2023–2033 and recognises Gunditjmara spiritual connections, including to Karntubul. CGG substantively addresses the relevant issues, including underwater noise, vessel interactions, and cumulative effects. The EP sets out noise-management frameworks, timing restrictions, and cumulative impact analyses consistent with the concerns raised.	
4490	CGG has failed to adequately assess the impacts of its proposed activity on the Budj Bim World Heritage Cultural Landscape. GMTOAC further states that CGG did not sufficiently evaluate impacts on Kooyang, a culturally significant species whose lifecycle and migration underpin the world heritage values of the Budj Bim Cultural Landscape and extend well beyond its physical boundaries.	Culturally significant features, including the Budj Bim landscape, were included in both impact and cumulative risk assessments using a methodology that blends scientific evidence with cultural narratives. Regarding Kooyang (Eel), CGG maintains that this culturally important species, whose lifecycle is central to the world heritage values of Budj Bim, was addressed within the EP's impact and cumulative assessments. These assessments include both Kooyang's cultural significance and ecological role. CGG reiterates that its EP is consistent with statutory obligations, based on best-available science, and tailored to the cultural and ecological sensitivities identified. CGG maintains that the Budj Bim Cultural Landscape and Kooyang have been incorporated into the EP and that this inclusion meets regulatory standards for demonstrating ALARP and acceptable levels of impact.	EVT352

Annex 3

Fishery Overlap Data

Commonwealth Fishery	Maximum Area Fished Sqkm	Maximum Area Fished within Operational Area Sqkm	% Overlap
Bass Strait Central Zone Scallop Fishery (BSCZSF)	96,937	284	0.29
Eastern Tuna and Billfish Fishery (ETBF)	2,940,804	6,517	0.22
Small Pelagic Fishery (SPF)	450,951	544	0.12
Southern and Eastern Scalefish and Shark Fishery (SCDS)	292,871	6,801	2.32
Southern and Eastern Scalefish and Shark Fishery (SCTR)	590,033	6,801	1.15
Southern and Eastern Scalefish and Shark Fishery (SSKK)	532,091	6,801	1.28
Southern and Eastern Scalefish and Shark Fishery SSKN	606,740	6,801	1.12
Southern and Eastern Scalefish and Shark Fishery (SSCK)	700,405	6,628	0.95
Southern Squid Jig Fishery (SSJF)	341,052	6,801	1.99
Southern and Eastern Scalefish and Shark Fishery SCSQ	519,490	6,801	1.31
Western Tuna and Billfish Fishery (WTBF)	1,549,608	544	0.04

Victorian Fisheries

Fishery	Area Fished between Port Campbell and Passed Portland Sqkm	Area Fished between Port Campbell and Passed Portland within Operational Area Sqkm	% Overlap
Wrasse (Ocean) Fishery	2,155	135	6.26

REGIA
Marine Seismic Survey

Impact Assessment
Underwater Sound: Plankton

Appendix E2: REG-EP-021-E2

Rev 5

December 2025

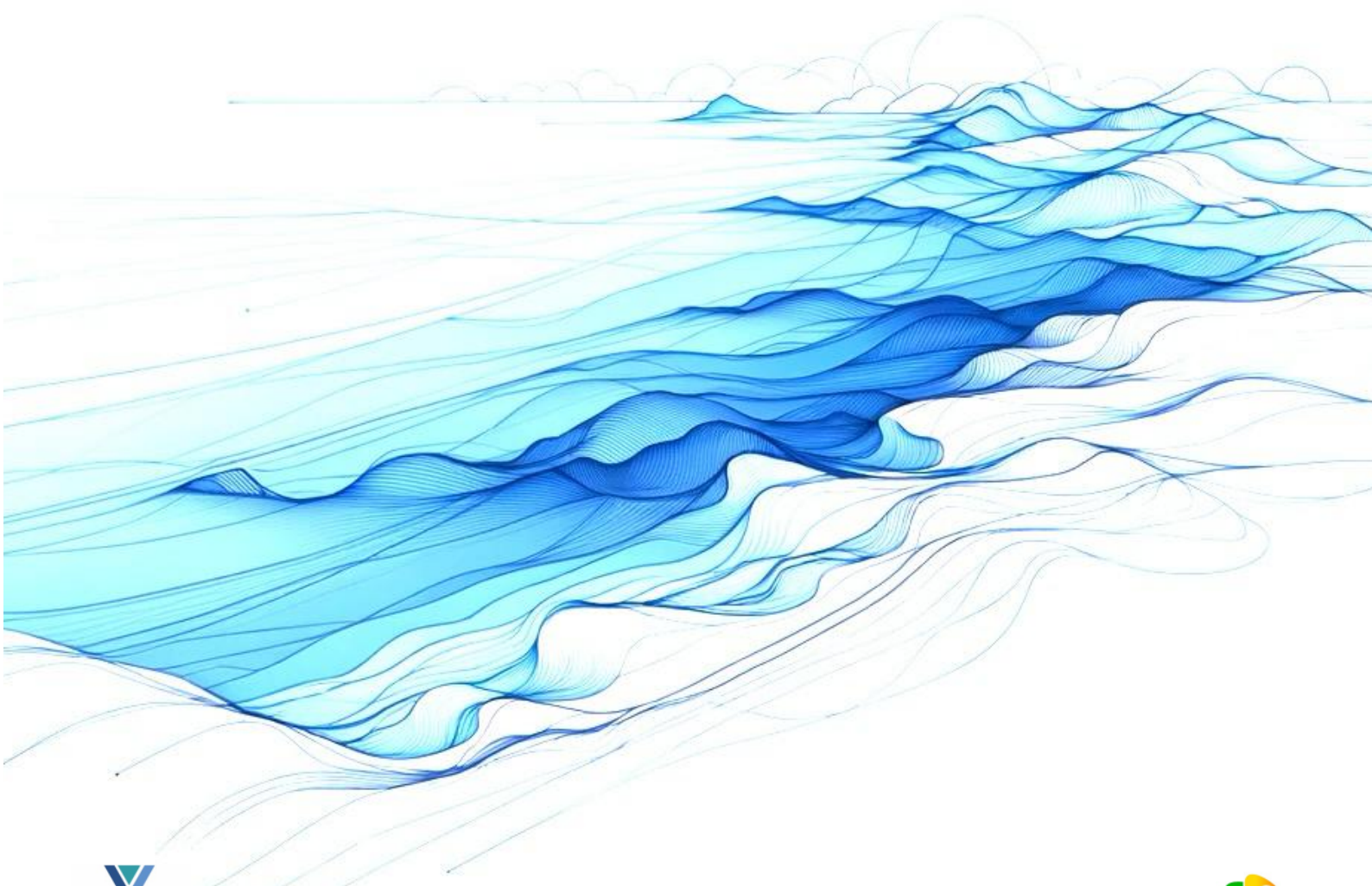

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Table of Contents

1 Introduction **4**
1.1 Purpose and Scope 4
1.2 Consultation in Preparation of the EP 4
1.3 Modifications Arising from Further Assessment 5
2 Aspect – Underwater Sound **6**
2.1 How the Aspect Occurs 6
2.2 Extent and Duration of the Aspect 6
3 Cause-Effect Pathway **7**
4 Description of the Existing Environment that may be Affected by the Activity **8**
4.1 Regional Oceanography 8
4.2 Krill - *Nyctiphanes australis* 10
4.3 Upwelling and Productivity 11
4.4 Bonney Coast Upwelling Key Ecological Feature 12
4.5 Marine Flora 13
4.6 People and Communities 13
4.6.1 Social and Economic Features 13
4.6.2 Cultural features 13
5 Relevant Legislative Requirements **14**
6 Defining Acceptable Levels of Impact **15**
7 Consultation Input **18**
8 Minimisation of Impacts Through Activity Design **19**
8.1 Elimination 19
8.2 Substitution 19
9 Predicted Levels of Impact **21**
9.1 Change in Fauna Behaviour and Physical Condition 21
9.2 Measures Adopted to Manage Environmental Impacts 25
10 Demonstration Impacts Will Be of an Acceptable Level **26**
10.1 Principles of ESD 26
10.2 Economic, Cultural and Social Categories 27
10.3 Consistency with Company Processes 28
11 Environmental Performance Outcomes **29**
12 Recommendations **31**
13 Document Control **32**

14 References **33**

Annex 1 **37**

Public Comment 37

Annex 2 **38**

Objections and Claims Raised from Consultation 38

1 Introduction

Underwater Sound was identified through the Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4) as an environmental aspect needing further assessment. Hence this document presents a detailed examination of **Underwater Sound**, as will typically be produced during the proposed Regia Marine Seismic Survey (**Regia MSS**), and its interaction with the environmental receptor we are collectively calling **Plankton.**

This assessment is built on the information contained in the following four core studies, which should be read in the order they are listed:

1. PEIRA
2. Seismic Sound Studies Report (Appendix B8)
3. Sound Emissions Initial Modelling Report (Appendix B7)

1.1 Purpose and Scope

The purpose of this document is to assess all acceptable sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document was initially published in draft form and uploaded to the Document Library of the Regia MSS Consultation Hub on 11 September 2023 as a stand-alone document, rather than as part of the much more substantial total EP document. This was done to maximise the ability of interested members of the public to read, interpret and respond within the mandated 30-day public comment period.

As such, public and Relevant persons were invited to comment on the document with an explicit request for feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

1.3 Modifications Arising from Further Assessment

To ensure this environmental assessment remains contemporary, accurate, and reflects feedback from the regulator and relevant persons, this document will be updated from time-to-time. In particular, the CGG environmental assessment process requires consideration of whether further assessment was needed to verify, or dive deeper into a topic, to further improve the predictive quality of the assessment. When this has occurred, reference to such changes will be communicated in the Recommendation section and identified at relevant points in the assessment.

2 Aspect – Underwater Sound

2.1 How the Aspect Occurs

The primary sound source will be impulsive underwater acoustic emissions coming from the seismic source releasing compressed air (seismic pulse) and creating a sound wave directed downwards towards the seabed.

Secondary sound sources will include continuous underwater acoustic emissions generated by the survey and support vessels and helicopters. Sounds from vessels are generated by thrusters, engines, and propellers. Underwater acoustic emissions from helicopters are generated via the engine and rotors. Underwater acoustic emissions from Ultra-Short BaseLine positioning are generated within the streamer spread.

An overview of underwater sound and studies relevant to seismic is in Appendix B8.

2.2 Extent and Duration of the Aspect

Impulsive Sound

Duration: 60 days

Extent: Active Source Area + 740 m based on the furthest distance to modelled sound effect criteria. [Updated in response to Matter: F17]

The seismic source will only be active in the Active Source Area.

Continuous Sound

Duration: 90 days

Extent: Operational Area

The survey and support vessels and helicopters will be active in the Operational Area for the duration of the survey undertaking support activities and acquisition.

3 Cause-Effect Pathway

The PEIRA identified a cause-effect pathway for underwater sound for the following environmental components and their social, cultural, and economic features:

- Plankton.
- People and communities.

Potential environmental impacts to plankton identified from the PEIRA are:

- Change in fauna behaviour.
- Change in physical condition.

There is no scientific information on the potential for underwater sound impacts on phytoplankton and no cause-effect pathway has been established. Thus, the impact assessment focuses on impacts to zooplankton from seismic sound emissions.

In addition, there is no scientific information on the potential for continuous underwater sound impacts to plankton and no cause-effect pathway has been established. Thus, the impact assessment focuses on impacts from impulsive (seismic) underwater sound to zooplankton.

From relevant person consultation, commercial fishers have raised concerns in relation to impacts to commercial fish and invertebrate spawning and recruitment. The assessment of impacts to commercial fish and invertebrate spawning and recruitment is covered by species in the underwater sound Impact assessment sections for invertebrates and fish.

From relevant person consultation, concerns have been raised in relation to impacts to zooplankton, particularly the copepod *Nyctiphanes australis*, generally called krill, which is an important component of the upwelling and productivity systems within the Survey Operational Area. These concerns are assessed in this section.

4 Description of the Existing Environment that may be Affected by the Activity

For a description of the baseline soundscape in the region relevant to the Regia MSS, refer to Section 1.1 of Appendix B8. Plankton is a collective term for marine organisms that are unable to swim against a current. This group is diverse and includes phytoplankton (plants) and zooplankton (animals).

Plankton is a key component in oceanic food chains and supports nearly all marine life and is the dominant biomass of marine ecosystems (CSIRO 2015). The carrying capacity of marine ecosystems (the biomass of fish resources) and recruitment of individual stocks is strongly related to plankton abundance, timing, and composition.

Plankton communities are highly diverse, with members from almost all phyla. Phytoplankton are the [plant] base of this community, capturing energy through photosynthesis while drifting with the ocean currents. They are grazed by zooplankton which are comprised of meroplankton which spend only the early part of their lives in the plankton (e.g. larval stages of jellyfish, molluscs, invertebrates, and fish) and holoplankton, such as copepods, chaetognaths and salps, which spend their entire life as zooplankton (White 2018).

The small sizes, short lifespans and high abundances of zooplankton enables fast rates of production and turnover of populations. It is advantageous to grow and multiply quickly to maximise access to phytoplankton resources when they become available (White 2018). Zooplankton are the key trophic link converting primary production into a food source for fish, such as sardines, which in turn are consumed by top predators such as tuna, shark and dolphins.

Watson and Chaloupka (1982) reported a high diversity of zooplankton in eastern and central Bass Strait, with over 170 species recorded while Kimmerer and McKinnon (1984) reported only 80 species in their surveys of western and central Bass Strait.

CSIRO's Australian Ocean Data Network which is a primary resource for marine science data does not contain any data collection points within the Active Source Area. The closest data points, located south of Wilson's Promontory, show that zooplankton samples taken at these sites from 2011-2020 contained copepods, appendicularians, chaetognaths, decapods, thaliaceans, cladocerans, amphipods, cirripedes and mysids with copepods the most abundant group in the samples. Surveys of the Eastern Great Australian Bight also highlighted the dominance of copepods in the zooplankton community (Van Ruth & Ward 2009).

4.1 Regional Oceanography

The two dominant features of the ocean along the southern Australian margin are a warm mixed-surface layer that is underlain by cooler Antarctic Intermediate Water (AAIW). The mixed surface layer flows in a generally east-southeast direction and is known as the Leeuwin Current off west Australia, the Coastal Current off South Australia and Victoria, and the Zeehan Current off west Tasmania. An underlying counter current of AAIW flows in a generally north-westward direction at a depth of about 400-600 m, extending to depths ranging from 500-1500 m (Wood and Terray 2005, Kampf 2024). This is known as the Flinders Current off western Tasmania, western Victoria and South Australia, and the Leeuwin Undercurrent off west Australia (Middleton and Cirano 2002). This is a perennial subsurface slope current and feeds into shallower shelf circulations during summer as wind from the southeast forces the mixed surface layer offshore and triggers a compensatory upwelling of AAIW from greater depths (Kampf 2024, Levings 2025). This currents role in the regional upwelling system includes the transportation of nutrient-rich, sub-Antarctic slope water westward along the continental slope (Kampf 2024). This upwelling, particularly along the Otway Shelf, influences water temperature and nutrient availability, linking to events like the Bonney Upwelling off South Australia.

Analysis of temperature, salinity, and nitrate data for western Victoria described by Levings (2025) showed distinct stratification of the water column over the shelf in the summer. The constant nature of salinity values ranging from 80 m – 200 m, <14.0°C, and the accompanying nitrate values, indicated the water was reheated Antarctic Intermediate Water (AAIW). Hence summer water at temperatures of <14.0°C was upwelled AAIW and measurement of temperature alone was sufficiently robust to investigate for linkages between the Bonney Upwelling off South Australia and the shelf waters of western Victoria.

Langmuir Circulation is a type of wind-driven surface current that occurs on a smaller, localised scale in regions exposed to high-speed winds traversing unidirectionally. Under the strong winds water flows in a series of "Langmuir cells", each of which can be several meters in depth and width. Adjacent cells rotate in opposite directions. Therefore, the overall direction of these cell systems within the Langmuir Circulation process is the same as the wind direction, the rotation of these cells is typically perpendicular to the wind direction. Regions of divergence and convergence between cells also result in upwelling and downwelling formations (Figure E2 - 1). The velocity within Langmuir cells may be in the order of 30cm/s-1 (G Cresswell, described by Levings 2025). This process creates rotating water patterns that transport nutrients and debris, affecting local ecosystems, and further contributing to the oceanographic complexity on a regional scale.

Australia's southern shelves are subject to a seasonal upwelling system known as the Great Australian Coastal Upwelling System (GSACUS) which occurs seasonally during November to April. This system is comprised of three distinct upwelling centres; one of which is the Bonney Upwelling which extends spatially from Cape Nelson to Cape Jaffa (Kampf 2024). Upwelling refers to physical processes that lift or entrain subsurface water into the eutrophic zone, where it can trigger autotrophic phytoplankton production if nutrient limitation is overcome (Shute et al. 2022). Upwelling in this region is catalysed by seasonal prevailing south-westerly coastal winds. Both the South Australian Current (south-eastward flowing) and north-eastward coastal currents also contribute to the surface circulation of water in the region during the austral summer months (Kampf 2024).

Wood and Terray (2005) present findings from a study conducted approximately 40 nautical miles off the coast of Portland, Victoria where data on wave and current dynamics was gathered in this region of the Otway Basin during the austral winter of 2004 (April to October). Findings from this study included the observed typical wave conditions in the Otway Basin as being long-period, open-ocean swell, with an average wave height of 3.7 meters. The dominant wave directions were identified as coming from the southwest, propagating north-eastward.

Currents at the study site were observed to flow parallel with the slope, either eastward or westward, with easterly flows being the most common. Currents were described as rarely being in the cross-slope, or north-south direction. Currents near the surface were observed as being stronger than those measured in deeper layers. Peak current speeds were recorded as being 2.8 knots near the surface. Current speeds were however observed as being less than 1 knot more than 90% of the time. At 50 meters, peak measured speeds were less than 2 knots while peak speeds were 1.4 knots at 200 meters. In all cases, the strongest currents reportedly flowed eastward. Deeper currents flowed westward typically, especially below 500 meters. Near-bottom currents were affected by local bathymetric relief, but generally flowed downslope (i.e., southward) (Wood and Terray 2005).

Results from Phase I (late autumn, early winter) suggested that currents at the study site could be defined as a two-layer system: the top layer (Coastal Current) flowed eastward while the bottom layer (the Flinders Current) flowed toward the west. The depth interface between these two major current systems appeared to be about 100-200 meters in April, deepening to about 500 meters by late June. Correlations between the upper layer and deeper layers improved during Phase II (winter) of the study when the water column was observed to move in a more uniform manner, with currents near the surface moving in the same direction (generally) as those in deeper layers. It was unclear whether these changes were due to seasonal influences (Wood and Terray 2005).

Deeper currents were most commonly westward, and much weaker typically than those eastward flows nearer the surface. Despite these 'normal' conditions, the study described instances during the six-month study, especially those observed during Phase II (July to October) when the entire water column appeared to flow in the same direction, contradicting the general assumption of two distinct layers. These instances (i.e., when entire water column flowed eastward) was observed as occurring every 30 days on average. Significant variability was also observed with deeper currents, below the eastward-flowing upper layer (the Flinders Current). These deeper layers which were typically observed to flow weakly westward, occasionally reversed to flow to the east (Wood and Terray 2005).

The metocean oceanography of the Otway shelf exhibits complex, seasonal patterns of stratification and mixing, interannual variation, with contributions from diverse locations. Variability of metocean conditions over the Otway Shelf is the subject of ongoing research, to refine understanding of this variability, ecosystem impacts, and climate influences on the region's oceanography.

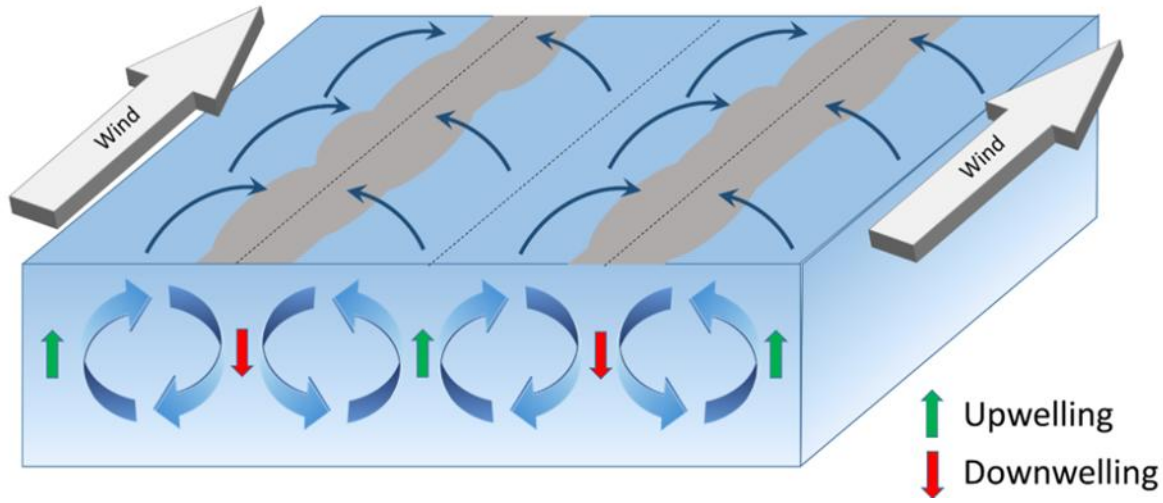

Figure E2 - 1 - Schematic of Langmuir Circulation (Webb 2023).

4.2 Krill - *Nyctiphanes australis*

N. australis is a common endemic coastal species of krill in southern Australian waters and plays an important role in the ecological significance of upwelling events in the area (e.g. the Bonney Coast Upwelling). *N. australis* is one of the most important dietary items for Pygmy Blue Whales, Jack Mackerel, Short-tailed Shearwater, Fairy Prion, Australian Salmon, Skipjack Tuna and Tiger Flathead among other abundant fish and seabirds (Nicol and Endo 1997).

The latitudinal range of *N. australis* in Australian waters extends from 31°S–44°S latitude to 132°E–156°E longitude, reaching their highest abundances in shallow waters of the continental shelf, predominantly during night-time vertical migrations (Hosie 1982). This vertical migration pattern is more evident during summer than winter (July to September), when *N. australis* becomes relatively scarce in the upper water column, even during the night. In southeastern Tasmania, highest abundances are found in summer between the surface and 40 m during the night and 30–100 m during the day; however, it is not rare to observe large numbers swimming ("swarming") at the surface during daytime (Lagos 2021, Gill 2002).

N. australis has one of the highest production-to-biomass ratios, including moulting and egg production, among all krill genera, about 10 times higher than values found for the Antarctic krill species, *Euphausia superba* (Lagos 2021). Production of *N. australis* ranges from 78.3–84.8 mg m^{-3} y^{-1}

(Ritz & Hosie 1982). It also has the fastest growth rate of the *Nyctiphanes spp.* at 40 d (Haywood & Burns 2003 in Lagos 2021).

As detailed in Butler et al. (2002) *N. australis* live ~ 1 year, reach sexual maturity at 3-4 months, with a maximum length of 20 mm and weight of 40 mg and are known to be omnivorous. The species broods its eggs until they hatch rather than spawning them directly into the water column. There is continuous maturation of ova, with an individual female capable of releasing a total of 1100 eggs in a lifetime, which are deposited as a series of batches into a pair of external ovisacs, every 30 days (Hosie 1982).

There is a main peak of spawning from early spring to late autumn, but reproduction continues through all months with as many as three generations produced each year. Continuous reproduction through the year coupled with a high growth rate means that *N. australis* has very high productivity (UTAS 2003). Gill and Morris (2003) noted that surface swarms of *N. australis* were sighted in all months that aerial surveys have been conducted except September, when no surveys were conducted. Sighting covered shelf waters from near King Island to waters 50 km west of Robe, SA.

Krill cannot swim horizontally, which implies that coastal currents are the only means by which krill can appear in the Bonney upwelling region during the seasonal upwelling plumes. These transport route of krill along Australia's southern shelves are currently unknown. Particle tracking conducted in a study by Kampf (2024) suggests that krill swarms are advected northwestward along the narrow continental shelf by the coastal upwelling current and winds, that extend the entire coastline to Cape Otway.

Kampf (2024) suggests that the upwelling current may be too weak in some upwelling seasons to transport krill all the way downstream past Cape Jaffa into the upwelling plume, so it is therefore likely that the largest number of krill swarms remain present in coastal waters upstream from Cape Nelson. This may explain frequent sightings of blue whales in this region. Kampf also notes that the continental shelf becomes narrower from Cape Otway to Cape Nelson, and that this feature supports the funnelling of krill swarms into a narrow, confined stream making it relatively easy for whales to obtain food.

Upwelling-favourable winds in the region have been measured as having a speed of 5-6 m/s (Nieblas et al. 2009). The continental shelf along the Bonney Coast is ~60–100 m in depth. The upper continental slope is relatively steep (up to 1o slope). With a speed of the upwelling jet of ~0.4 m/s (Kampf 2024), it has been determined by Kampf (2025) that it takes 8–10 days for a water parcel to travel along the entire Bonney Coast upwelling region. A key finding from the Kampf (2025) study identified Long Bay as potentially important upwelling shadow, with high zooplankton abundance and a potential region of larvae retention. This pivotal finding offers valuable new insight into the Bonney Coast, identifying a specific region that may serve as a critical zone of heightened productivity for zooplankton in the region.

4.3 Upwelling and Productivity

Upwelling refers to physical processes that lift or entrain subsurface water into the eutrophic zone, where it can trigger autotrophic phytoplankton production if nutrient limitation is overcome (Shute et al. 2022). Phytoplankton are the food source underpinning the trophic structure and flow of energy through marine food webs as they are consumed respectively by zooplankton and these in turn are consumed by larger and larger predators (CoA 2015a).

Each year during summer, a number of well-described coastal upwelling centres develop along Australia's southern coastline off the Bonney coast (Lewis, 1981, Schahinger 1987), the southern tip of the Eyre Peninsula (Kämpf et al. 2004), and the west coast Tasmanian shelf (Kämpf 2015). Upwelling also occurs along the Otway Shelf between Portland and King Island (where the Regia MSS will be undertaken). However, upwelling along the Otway Shelf is primarily sub-surface, with only a narrow

band of surface upwelling inshore during strong upwelling events (Levings and Gill 2010). These sub-areas of upwelling are recognised as components of a unified upwelling system extending from the eastern Great Australian Bight to western Bass Strait/west coast Tasmania and are referred to as the Great Southern Australian Upwelling System (GSACUS) (Kämpf 2004, 2015).

The GSACUS is active during autumn and summer, driving simultaneous upwelling along the Bonney and Otway Coasts (Levings and Gill 2010). Cool upwelled water from depths of 200-400 m is nutrient rich, enhances subsequent upwelling events and leads to phytoplankton growth in the region (Rogers et al. 2013).

4.4 Bonney Coast Upwelling Key Ecological Feature

The Bonney Coast Upwelling (BCU) occurs between Cape Jaffa, South Australia and Portland, Victoria (DCCEEW 2023). It is a productivity hotspot, with high densities of zooplankton including the coastal krill (*N. australis)* which is an important food source for fish, birds and whales.

The BCU is driven by the frequent south-easterly winds which are the result of southern migration of the subtropical ridge (Nieblas et al. 2009, Schahinger 1987), during the austral summer. The upwelling occurs via Ekman dynamics, where the ocean surface experiences a steady wind stress resulting in a net transport of water at right angles to the left of the wind direction which brings cold, nutrient rich water to the sea surface.

The Bonney Coast Upwelling has been shown to follow a clear temporal pattern. When the upwelling season starts during late spring and early summer (November and December), the influence of the BCU was found to be often restricted to the coast. During the mid-summer and early autumn (January to March) when the upwelling is the strongest, the upwelling influence often extends to the shelf break before retreating in April (Huang and Wang 2019).

Gill et al (2011) states that the Bonney Coast Upwelling generally starts in the eastern part of the Great Australian Bight and spreads eastwards to the Otway Basin. At the height of the upwelling during February and March, its area of influence often exceeds 12,000 km^2, while its sea surface temperature anomaly often exceeds 1°C, and its chlorophyll-a concentrations are often >1.5 times adjacent areas (Huang and Wang 2019).

The BCU is one of only two identified seasonal feeding areas for blue whales in Australian coastal waters and is one of 12 known blue whale feeding aggregation areas globally. Sightings of Sei whales and Fin whales in the upwelling indicate this is potentially an important feeding ground for these species also (Gill et al. 2015, Morrice et al. 2004).

The BCU is regionally important as it supports the lucrative local fishing and tourism industry off the Otway towns such as Portland, which annually holds an Upwelling Festival in late October/early November to celebrate the abundance of the Bonney Upwelling, and to begin the summer fishing season (Glenelg Shire 2023).

The Bonney Coast Upwelling is defined as a Key Ecological Feature as it is an area of enhanced pelagic productivity and has high aggregations of marine life (DCCEEW 2023). In addition to whales, many endangered and listed species frequent the area, possibly also relying on the abundance of krill that provide a food source to many seabirds and fish. The high productivity of the Bonney Coast Upwelling is also capitalised on by other higher predator species such as little penguins and Australian fur seals feeding on baitfish (DCCEEW 2023).

The Regia Operational Area overlaps the eastern end of Bonney Coast Upwelling Key Ecological Feature by 1.21 % (Appendix B12 MAP-REG-EPM-003). The Regia Active Source Area does not overlap this KEF. [Paragraph updated in response to Matter E01].

4.5 Marine Flora

In Australia, shallow (<30 m) temperate reefs are defined largely by the distribution of *Ecklonia radiata* kelp forests, which span more than 8000 km of coastline from the subtropical waters of northern New South Wales down the east coast of mainland Australia, around Tasmania, along Australia's southern coastline and north as far as Kalbarri in Western Australia (Bennet et al 2015). Most of Australia's kelp-dominated temperate reefs lie within the 'coastal zone' under state jurisdiction (3 nautical miles or 5.5 km from shore) (Bennett et al 2015). On the south and west coasts of Australia, E. radiata forests typically occur in mosaics of mixed species with large canopy-forming fucoids (e.g. *Cystophora* spp., *Scytothalia dorycarpa*), covering most of the rocky reefs.

Timing of reproduction is variable across its distribution range with seasonal peaks in Western Australia and more continuous reproduction of sori and zoospores in Tasmania. Water temperature is the key driver of reproductive timing but is also influenced by other variables such as wave action. Once *E. radiata* zoospores are released, they have the ability to swim for at least 24 h (although they often do so for only 1–2 h), until they settle onto the substratum and germinate into male or female gametophytes. *Ecklonia radiata* can disperse via three modes; zoospores, sperm and detached fertile drift material. Population genetic studies on *E. radiata* using neutral microsatellite markers (Dolman & Coleman 2009, reported in Wernberg et al 2019) have identified that genetic structure around the Australian continent is weak, suggesting widespread gene flow that is mediated by the strength and direction of prevailing ocean boundary currents. Such strong connectivity should imbue considerable resilience on this species; however, climate change is operating at such a large scale that warming temperatures are negatively affecting kelp across its entire range.

Due to the depths associated with the Survey Acquisition Area, with no discharge of the sound source at full power to occur in water depths less than 50 m, impacts on larger plants and nearshore planktonic phases arising from the activities associated with the Regia MSS are not anticipated. There is no scientific information on the potential for noise-induced effect in macroalgae and no functional cause-effect relationship has been established. Therefore, impacts from acoustic disturbance on macroalgae/ marine flora, or associated cultural values has not been considered further.

It is understood there is potential for kelp in shallower, more coastal areas to be impacted in the highly unlikely event of a marine oil spill, and a detailed description of kelp, its cultural and seaweed industry value, and risks to kelp associated with a spill are detailed in EP Appendix D4 (Accidental Release of Fuel).

[Section added in response to Matters: E09, E10 and FN06].

4.6 People and Communities

4.6.1 Social and Economic Features

During consultation, as presented in Annex 2, objections and claims were raised regarding how impacts of the Regia MSS on plankton and the Bonney Upwelling could affect the reputation, health and function of the local ecosystem. These receptors are assessed below in Section 9.

4.6.2 Cultural features

The Bonney upwelling, where cold, nutrient-rich waters rise to the surface, is a key element in this ecosystem, boosting phytoplankton populations that sustain many species culturally important to the Gunditjmara (GMTOAC, 2023)

Kelp forests, home to giant and bull kelps, are identified as culturally significant to the Wadawurrung People as habitats and food sources for species with cultural values, including rock lobster and abalone and their ability to be used to create water carriers (WTOAC, 2020)

5 Relevant Legislative Requirements

CGG has considered all the relevant legislative requirements, conservation management and recovery plans for species of plankton that may be affected (see Appendix B3). No measures were identified from this process.

6 Defining Acceptable Levels of Impact

To define acceptable levels of impact to plankton, zooplankton, and krill sound exposure guidelines for eggs and larvae have been used by CGG from the American National Standards Institute (ANSI) accredited report of Sound Exposure Guidelines for Fishes and Sea Turtles (Popper et al. 2014).

The sound exposure guidelines from Popper et al. (2014) are based on references and studies on potential impacts of noise emissions on fish eggs and larvae prior to 2014. Results presented in Day et al. (2016b) for embryonic lobsters and Fields et al. (2019) for copepods align with those presented in Popper et al. (2014), which is that mortality and sub-lethal injury are limited to within tens of metres of seismic sources. Additionally, the Popper et al. (2014) sound exposure guidelines are extrapolated from simulated pile driving signals which have a more rapid rise time and greater potential for trauma than pulses from a seismic source.

For eggs and larvae, the sound exposure guidelines provide sound exposure metrics for:

- Mortality and potential mortal injury: Popper et al. (2014) suggests that injury to larvae resulting from seismic impulses may occur for sound exposures above 207 dB PK or above 210 dB SEL_{cum}. However, Popper et al. (2014) suggest that recoverable injury and TTS is likely within tens of metres of a seismic source, which is generally less than the distance associated with their proposed mortal injury threshold, hence there is some discrepancy. The threshold proposed for mortal injury is derived from pile driving impacts to fish and is likely to be conservative. The body of literature indicates that mortality and sub-lethal injury are limited to within tens of metres of seismic sources.

Within these sound exposure guidelines, there was insufficient data to make a quantitative guideline for:

- **Recoverable injury:** There are few studies to base criteria on, however, Popper et al. (2014) provides acoustic criteria extrapolated from simulated pile driving signals which have a more rapid rise time and greater potential for trauma than pulses from a seismic source. Popper et al. (2014) does not recommend a timeframe for cumulative sound exposure levels and thus 24 hrs has been used as is current industry practice.
- **Temporary threshold shift (TTS) in hearing:** There are currently no acoustic criteria for plankton, fish and invertebrate eggs or larvae, however, a scale of relative risk is provided
- **Behaviour / Masking:** There are currently no acoustic criteria for plankton, fish and invertebrate eggs or larvae, however, a scale of relative risk is provided in Popper et al. (2014). The scale assumes that a behavioural response is possible.
- For these impacts, a subjective approach of 'relative risk' (low, moderate, and high) is used to assess risk at three distances from the seismic source (near - tens of metres, intermediate - hundreds of metres, and far - thousands of metres)

Natural mortality rates within the plankton are variable but usually high, across all taxa (e.g. Garrido et al 2015). Estimates can range all the way from very little to as high as >99% (see review by Vaughn et al. 2010). Despite this level of mortality adult populations survive and thrive under natural conditions, indicating that such high mortality levels in the plankton are not an impediment to population persistence. Any potential mortality to planktonic communities from seismic needs to be assessed against this background mortality.

CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that assessment specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, Table E2-1 shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding assessment specific defined acceptable levels established for this assessment. This sets the foundation for relevant and targeted demonstration later in this assessment. [1]

Table E2-1 - General and Assessment Specific Defined Acceptable Levels

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	Sound exposure to plankton communities does not compromise ecological integrity of the pelagic food web. Plankton communities should not be exposed to sound exposure levels of >210dB $SEL_{cum24hr}$ over a spatial or temporal scale likely to result in significant disruption to population dynamics.	Plankton communities are a critical component of marine ecosystems, forming the base of the food web and driving nutrient cycling. Although some individual plankton proximate to the sound source may experience lethal effects, acoustic impacts must not alter community structure or productivity. Maintaining ecosystem integrity ensures broader ecological functions are protected. Scientific literature (Popper et al 2014) and modelling (Appendix B7) conservatively indicate that levels above 210 dB $SEL_{cum\ 24hr}$ cause mortality or sublethal effects in plankton. This threshold represents the onset of ecologically meaningful harm and is a scientifically robust benchmark for assessing acceptability. The threshold can be modelled to understand the distance ranges at which mortality or mortal injury occur.
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	Reflects Commonwealth and State policy objectives for sustainable resource use and protection of ecosystem services.

[1] Note: The acceptable levels related to demonstrating ALARP and the adoption of specific measures to ensure the effectiveness of control measures can be found in Appendix F2 and B3 respectively. As they are criteria integral to the acceptance of the Environment Plan, and they are documented elsewhere, these criteria are not discussed further in this assessment.

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	This level reflects the principle of maintaining cultural values and heritage as protected under national and state legislation. It ensures that activities do not interfere with traditional practices, spiritual connections, or ongoing access to culturally significant areas.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons. The views of public have been considered in the impact and risk assessment.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	This level reflects broader social licence to operate, ensuring that environmental activities do not lead to degradation of public amenity, loss of recreational use, or impacts to non-Indigenous heritage values. It aligns with Commonwealth policies promoting public access, well-being, and sustainable use of the marine environment.
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Impacts Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of impact could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of underwater sound, elimination involves removing the source of underwater sound or preventing its generation in the first place. Two main options were considered and subsequently adopted:

No discharge of sound sources within the Bonney Upwelling KEF

The activity design explicitly excludes any sound source discharge within this sensitive ecological area, thereby preventing disturbance to the unique assemblages and biodiversity it supports. Discharging sound sources in this region could disrupt plankton populations by causing increased mortality rates or altering their distribution, which could have cascading effects on the broader marine ecosystem. By prohibiting any sound source discharge within this KEF, this measure ensures that the region's high ecological value is maintained and that the biological processes dependent on plankton productivity remain undisturbed during this key period of productivity in the region.

No petroleum activity to be carried out between 1 January and 15 September. The elimination of sound discharge during these months helps to protect plankton populations at their peak productivity levels, reducing potential mortality and ensuring that the full extent of their role in nutrient cycling and energy transfer remains intact. Additionally, this measure aligns with stakeholder concerns regarding the protection of the region's biodiversity during critical upwelling events, such as the Blue Whale which is known to utilise this upwelling as a key seasonal feeding site.

The sound source will not be discharged at full power while stationary

A stationary sound source at full power would potentially lead to repeated exposures above predicted levels of impact to plankton. Whilst is it operationally unplanned that the sound source would remain active whilst the seismic vessel is stationary that does not mean it couldn't occur. That also make this commitment somewhat easier to make and it provides a clear reduction in impact for no cost.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the impact. Two main options were considered and subsequently adopted:

Sound will not be emitted above the stated capacity

Underwater sound emissions are a key concern for plankton, as exposure to high-intensity sound waves has been linked to increased mortality, particularly in larval stages. By ensuring that sound emissions remain within predetermined capacity limits, this measure ensures that the effects on plankton remain below the levels predicted by acoustic modelling. Limiting sound intensity also reduces the likelihood of disrupting plankton distribution patterns, which is critical for maintaining local food web stability. This option ensures that the effects of sound emissions remain within predicted and acceptable limits, ensuring compliance with environmental standards.

Data acquisition will follow along the 293°/113° azimuth orientation

The orientation of data acquisition was initially set to optimise for geophysical data needs and minimise the duration of the survey (due to costs). There was some feedback from relevant persons that the survey orientation should also be optimised for reduced impacts to plankton due to current speeds in the area and the Richardson et al (2017) suggestion to conduct surveys into or across prevailing currents would result in fewer exposures for individual plankters. CGG's analysis of ocean currents could not corroborate the claims of relevant persons about current speeds and directions. Indeed, the Otway is a confluence of ocean currents with currents running in different directions at different depths, as well as rotating the prevailing direction seasonally. As such, any orientation of the survey would have similar impacts to plankton as other orientations. That isn't to say that a fix orientation isn't required. A fixed orientation is necessary for efficient acquisition, predictability of movements for other marine users, and to ensure impacts are within predicted parameters. As a result, the survey will be undertaken along the 293°/113° azimuth in alignment with the modelled parameters. In previous versions of the EP this was stated as being 130° as an angle from the horizontal. This phasing is less precise than is necessary for marine operations.

9 Predicted Levels of Impact

To arrive at the predicted levels of impact of underwater sound on plankton at this stage in the process requires the reader to have assimilated all prior relevant information that has been assessed on plankton. The EP documentation is coded alphabetically to guide the reader through what is a natural process of temporal accumulation and review of evidence. The following documentation forms the evidence lineage for predictions on plankton as described here.

- B7 – Sound Modelling Reports SLR performed a numerical modelling study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic impacts on key regional receptors including plankton along with marine mammals, fish, turtles, benthic invertebrates, and recreational divers and swimmers. Acoustic thresholds derived from this document are used to guide assessments of impacts.
- B8 – Seismic Studies Report – This report provides a detailed assessment of the scientific literature related to sound (and specifically seismic) effects on plankton and other fauna. This literature is the key evidence base from which impact levels are derived.

Therefore, all species, taxa or groups identified have been assessed through the framework provided by B7 and B8. Because of commonalities among species/taxa/groups in their sensitivity to seismic it is not always necessary to describe effects to each species individually but rather as groups defined by their sensitivity to different frequency levels of sound and shared life-history behaviours.

9.1 Change in Fauna Behaviour and Physical Condition

As detailed from the underwater sound and studies relevant to seismic surveys (see the Regia MSS Seismic Studies Summary available in Appendix B8), mortality and injury to plankton has been identified from seismic source sound emissions for individuals within proximity to the seismic source. This can have direct impacts to plankton including krill, fish and invertebrate larvae and indirect impacts to receptors that feed on plankton and recruitment of fish and invertebrate species.

The extent of the area of impact is predicted to be a maximum of 740 m from the sound source during survey acquisition

The predicted effect level on these species is assessed as minor, meaning impacts to plankton are predicted but they will be localised and temporary, with the system having the capacity to recover from the impact in a timescale of days to months given the following:

- Phytoplankton and zooplankton biomass in the oceans varies significantly at spatial scales ranging from hundreds of metres to hundreds of kilometres, and temporal scales of hours, days, seasons and inter-annually, due to tidal and large-scale currents, bathymetry, temperature, salinity, water chemistry parameters and other environmental factors (Gibbons & Hutchings 1996; Holliday et al. 1987; McKinnon et al. 2008; Pearce et al. 2000; Sutton & Beckley 2017). Thus, plankton will be spatially and temporally variable throughout the seismic survey and it follows that predicted impacts will not be ubiquitous to all plankton present within the Active Source Area.
- No impacts to phytoplankton are predicted so they will remain available for zooplankton and other fauna to graze on.
- Zooplankton do not have hearing structures (although they can sense pressure changes) and their bodies are generally the same density as the surrounding water so sudden pressure changes associated with seismic activity are presumed to not cause physical damage (Parry & Gason 2006).
- The Working Group on the Effects of Sound on Fish and Turtles (Popper et al. 2014) detailed (a) there is a low relative risk of plankton experiencing masking impacts at all distances from the seismic source (b) a moderate risk of recoverable injury from TTS behavioural impacts near (tens

of metres) to the seismic source (c) a low risk of TTS impacts at intermediate or far distances from the seismic source (Table E2-51).

- Any potential mortality or permanent injury effects to plankton must be assessed in the context of natural mortality rates. Mortality and/or mortal injury impacts to plankton assemblages (including fish eggs and larvae) resulting from seismic surveys are likely to be inconsequential relative to natural daily mortality rates, which can range from 11.6% (average minimum) to 59.8% (average maximum) as reported by Tang et al. (2014). Mean mortality rates for marine fish larvae have been assessed as equivalent to 21.3% per day (Houde and Zastrow 1993). In the experiment undertaken by McCauley et al. (2017) zooplankton mortality rate background levels were 19%. Thus, predicted impacts to zooplankton from the seismic survey are likely to be well within natural mortality rates.
- Sætre and Ona (1996) calculated that under a 'worst-case' scenario, the number of larvae killed during a typical seismic survey was 0.45% of the total population, and they concluded that mortality rates caused by exposure to the seismic source were so low compared to natural mortality that the impact from seismic surveys must be regarded as insignificant.
- Zooplankton have rapid recovery rates given their life-history characteristics as described earlier (e.g. Huntley and Lopez 1992, Richardson et al 2017). Richardson et al. (2017) modelled the spatial and temporal impact of a seismic survey on zooplankton on the North-West Shelf from a large-scale seismic survey, considering the mortality estimates of McCauley et al. (2017), and accounting for typical growth rates, natural mortality rates, and the ocean circulation in the region. Their results illustrated:
  - Simulations that included ocean circulation showed that the impact of the seismic survey on zooplankton biomass was greatest in the Survey Region where 22% of the zooplankton biomass was removed, while declines moving to the Survey Region + 15 km were 14% of the zooplankton biomass was removed, and when moving out to the Survey Region + 150 km only 2% of the zooplankton biomass was removed. There was no discernible regional-level effect on the entire Northwest Shelf Bioregion. The time to recovery (to 95% of the original level) for the Survey Region was 39 days (38-42 days) after the start of the survey and 3 days (2-6 days) after the end of the survey.
  - Simulations with no ocean circulation showed a much greater impact of the seismic survey on relative zooplankton biomass with 35% of the zooplankton biomass removed for the Survey Region, 22% for the Survey Region + 15 km and 3% for the Survey Region + 150 km. Nevertheless, there was still no discernible effect on the entire Northwest Shelf Bioregion. The time to recovery for the Survey Region from the start of the survey was 64 days (49-100 days) and from the end of the survey was 26 days.
- Though the modelling by Richardson et al. (2017) was done for the North-West Shelf the outcomes provide a reasonable proxy as to the impact and recovery of plankton to a seismic survey in the Otway. Average current speeds within the Otway are within those for the North-West Shelf with the maximum Otway current speed higher than for the Northwest Shelf[2]. Water temperatures are colder in the Otway but during upwellings there is significantly more nutrients to fuel plankton growth. Applying predicted impacts from the Richardson et al. (2017) modelling to a seismic survey in the Otway could result in a loss of zooplankton biomass ranging from 22 – 35% with recovery within 3 to 26 days from the end of the survey. Even under the worst-case scenario of no ocean circulation mortality rates for the whole survey fall within the daily mortality rates of 11.6% (average minimum) to 59.8% (average maximum) as empirically derived by Tang et al. (2014).

[2] RPS (2019) details for Otway monthly average surface current speed was 0.16 to 0.25 m/s, maximum surface current speed ranged between 0.60 m/s and 1.22 m/s, and sea surface temperatures ranged from 13.3°C to 18°C. RPS (2019a) details for Scarborough on the North-West Shelf monthly average surface current speed was 0.4 to 0.26 m/s, maximum surface current speed was ~0.70 m/s, and sea surface temperatures ranged from 15°C to 29°C.

- Tang et al. (2014) examine the role of non-predatory mortality in zooplankton populations and its implications for ecosystem processes, with some relevance to open water systems. The study reveals that a significant proportion of zooplankton mortality results from non-predatory factors such as senescence, environmental stress, parasitism, and food quality, rather than just predation. In open water systems, where large-scale physical processes like currents, stratification, and turbulence govern ecosystem dynamics, the sinking and decomposition of zooplankton carcasses contribute substantially to vertical carbon flux. This process plays a critical role in the biological pump, affecting nutrient cycling and microbial production. The findings highlight the potential for significant carbon sequestration through zooplankton carcass deposition, particularly in deeper offshore regions where carcass retention in the water column is influenced by stratification. Additionally, in highly dynamic open water systems, turbulence and mixing can prolong carcass suspension, delaying their contribution to benthic food webs. This is relevant to the Regia MSS because any increase in mortality from seismic exposure would not necessarily remove energy from the food web but may instead alter the timing and location of energy transfer, such as via delayed sinking or scavenger consumption.

  However, the paper has some limitations with fewer direct observations from large oceanic systems than close marine systems. The study's reliance on staining methods and sediment traps introduces uncertainty in mortality estimates. Additionally, while it discusses climate change impacts, it does not directly address anthropogenic stressors, such as underwater seismic sound, which may further influence zooplankton mortality in open ocean environments. Nevertheless, the high baseline mortality rates reported in the study (ranging up to 59.8% daily in some taxa) provide a valuable benchmark for contextualising the small-scale, localised mortality estimated from seismic activity, supporting the conclusion that predicted impacts from the Regia MSS remain within natural variability.
- From a bioregional perspective, the area where zooplankton may be impacted (assessed on the most conservative areal basis) is localised within the Active Source Area and represents <1% of the Otway bioregion. In addition, there are no recorded significant upwelling zones within the Active Source Area.
- Richardson et al (2017) notes that zooplankton communities can begin to recover in number during a seismic survey, such that a continuous decline in zooplankton throughout the seismic survey is unlikely and parts of the Active Source Area would be replenished with zooplankton as the survey progresses.
- Predicted impacts to zooplankton, including krill, do not remove them from the food web and as such the nutrients and energy they contain are retained within the ecosystem. Even after plankton die, their carcasses remain in the water column for several days where they remain available for scavengers before any remaining carcasses sink to the seafloor to be consumed by opportunistic benthic organisms (Kirillin et al. 2012, Tang et al. 2014, Dubovskaya et al. 2015). Thus, tangible impacts to primary production and ecosystem function are not predicted.
- While the upwelling season provides the greatest concentration of krill in a defined area, krill swarms are nevertheless prevalent throughout the year and over a broad area as detailed by Gill and Morris (2003) who noted that surface swarms of *N. australis* were sighted in all months that aerial surveys were conducted and that sightings covered shelf waters from near King Island to waters 50 km west of Robe, SA. *N. australis'* main peak of spawning is from early spring to late autumn, but reproduction continues through all months with as many as three generations produced each year (UTAS 2023). Continuous reproduction throughout the year coupled with high growth rates results in very high productivity which confers high levels of resilience to any disturbances.
- Long Bay – the location identified in the Kampf (2025) study as being a potentially important upwelling shadow, is several hundred kilometres from the Regia MSS Active Source Area, and is not expected to be impacted by the activity.

- The area of predicted impact overlaps the pygmy blue whale high density foraging BIA. Seasonal aggregation for feeding is associated with the timing of the Great Southern Australian Upwelling System, specifically the Bonney Coast Upwelling and the presence of high concentrations of *N. australis* (Australian Krill). Krill is also an important dietary item for other fauna such as Jack Mackerel, Short-tailed Shearwater, Fairy Prion, Australian Salmon, Skipjack Tuna and Tiger Flathead (Nicol and Endo 1997).
- Mortality or mortal injury effects to krill will be confined to the active seismic area. As noted previously effects will be patchy, and relative to the scale of the foraging grounds and the spatial extent of the upwelling the scale of any impacts will be minor. The upwelling is providing an extremely concentrated food source for the food chain which is effectively super-charging the productivity rates of zooplankton and krill, and by extension increasing their resilience to disturbance. It is an unrealistic assumption that the density of food (e.g krill) and the density of feeding animals is completely filling this niche and therefore any changes will tip the system into an alternate state. Any potential changes to plankton populations will not have any measurable effect on the ability of pygmy blue whales and other species being able to feed on them. Any impacts to krill are likely to be within natural mortalities rates thus not effecting the availability of krill for foraging.
- In Summary, impacts to the Bonney Coast Upwelling KEF and the broader Great Southern Australian Upwelling System, that the Regia MSS overlaps, and the role these upwellings play in ecosystem function and productivity, are not predicted as:
  - An activity limitation has been adopted whereby the seismic source will not be discharged within the Bonney Coast Upwelling KEF.
  - Impacts to the physical upwelling process are not predicted.
  - Impacts to phytoplankton are not predicted and thus they are available to be grazed on by zooplankton and other fauna that increase productivity in the area.
  - Levels of mortality or mortal injury effects to zooplankton will be subsumed by higher natural mortality rates. Plankton communities are patchy in time and space and also highly productive which confers powerful rates of recovery in response to any disturbances not just seismic. Hence, continuous declines of zooplankton throughout the duration of the seismic survey are not anticipated.
  - Mortal injury effects to zooplankton, including krill, will not confer any disadvantage to feeding marine fauna as they will remain available within the water column.

The uncertainty level for impact to plankton is assessed as low based on:

- There are multiple published studies on seismic sound effects to plankton.
- The impact assessment used all available literature and used peer-reviewed published literature to validate report data where possible.
- There are peer reviewed sound effect criteria for fish eggs and larvae.
- There are several published studies on zooplankton and krill that are relevant to the Otway region.
- The body of peer reviewed literature indicates that mortality and sub-lethal injury are limited to within tens of metres of seismic sources.

The predicted level of impact based on the effect (minor) and uncertainty (low) is assessed as low. For plankton the predicted level of impact is beneath levels of perception and/or within normal bounds of variation. Good industry practice (including legislation and standards) has been applied and therefore these impacts are of an acceptable level without further reduction measures being required.

9.2 Measures Adopted to Manage Environmental Impacts

No measures have been adopted because the relevant Activity Limitations were enough to reduce impacts to Plankton Communities to an acceptable level.

10 Demonstration Impacts Will Be of an Acceptable Level

10.1 Principles of ESD

This discussion addressed the principles of ESD, the biological and ecological criteria for demonstrating acceptable levels of impacts to plankton. In the context of underwater sound impacts on plankton biological means impacts to individuals and populations. Impacts to the ecology has been interpreted at impacts to the broader food web and ecosystem as a result of impacts to plankton biology.

Temporary

As described in the impact assessment, Richardson et al (2017) notes that zooplankton communities can begin to recover in number during a seismic survey, such that a continuous decline in zooplankton throughout the seismic survey is unlikely and parts of the Active Source Area would be replenished with zooplankton as the survey progresses. Plankton life cycles generally have a duration of weeks to months (reference), have a very high level of spatial connectivity due to metocean processes (reference). Therefore, impacts to plankton populations are predicted to be temporary and with recovery in weeks to months after seismic noise exposure and consistent with this aspect of ESD.

Reversible

As described in the impact assessment, Richardson et al. (2017) used modelling to demonstrate that the time to recovery for plankton (to 95% of the original level) in a Seismic Survey Region was 39 days (38-42 days) after the start of the survey and 3 days (2-6 days) after the end of the survey. This evidence predicts the impacts to plankton populations is reversible and consistent with this aspect of ESD.

Small scale

As described in the impact assessment, the extent of the area of impact is predicted to be a maximum of 740 m from the sound source during survey acquisition based on underwater noise modelling (Table E2-51-). Given the impacts to plankton are in the dynamic movement of ocean circulation and currents, modelling was used by Richardson et al. (2017) to estimate that impacts could occur up to 150km from the survey area. The scale of this impact is small relative to the size of the broader bioregion (100s of km) and Southern Ocean (1000s of km). The Active Source Area represents <1% of the Otway Bioregion and when the additional 150km from the survey area of impacts to plankton are accounted for, the scale of the impacts is not more than a few percent of the bioregion. Based on this reasoned and supporting evidence, this scale of spatial impact is considered small and consistent with this aspect of ESD.

Natural variation

Modelling conducted by Richardson et al. (2017) on the North-West Shelf shows that even under the worst-case scenario of no ocean circulation, mortality rates for the whole survey fall within the daily mortality rates of 11.6% (average minimum) to 59.8% (average maximum) as empirically derived by Tang et al. (2014). As such, the impact assessment has demonstrated that due to the low level of potential mortality induced by the seismic activity coupled with the inherently high levels of natural mortality and reproduction of plankton populations, that potential impacts will be within natural variation and consistent with this aspect of ESD.

Based on sufficient information

The literature used throughout the impact assessment on plankton is the best available science and is comprised of peer reviewed papers and relevant industry studies. This literature produces the highest level of confidence for a desk-based analysis. All noise impacts have been predicted with validated noise models based on contemporary and local input data.

As described above, the predicted impact to plankton is temporary, reversible and small scale and therefore is not predicted to be serious, or irreversible. Therefore, the impact assessment is considered to have a high level of confidence, is based on sufficient information and consistent with this aspect of ESD.

Activity not inconsistent with EPBC Act

No EPBC Act Management Plans and Recovery Plans exist for plankton. Planktonic organisms are not individually protected under the EPBC Act, and there are no recovery or management plans directly applicable to plankton. However, the assessment considered indirect implications for listed species that rely on plankton as prey or for dispersal. No significant overlap was identified between the small zone of predicted impact and the key habitats or life history stages of EPBC-listed species. The extremely small scale of exposure and high natural variability in plankton availability supports the conclusion that the activity is not inconsistent with the objectives of the EPBC Act.

The Bonney Coast Upwelling KEF is the only relevant KEF to plankton and the seismic survey has been designed to avoid this sensitivity. Therefore, the potential impacts to plankton are considered consistent with this aspect of ESD.Biological and Ecological Categories

Plankton form the base of many marine food webs, but the affected area is extremely small in comparison to natural planktonic variability. The zone of effect comprises a tiny fraction of the local plankton population, and new individuals are rapidly recruited through natural spawning and transport processes. The spatial and temporal scales of disturbance are therefore insufficient to affect population viability or reproductive success of planktonic species. Any biological impacts will be minor and reversible.

While plankton are ecologically critical, their high abundance, rapid turnover, and spatial heterogeneity provide natural resilience to short-lived localised disturbances. No change in ecosystem structure, diversity, or function is predicted attributable to a one-off seismic survey. The zone of sound exposure is too small and transient to result in food web disruption, prey depletion, or changes in predator-prey relationships. As such, no measurable impact to ecological features is anticipated.

10.2 Economic, Cultural and Social Categories

The impact assessment demonstrates that the biological and ecological impacts to plankton are small scale, temporary, reversible and within natural levels of population fluctuations. With such low levels of potential impact, it is not considered possible for there to be economic, cultural or social impacts because of seismic noise impacts on plankton.

As required under the regulations, consultation was conducted as part of the assessment of impacts to economic, cultural and social sensitivities. From relevant person consultation the following objections and claims were made:

- Impact of the survey on the Bonney Upwelling.
- The impacts of the noise on marine ecosystems, can kill zooplankton.
- Seismic blasting will kill zooplankton which have a fundamental role for ecological integrity as food for krill and subsequently krill are food for whales.

However, the seismic survey has been designed to avoid the Bonney Upwelling and therefore impacts to this environmental sensitivity are not predicted to occur. The impact assessment demonstrates that mortality to plankton is possible from seismic noise. However, the level of impact to the biology and ecology of plankton is predicted to be so low that is has been assessed as small scale, temporary, reversible and within natural levels of population fluctuations.

10.3 Consistency with Company Processes

The impact assessment followed the methodology in Appendix B3 and applied defined thresholds for physiological effects to planktonic organisms, particularly mortality and sublethal exposure. For plankton, the level of effect was assessed as minor, the uncertainty as low, and the final predicted impact level as low. The predicted sound footprint was compared with the spatial distribution and reproductive characteristics of plankton, confirming that potential impacts are restricted to a small and transient zone near the source. All mitigation measures consistent with regulatory guidance and good industry practice were incorporated. As no exceedance of thresholds or high-consequence outcomes were identified, the final consequence rating remains within company limits.

This impact assessment has demonstrated that the effect of underwater sound to plankton has a:

- **Predicted level of effect of minor (2).**
- **An uncertainty level of low (2).**
- **Predicted level of impact of low (4).**

11 Environmental Performance Outcomes

CGG is required to set environmental performance outcomes (EPOs) to ensure that impacts are of an acceptable level.

Table E2-2 - Environmental Performance Outcomes and Justifications

Defined Acceptable Level (From Table E2-1)	Environmental Performance Outcome	Rationale
Sound exposure to plankton communities does not compromise ecological integrity of the pelagic food web.	**As a result of complying with the sound source volume and activity limitations, sound emissions will not disrupt the ecological integrity of plankton communities.**	This EPO can be supported through spatial and temporal management of sound exposure through compliance with the activity limitations. Doing so will ensure impacts are within the modelled predictions. This method of monitoring the source of the impact is the only way to determine whether impacts will be of an acceptable level given the conclusion that the nature of the impacts to plankton communities are immeasurable.
Plankton communities should not be exposed to sound exposure levels of >210dB SELcum24hr over a spatial or temporal scale likely to result in significant disruption to population dynamics.	**As a result of complying with the sound source volume and activity limitations, no impacts to plankton communities beyond 740 metres from the sound source.**	This is an appropriate EPO because impacts at these distances are the foundation of the acceptable levels' demonstration and sound discharges can be measured and verified to conform with modelled predictions.
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	**Social, cultural, and economic features are protected, sustaining their value for people and communities.**	As predicted impacts to zooplankton are temporary, reversible, small-scale, and within natural variations in mortality, impacts to primary production and ecosystem function are not predicted.
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		Impacts to the Bonney Coast Upwelling KEF, that the Regia MSS overlaps, and the role these upwellings play in ecosystem function and productivity, are not predicted. Due to the depths associated with the Survey Acquisition Area, with no discharge of the sound source at full power to occur in water depths less than 50 m, impacts on kelp forests arising from the activities associated with the Regia MSS are not anticipated.
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		As predicted impacts to zooplankton are temporary, reversible, small-scale, and within natural variations in mortality, impacts to primary production and ecosystem function are not predicted.

Defined Acceptable Level (From Table E2-1)	Environmental Performance Outcome	Rationale
Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	**The activity is conducted such that environmental impacts and risks remain within the range assessed as medium or lower, with mitigation measures in place and functioning as intended.**	This EPO enables ongoing assessment of effectiveness through internal reviews and operational audits. It provides a clear link between the risk assessment process and implementation strategy, supporting regulatory compliance and continuous improvement without requiring environmental outcome monitoring.

12 Recommendations

For most species/taxa/groups of plankton reviewed, this document provides the final assessment of impacts. However, despite an extensive review of the relevant literature around the effects of seismic on plankton, there has been a high level of concern voiced throughout consultation with relevant persons, around the importance of biodiversity increases associated with summer upwelling events. High levels of engagement on an aspect are a trigger for CGG to undertake additional assessment. In this case looking at the effects of the activity on plankton and spawning in the context of upwelling events. This additional assessment is detailed in Appendix F3 – Further Assessment of Key Values and Sensitivities under Section

- 3.13 Plankton Communities and the Bonney Upwelling.).

It is important to note that F3 is a response to further information requests and/or clarification and not a reflection of any prior assessment being insufficiently thorough. It is a recognition that more explanation and detail was sometimes necessary to better inform all groups involved in the consultation process, including the regulatory authority.

Hence F3 does not provide further assessment on all aspects and values identified through the EP process only those that were identified as

- Having some residual uncertainty about whether impacts or risks were of an acceptable level; and/or
- Contained environmental values and sensitivities (species) of key importance due to their protection status or commercial value; and/or
- Consultation with relevant persons revealed a particular value or sensitivity required further attention and material to support the consultation.

13 Document Control

Date	Revision	Update
6 July 2023	A	Draft prepared for initial comment.
23 August 2023	B	Update based on comments and relevant person feedback.
11 Sept 2023	0	Approved for release on Regia MSS website.
20 Dec 2023	1	EP submission to NOPSEMA.
14 May 2024	2	Review and update following public comment
23 October 2024	3	Updated following NOPSEMA assessment
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
6 December 2025	5	Updated following NOPSEMA OMR 2 Letter

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table E2-3 shows how this feedback has been incorporated into the environmental assessments.

Table E2-3 - Public comment input

Matter	Matter ID	Changes made arising from public comment
Matter: Unacceptable impacts and risks to Marine Parks and protected areas	E01	CGG has considered these claims and has updated figures in Appendix B12 to include distances from operational and activity action zone areas to marine parks, reserves, and KEFs thereby providing further context of separation distances; and has calculated the percentage overlap of the Regia Operational Area with Bonney Coast Upwelling KEF.
Matter: Awareness of, and impacts on marine flora	E09	CGG has considered these claims and has added Section 4.5 to include information relevant to marine flora.
Matter: Risks to seaweed	E10	CGG has considered these claims and has added Section 4.5 to include information relevant to risks to seaweed.
Matter: Impacts on planktonic seaweed	E10 & FN06	CGG has considered these claims and has added Section 4.5 to include information relevant to impacts on planktonic seaweed.
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and the following Activity limitation: to reflect that the sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the safety criterion human health safety criterion for recreational divers, surfers and swimmers along the coastline. CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F1 F3, G1 and G2).

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table E2-4. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table E2-4 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4011	AMCS challenges the claim that sufficient information was used in the impact and risk assessment process, noting that the EIA omitted the study by McCauley et al. (2017), which indicates significantly higher zooplankton mortality over larger distances (up to 1.2 km) than the EIA's stated maximum of 230 meters. The necessity for the precautionary principle is highlighted by statements in Table 1 of the EIA, which notes the lack of studies to establish criteria for mortality and the absence of acoustic criteria for plankton and other organisms. The acoustic criteria used were extrapolated from studies on pile driving rather than seismic surveys. AMCS requests that CGG revise its risk assessment and impact predictions to reflect the limited scientific information available and the findings of McCauley et al. (2017), thereby ensuring the precautionary principle is applied appropriately.	CGG have considered the McCauley et al. (2017) paper and it is not omitted from our assessment. We agree to review and update the EIA in respect of the AMCS feedback to ensure the paper is put in proper context and subsequent changes made in the assessment.	3384
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	4226
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrate to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of	2831

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	
4017	AMCS seeks clarification from CGG regarding the location of the Regia Active Source Area within the Bonney Coast Upwelling Key Ecological Feature and the potential impacts of placing the MSS within this Key Ecological Feature. Information in the draft chapter appears to conduct itself.	Thank you for pointing this inconsistency out. The statement should have been "The Regia Operational Area overlaps the eastern end of Bonney Coast Upwelling Key Ecological Feature. Based on mapping of the Bonney Coast Upwelling frequency by Huang and Wang (2019) the Active Source Area is outside of the Bonney Coast Upwelling Key Ecological Feature." To reinforce our commitment to protecting this KEF we will implement an activity limitation for there to be no acquisition within 300m of the Bonney Coast Upwelling KEF. This distance has been selected as a conservative distance beyond our predicted no effect threshold to plankton.	3384
4018	Any assessment of potential mortality or injury effects on plankton must consider natural mortality rates. However, relying on natural mortality rates is irrelevant, as seismic survey-induced mortality will compound existing natural mortality, thereby increasing overall mortality rates. The Environmental Impact Assessment (EIA) does not acknowledge that this additional mortality could significantly affect plankton reproduction. The continuous nature of the blasting (every 10-15 seconds for 60 days) will likely hinder zooplankton recovery more than indicated in the EIA, which treats seismic-induced mortality as separate from natural mortality. AMCS requests that CGG explicitly evaluate the cumulative and additive impacts of continuous seismic surveys on plankton communities to provide a more comprehensive assessment of their effects on this critical trophic level and overall ecosystem health.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E2 and F3. Contrary to this feedback our intent within the assessment has been to expressly consider the compounding effect that the sound emissions would have on plankton - as it is stated in the quote provided. We have provided references for our application of recovery rates (Huntley and Lopez 1992, Richardson et al 2017) and respectfully request that AMCS provide your references for the claim that "The continuous nature of the blasting (i.e. every 10-15 seconds for 60 days in a row) will affect the ability of zooplankton communities to recover beyond what is presented in the EIA" so that we can consider them.	3384
4029	CGG should release their seismic track line plan for independent review and implement active current monitoring to minimize harm to zooplankton populations, aligning with the ALARP principle.	CGG has agreed to release the sail line plan as soon as the lines have been confirmed, noting that the exact details of the start and stop points of each line may be varied until just before the sail line commences.	5126
4030	CGG's email on September 14 indicated that the project's timing has changed to two separate 3-month windows: April-June and September-November. AMCS is concerned that the December sound speed profile may not accurately reflect the physical conditions during these new survey	We acknowledge this concern and agree that acoustic propagation modelling is the foundation of subsequent analysis. We will complete another modelling report prior to submission to cover the changed timeframes of the proposed survey.	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	periods. Since acoustic propagation modelling is critical for subsequent analyses and for setting thresholds for mitigation measures required for NOPSEMA approval, AMCS requests an explanation of how the December sound speed profile differs from those in April-June and September-November.		
4033	Claim that seismic testing is proven to damage and kill marine life.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1024
4050	Concern about the destruction of smaller sea life and the wounding of larger marine animals due to seismic blasting.	Regia EP has conducted thorough assessments of the literature for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	1669
4051	Concern about the detrimental impacts on marine animals.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1452
4053	Concern about the impact on marine creatures due to noise pollution from seismic surveys.	The titleholder acknowledged the feedback, noting that potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals, are assessed in the Environmental Plan (EP) and can be found in E2, E3, E4, E5, E6, and E7. Measures to minimise adverse impacts on biological receptors are outlined in the EP also and can be found in G2.	3237
4064	Concern raised by the stakeholder regarding the potential damage/kill of marine life due to seismic testing.	Titleholder responded to individual advising that CGG would not propose an activity that would lead to unacceptable impacts to marine life and advised that environmental impact assessments for each aspect of the proposed activity that	1024

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		has the potential to impact marine life were currently being prepared and that they would be based on scientific literature and published shortly for consultation and feedback.	
4066	Concern regarding the potential effects of the proposed activities on zooplankton populations and the subsequent impacts on marine ecosystems.	The only effects to zooplankton come from elevated levels of sound. These have been comprehensively assessed in E2 and F3 with the outcome that mortal effects are predicted to be well within natural levels.	2027
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration by other companies, particularly regarding the sale of seismic data.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	879
4068	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4073	Concerns about impacts both reputational and physical to the region if the activity is allowed.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1244
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4076	Concerns about potential disturbance to the marine environment, including marine parks and areas of Biological Importance.	The titleholder acknowledged this concern and noted that potential impacts to the marine environment including marine parks and biologically important areas as a result of the Regia MSS is assessed in E1 to E9 and F3 of the	2278

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		EP. There will be no activities with Australian Marine Parks. All areas of biologic importance have been identified and assessment in the respective impact and risk assessments.	
4077	Concerns about potential harm to zooplankton, whales, dolphins, sharks, seals, the Bonney Upwelling, rock lobster fishery and other local fishing industries.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	722
4078	Concerns about seismic testing and drilling rigs impacting marine life and fishing activities.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	917
4079	Concerns about the impact of seismic activities on the Bonny upwelling.	The Bonney Upwelling is subject to further assessment in F3 and the values (plankton) of the Key Ecological Feature have been assessed in E2. There are limitations in place to ensure there is no discharge of the sound source within the Bonney Upwelling KEF and the effects to zooplankton are well within natural mortality levels.	2997
4080	Concerns about the impact of seismic testing on various marine species.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	2179
4081	Concerns about the impact on whale habitat, endangered marine life, and commercial fisheries	Titleholder acknowledged this concern and noted that potential impacts to whales and relevant endangered marine species is assessed in the EP Chapters on underwater sound and light (E2-E7, and E9). Any interactions with seismic are mitigated and managed through spatial boundaries and a comprehensive fauna management plan. Advised that control measures to reduce impacts to commercial fishers as a result of displacement are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	4551

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825
4088	Condemns seismic testing, asserting that it is deadly to marine life and unacceptable for ocean ecosystems. Call for a total ban, citing the large number of marine animals harmed by the practice. Argument that the destruction of marine ecosystems and the fishing industry is unjustifiable and express frustration, telling the parties responsible to stop.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	422
4093	Doubted the effectiveness of mitigation measures and believed the reports/information provided were absent of action /intention.	The mitigations applied by CGG are industry standard and comply with government policy. They have been proven to be as effective as reasonably practical for a number of years. The measures adopted to protect species from the aspects of the activity are found in the respective impact and risk assessments.	2830
4096	Environmental Risk: Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artificial light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to	2766

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	
4107	Findings from recent modelling on mitigating risks to zooplankton suggests that designing track lines relative to prevailing currents can significantly reduce damage to zooplankton, contrasting with previous studies that recommended parallel alignment to currents.	This measure has already been adopted as the sail line are planned to occur in line with the prevailing currents. Further, the effects of sound on zooplankton have been thoroughly assessed in E2 resulting in almost no different to natural mortality levels.	5126
4118	Impact on marine animals, which are the livelihood of the community.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4122	Indirect Impact: Changes To Prey Availability: CGG cannot assure that the proposed seismic blasting will not reduce the prey available in the breeding season foraging areas of the Fairy Penguins. Therefore, seismic blasting should be prohibited in these critical areas due to the negative impact it would have on the prey species that the penguins rely on for survival and feeding their young.	We refer you to E - Impact Assessments - E2 – Underwater Sound – Plankton, and F – Decision Making – F3 – Acceptability Assessment - Sections 4.2.7 – Goulds Squid, 4.2.12 – Plankton Communities and Bonney Upwelling, and section 4.2.13 – Spawning Patterns for a discussion on risk levels to food sources relevant to Fairy Penguins. Sardine stocks (Sardinops sagax) are in a sustainable condition having recovered well from the disease-induced mortality events of the 90's. Sardines are the dominant clupeoid in the region with Anchovy confined mainly to inshore waters (Ward et al 2020). Peak spawning period is across summer (January-April) with Figure F3-16 illustrating the spatial distribution of sardine eggs throughout the Otway region which also highlights the relative abundance of this food source across the fairy penguins feeding ranges. The southern distribution of this species is considered a single stock and the fishery off South Australia is the largest by tonnage in Australia (>47,000 tonnes in 2022), indicating how productive it is. Behaviourally, pelagic schooling species such as sardine are highly mobile in space and time which makes them highly resistant to localized and/or transient disturbances. It is also the case that Australia's less-productive pelagic ecosystems mean predators are less dependent on only one prey species and can feed opportunistically across a wider variety of species. This has been seen with dietary examinations of Fairy Penguins who can switch between sardines, anchovies and squid as	5117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		encountered. Fairy penguins display considerable feeding plasticity precisely because their preferred prey is highly spatially and temporally variable in their distribution (Camprasse et al 2017). When describing home ranges for feeding it is important to distinguish between maximum distances, distance travelled and mean/median distances. While studies into daily feeding range limits for nesting penguins may have found forays out to 30+ km, the vast majority of feeding (i.e. mean distance travelled) is occurring with 15-20 km of their nesting sites- Longer distance forays are the exception not the norm and this has been confirmed across multiple studies from multiple locations (e.g. Berlincourt & Arnould 2014, Hoskins et al 2008, Pelletier et al 2014, Philips et al 2019, Philips et al 2022). Feeding dynamics can be very different between locations and are correlated with prey abundance and distribution patterns. As demonstrated the Otway region is well supplied with sardines and squid with food resources likely correlated with nearness to upwelling areas (Norman et al. 2017).	
4123	Insufficient information about potential damage from seismic testing.	The titleholder is confident that sufficient relevant and available information has been used to inform this this EP and to complete a comprehensive assessment of relevant aspects of the activity. Information used based around sound, peer reviewed scientific literature.	4190
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808
4133	Mass destruction of marine populations through the blasting process.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4136	Mention of considerable damage to marine life outweighing the benefits of mapping seafloors for gas drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4145	Opposes seismic exploration claiming it is dangerous to all marine life. Cannot ensure zero risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	427
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high decibel blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making them unacceptable in a whale sanctuary area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	537
4151	Potential cumulative impacts upon species are addressed.	The titleholder responded by informing the stakeholder that the Regia MSS team were currently undertaking the cumulative impact assessment and will ensure that it covers previous and planned seismic surveys within the area and assesses impacts to cetaceans (behaviour, PTS, TTS) and their food source (krill).	653
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4155	Raised concerns about sound levels from the survey and associated effects on marine mammals and other species.	Acknowledged concerns and outlined the predicted effects of sound levels of different species of marine mammals including difference between high and low frequency cetaceans, sound propagation and modelling, and different effect level thresholds. Also outlined the whale management and mitigation measures in place for	3697

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection technology trails, and citizen science program access. Also outlined the effects on zooplankton and the case for acceptability of these	
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4173	Seismic blasting has adverse effects on the marine environment, with critical gaps in understanding the effects on individual species and the marine environment as a whole.	The titleholder responded with an explanation of the information sources used to inform the Regia MSS impact and risk assessments, and explained how these information sources and resulting measures are specific to the potential impact. The titleholder also made reference to documents relevant to this claim within the environment plan (Event ID 4092).	4091
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4179	Seismic sounds have far-reaching effects on the marine environment, causing damage and suffering to species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3237
4180	Seismic testing and gas exploration/drilling pose undeniable risks to marine fauna, flora, ecosystems, local fishing, and tourism industries.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and	2118

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2963
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1659
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663

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4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1665
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4198	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1672

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4199	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2586
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments is covered below in response to concern 6.	2886
4202	Stakeholder objects to the proposed blasting activity due to its detrimental effects on marine ecosystems.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice,	1049

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	
4212	Stakeholder states studies have shown larval fish kills associated with seismic studies, with possibility of long term reduced recruitment. Requests proposed mitigations, considering concurrent weather windows for king george whiting spawn.	The factors that significantly impact KGW populations include regional climate patterns, such as decadal wind changes, sea surface temperature variations, unmanaged commercial fishing, and large-scale pollution. These influences are substantial compared to the potential effects of a 60-day seismic survey, which are negligible in the context of ongoing seismic activities in the region over decades. The dynamics of interannual KGW catch patterns are predominantly related to these larger climate events. Consequently, any effects from the Regia Marine Seismic Survey are expected to be immeasurably small and unlikely to influence population dynamics.	4355
4217	Strong objection to the proposal for 3D seismic blast in the Otway Basin due to harm to oceans and unacceptable environmental impact or risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4218	Strong opposition to seismic testing in the ocean due to its effects on both wildlife and the fishing industry. Individual firmly disapproves of the practice.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	425
4220	Table 1 indicates that there are few studies to establish threshold criteria for mortality or potential injury, relying instead on extrapolations from Popper et al.	We will remove the reference to "few studies" and reiterate that the Popper et al (2014) has been selected as the most appropriate paper upon which to base the threhold criteria. The McCauley et al	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	(2014). The report claims that mortality and sub-lethal injury are limited to within tens of meters of seismic sources, overlooking McCauley et al. (2017), which found a 2-3-fold increase in zooplankton mortality up to 1.2 km from the source. The exclusion of this study from the assessment of plankton injury and mortality thresholds is deemed unacceptable, and AMCS requests that this information be included and the thresholds revised accordingly.	(2017) paper has been considered in the chapter as a whole and it is incorrect to claim its omission from the assessment	
4224	The EIA claims that impacts to the Bonney Coast Upwelling KEF and the broader Great Southern Australian Upwelling System, which the Regia MSS overlaps, are not predicted because the effects on zooplankton mortality are within natural mortality rates. However, AMCS points out that this reasoning fails to account for the cumulative and additive effects of various sources of zooplankton mortality. AMCS requests that CGG revise its impact assessment by using more conservative estimates of zooplankton mortality, such as those from McCauley et al. (2017).	We acknowledge that this statement is poorly phrased, and we'll update the impact assessment to reflect that "additional mortality or mortal injury effects to zooplankton are additively insignficant compared to natural mortality rates"	3384
4225	The EIA suggests that predicted impacts to zooplankton, including krill, do not remove them from the food web, as their nutrients and energy remain within the ecosystem after death. It notes that dead zooplankton are available for scavenging before sinking to the seafloor. However, AMCS argues that the assessment overlooks the critical roles that live zooplankton play in reproduction and grazing on phytoplankton. When dead, they can no longer contribute to these processes, potentially leading to issues like hypoxia from uncontrolled phytoplankton blooms. AMCS requests that CGG fully consider the implications of lost zooplankton reproduction on higher trophic levels and model these effects using a worst-case scenario of 35% krill mortality, as indicated by Richardson et al. (2017). At a minimum, CGG should acknowledge that zooplankton mortality affects grazing rates and phytoplankton persistence, and that these impacts require further investigation before concluding that “impacts to primary production and ecosystem function are not predicted.”	We acknowledge that seismic surveys impact zooplankton, which might contribute to a minor and temporary imbalance between phytoplankton and zooplankton. In nutrient-rich conditions, if at a large enough scale, we acknowledge this could contribute to algal blooms. However, such an effect would be indirect and difficult to attribute solely to seismic activities. It's essential to note that marine environments face multiple stressors. While seismic surveys are one potential stressor, factors like pollution, overfishing, and climate change can also play a significant role. Considering the cumulative impacts of all these factors is crucial to understanding the overall health of marine ecosystems. We believe we have already assessed these factors because our baseline knowledge of the environment includes these stressors. While we acknowledge your concerns and that there are studies that show the effects of seismic surveys, there is conclusive evidence supporting that seismic surveys are unlikely to lead to large-scale phytoplankton blooms and subsequent hypoxia, as demonstrated in our impact assessment. Once again, we have provided our consideration of many papers, including Richardson et al.	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		(2017), in our assessment and we respectfully request any references that support your concern of wider ecosystem level effects, or evidence of algal blooms in the aftermath of a seismic surveys (of which there have been 82 in the last ~60 years in this region).	
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4232	The feedback expresses frustration over repeated seismic blasts in the same area, emphasising the significant environmental impacts associated with these activities. It calls for accountability from NOPSEMA to prevent future occurrences, highlighting the ongoing threat to the environment.	The Regia MSS is targeting areas that have not been surveyed before though we acknowledge there may be some overlap with previous surveys. We have to show that the environmental impacts are short-term, localised, or recoverable and that they are controllable with appropriate measures in place.	2104
4241	The fisher expressed concerns about the adverse effects of seismic activities on the stocks he relies on, indicating that the surveys have negatively impacted fish availability.	This claim was thoroughly assessed both in E3 and in F3. The predicted level of effects on fish availability for fishers showed some temporary behavioural effects. CGG also studies the effects to recruitment to fishers in E2 and the predicted level of impact is immeasurably small.	2026
4249	The largest jig fishery for squid in Bass Strait operates in the depths and area proposed for the project, raising concerns about the impact on squid reproduction.	As stated in the Commercial Fishers Information Sheet, the Southern squid jig fishery has been identified as present in the area and as such has been assessed in the Impact Assessment and in our Acceptable Levels of Impact and Risk document. From this research and assessment, the following mitigation effectiveness was concluded: While the probability of adverse consequences for squid populations from seismic is extremely low it is appropriate to reduce any probability to as low as possible. The timing of peak catches has centred around February/March in the Western Victoria fishery hence avoiding seismic during this period is advisable. Two windows have been identified for the survey to occur, being April – June and September –December, avoiding the February-March period.	3917

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4253	The possible effects to marine life and ecosystems are my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4260	The protection of wildlife in the Otway Basin is directly affected by drilling and seismic surveying.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1901
4263	The recognition of plankton diversity in the proposed OA and EMBA, combined with the lack of comprehensive data for the area, suggests that the precautionary principle should be applied due to the crucial role of plankton in overall ecosystem function.	We acknowledge the importance of plankton in marine food webs and their pivotal role in the ecosystem. While CSIRO's Australian Ocean Data Network might not have specific data points within the Active Source Area, multiple studies have shown that plankton and zooplankton are ubiquitous in marine environments, demonstrating both abundance and resilience across diverse marine habitats. For instance, Beaugrand et al. (2019) and Hays et al. (2018) have highlighted the pervasive distribution of these organisms throughout the world's oceans,	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		including regions similar to the Bass Strait [1,2]. Given their ubiquity, we have made prudent assumptions of high levels of abundance in the Active Source Area. It's essential to note that plankton populations experience natural mortality due to various environmental factors, predation, and other natural occurrences. Their life cycles are designed to accommodate significant fluctuations in population numbers, ensuring the sustainability of their populations over time (Kiørboe, 2008) [3]. Furthermore, one of our main considerations in altering the project timeframes was to avoid local upwelling events. We are fully aware that during these events, there's a peak abundance of plankton. Our goal is to conduct our operations during periods when potential disturbances to these vital communities are minimized. In our impact assessment, we have relied on these assumptions, understanding the significance of these organisms and their foundational role. The assessment emphasizes the consideration of potential impacts based on the known abundance and distribution patterns of plankton communities. Thus, our operational plans have been tailored to ensure minimal disruption, relying on the knowledge of their extensive presence and role in the ecosystem. References: [1] Beaugrand, G., Edwards, M., Brander, K., Luczak, C., & Ibanez, F. (2019). Causes and projections of abrupt climate-driven ecosystem shifts in the North Atlantic. Ecology Letters, 11(11), 1157-1168. [2] Hays, G. C., Richardson, A. J., & Robinson, C. (2018). Climate change and marine plankton. Trends in Ecology & Evolution, 20(6), 337-344. [3] Kiørboe, T. (2008). A Mechanistic Approach to Plankton Ecology. Princeton University Press	
4264	The report states that the area of impact is predicted to extend a maximum of 230 meters from the sound source during survey acquisition, with a severity rated as Minor (2). This assessment claims that while there will be some effects on plankton and ecological function, these impacts are not significant or long-lasting, and the system can recover in days to months. AMCS challenges this conclusion, citing evidence from McCauley et al. (2017), which was excluded from the assessment. That study indicates impacts can occur	We have acknowledged the findings of McCauley et al. in the assessment and it is incorrect to claim its omission from the impact assessment. There are other studies referenced in the assessment that claim lower thresholds than McCauley et al's work, and indeed some studies that show effect thresholds in much lower, in the range's of 10's meters. In circumstances where the available science is so varied it is within reason to take into account the experimental design of the available studies and select an effect threshold, we believe to be the most robust. We note also that the Popper et al. (2014)	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	at distances at least six times greater than the 230 meters cited. Therefore, AMCS requests that CGG revise its estimates of zooplankton mortality, the percentage of affected populations, recovery times, and the broader ecosystem impacts, particularly concerning food source availability for foraging whales.	thresholds have been routinely applied by titleholders, and accepted by NOPSEMA, further emphasising that this threshold is likely the most appropriate to use.	
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064
4268	The stakeholder argues that it is impossible to ensure zero risk from seismic activities, emphasising that only zero risk is acceptable. This position reflects a strong concern regarding the potential negative impacts of seismic exploration on the marine environment.	The legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4270	The stakeholder asserts seismic surveying has been proven to be harmful and disruptive to marine life of many species.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	3343
4271	The stakeholder asserts that seismic blasts will have a direct negative impact on marine life, specifically mentioning that an “exclusion zone” will not effectively prevent the	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of	2108

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	effects of the blasts from travelling through the ocean.	operation. Mitigation plans are in place to reduce any impacts to as low as practicable. The titleholder is aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how to protect and preserve the values of this site.	
4272	The stakeholder asserts that the survey will have a harmful effect on millions of sea creatures.	It would be unacceptable to have long-term or permanent/unrecoverable impacts, fortunately, impacts from marine seismic surveys are short-term, temporary, and recoverable. (Event ID: 3419)	3343
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publicly responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4278	The stakeholder expresses an active interest in the wellbeing of the coastline and its flora and fauna, indicating a general concern for environmental conservation.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	1325
4284	The stakeholder noted concern regarding impacts to zooplankton and the marine ecosystem.	The only effects to zooplankton come from elevated levels of sound. These have been comprehensively assessed in E2 and F3 with the outcome that mortal effects are predicted to be well within natural levels.	1890
4285	The stakeholder noted their concern as a resident of Port Fairy: noise (land and sea), impact on marine life, potential impacts on the environment and the future potential if gas is found.	We are also concerned about the welfare of marine fauna. We have undertaken an impact assessment process that includes whale, seals, pelagic and shorebirds. As part of this assessment, we must show that impacts to these species will be of an acceptable	1747

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		level. We have determined that it is acceptable to have temporary behavioural changes, such as moving away from the survey vessel, and no injury or long-term impacts. Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We are also publishing environmental impact, risk and mitigation documents as they are completed, in the document library. We are publishing the entire documents in order to remain transparent, but I have also attached a summary document.	
4287	The stakeholder objected to the activities due to sound levels/acoustic trauma experienced by sea creatures	The scientific literature supports that marine fauna may potentially be displaced due to a seismic survey but that these impacts are typically short term with no impact to ecosystem function. Large scale studies undertaken in Australia that you may be interested in are: Australian Institute of Marine Science. North West Shoals to Shore Marine Noise Monitoring and Impacts https://www.aims.gov.au/research-topics/monitoring-and-discovery/north-west-shoals-shore Behavioural Response of Australian Humpback whales to Seismic Surveys https://www.brahss.org.au/ Assessing the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries https://www.frdc.com.au/project/2012-008 Marine Seismic Survey Impacts on Fish and Invertebrates: Final Report for Gippsland Marine Environmental Monitoring Study https://ecat.ga.gov.au/geonetwork/srv/api/records/2292f4a7-ba2e-3533-e053-12a3070aaf2c Maxima 3D Marine Seismic Survey at Scott Reef https://www.sciencedirect.com/science/article/abs/pii/S0025326X13006528 https://www.sciencedirect.com/science/article/abs/pii/S0025326X18300687 Regarding Marine Fauna Observer's (MFOs), companies that contract MFOs such as Blue Planet Marine and RPS Group provide training for MFOs. As part of contracting MFOs we will ensure that the	2389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		persons provided meet the requirement of the Australian Government EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales, that requires MFOs to be trained and experienced in whale identification and behaviour, distance estimation, and be capable of making accurate identifications and observations of whales in Australian waters. The Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, details the competency requirements for MFOs and ongoing awareness (page 23 and 24). The Regia MSS Implementation Strategy is available on the Regia MSS Website Document Library see https://klarite.mysocialpinpoint.com.au/regiamss/document-library As detailed in the Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, CGG will only use appropriately experienced MFOs as determined by a review of their CVs (page 23). The Regia MSS Implementation Strategy also details how CGG will monitor the performance of the control measures during the activity (page 25). For example: Audits and Inspections Post acceptance of the EP, conformance will be monitored on an at least quarterly basis by the Client Site Representative, or delegate, via audits and inspections, as well as through the commitments under the Management of Risk, Management of Change, and Management of Knowledge parts of this Implementation Strategy. During the activity, conformance will be monitored on an at least fortnightly basis by the Client Site Representative, or delegate, via audits and inspections during the activity. Conformance auditing or inspection while the EP is in-force will be based on the Conformance Register and will target the following: • Conformance with regulatory requirements detailed in the accepted EP. • Management strategies and procedures to ensure EPOs and EPSs are being implemented, monitored, measured, and evaluated. • Emissions and discharges are being	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		monitored, measured, and documented As stated in the previous email, matters of national energy policy are not within the purview of CGG or the Regia MSS. We will however register claims related to the ongoing need for gas and provide those to NOPSEMA. Please find attached a brochure from NOPSEMA that describes this and may be of use to you.	
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Thank you very much for taking your time to engage with us on your concerns regarding the planned Regia marine seismic survey, it is very much appreciated. I can confirm you've been added to our records. I have attached a NOPSEMA brochure that may be of assistance to you. We believe your concerns are environmental, relating to tourism and your recreational activities. If this is incorrect, please let us know. Regarding environmental concerns, we recognise the potential to harm marine life and address this by identifying potential impacts and risks and putting mitigation plans in place. Examples of these include: - Conducting the survey during a time of year marine mammals and fish are less likely to be in the area. - Reducing the sound source to the lowest settings and reducing the number of times the sound source is activated. - Implementing marine mammal and fish monitoring programs during the survey. - Implementing exclusion zones around marine mammals and fish to minimize the potential for injury or harm. - In-field monitoring of the ocean for the presence of marine life. - Following strict guidelines as set by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We are publishing environmental assessment documents, and the environmental impact and risk treatments, as they are finalised, in the document library. For transparency we are publishing entire documents, but please let us know if you would like a summary of a specific concern (marine mammal and diving summaries are attached). The Australian Government requires petroleum and greenhouse gas (GHG)	2064

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		companies to conduct their activities in a manner that meets a high standard of environmental protection. The seismic industry's environmental record in Australia, particularly in offshore areas, has been exemplary. No offshore seismic survey proposal would be approved unless the highest environmental standards had been met. Most of the survey will be conducted far from the coast and will not impede the normal recreational activities such as surfing and swimming. If our predictions of impact and risk show any residual harm to recreational marine users the risks will be clearly communicated, the vessels will be clearly marked, and any exclusion zones will be clearly marked and communicated to the public. If we can clarify any of the information above, or if you have any questions or comments, please don't hesitate to contact us.	
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747
4306	The stakeholder was concerned about potential negative impacts of gas exploration and development on Country, the marine and coastal environment, the local economy, Traditional Owners, and local communities.	The titleholder acknowledged the feedback, noting that all relevant impacts are assessed in the Environmental Plan (EP) and can be found in E1-E9. Measures to minimise adverse impacts on functions, interests and activities on relevant receptors are also adopted and can be found in G1.	3152
4309	The stakeholder was concerned about the impact on marine life sensibilities and populations.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2273
4314	The statement comments on the distances and the scale of sound sources. It highlights the potential for millions of shockwave-producing sound sources over an	Our preliminary modelling indicates no effect to plankton at 220m from the sound source. The effects within this range are not uniform. The number of times the sound source will be activated	2086

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	extensive area and raises concerns about the implications of such activities on marine life and ecosystems.	will be determined soon but is likely to be in the range of 5000, not millions. There will be no more than 60 days of acquisition (Event ID 2086).	
4315	The statement suggests that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4323	There will be potential permanent damage to marine life due to sonic testing and drilling.	Titleholder responded and listed various information needs related to the activity, environmental assessment process, environmental aspects, predicted levels of environmental impact and risk, environmental management, consultation processes, and regulations or regulatory processes. Links to the project website and document library was provided.	1046
4326	This feedback challenges a response (that was taken out of context), that there would be no mortal impacts on plankton from seismic testing. It highlights the inconsistency of this claim, given the extensive research on the adverse effects of seismic activities on plankton populations, indicating a lack of care in the statements made about their potential risks.	Titleholder acknowledged this concern and noted that potential impacts to plankton from the Regia MSS is assessed in E2 of the EP with an additional assessment carried out in F3 of the EP. Any potential mortality or permanent injury effects to plankton must be assessed in the context of natural mortality rates. Mortality and/or mortal injury impacts to plankton assemblages (including fish eggs and larvae) resulting from seismic surveys are likely to be inconsequential relative to natural daily mortality rates, which can range from 11.6% (average minimum) to 59.8% (average maximum) as reported by Tang et al. (2014). Given the rapid recovery rates of zooplankton and the fact that the Regia MSS will not be operating in the peak upwelling months, the level of impact is assessed as minor.	5210
4330	This feedback questions the accuracy of claims regarding the safe distance of seismic blasting impacts, contrasting reported effects from previous studies in Western Australia that indicated zooplankton mortality within a 1.2 km radius. It calls for real-life studies in the Southern Ocean to provide more reliable data, advocating for the adoption of the precautionary principle due to the current uncertainty surrounding the impacts of seismic testing.	Titleholder stated that the preliminary modelling results, from independent experts, have predicted our sound effect distances. For zooplankton this is 220m. Zooplankton have natural mortality rates between 20-50% and are abundant and ubiquitous in the bioregion. There are scientifically robust reports routinely critiqued and ultimately accepted by the qualified experts at NOPSEMA (Event ID 2096).	2096

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4340	Zooplankton - Stakeholder noted that marine seismic survey air gun operations have been shown to negatively impact zooplankton which underpins the health and productivity of global marine ecosystems. Stakeholder cited evidence of significant mortality to zooplankton populations from seismic surveys using intense, low-frequency, acoustic impulse signals and quoted experimental data re impacts on larval krill. LINK provided.	When Dr McCauley's paper was published in 2017 two relevant and experienced organisations undertook reviews of the work. The International Association of Geophysical Contractors (IAGC) and the CSIRO reviews are attached as part of our response to your concern in reference to the McCauley paper. The weight of evidence suggests the McCauley findings are, at best, an outlier in a preponderance of evidence that show effect distances for zooplankton are likely to be far less than claimed. Further, like most development activities, seismic surveys in Australia are not required to meet a 'no impact' standard. Acceptable levels of impact are to be defined and met by the Regia MSS and scrutinised by NOPSEMA. The acceptable level of impact that we have set relevant to this literature is that 'plankton abundance is maintained within variance of natural mortality; and ecosystem dynamics are maintained.' We do not claim that seismic surveys have no effect on zooplankton. Rather, we believe there is a broader and more accurate understanding of effects to zooplankton when considering the full suite of available peer reviewed literature which demonstrates that the impact to zooplankton, and the knock-on effects to ecosystem dynamics, are of an acceptable level. We have published our draft impact assessment of underwater sound on Plankton here and would appreciate any feedback on the document.	2886
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4365	Concerns about the lack of definitive clarification on how seismic testing affects the marine environment and the clash between economic interests and environmental risks.	The titleholder acknowledged the feedback, noting that they have undertaken a thorough analysis and assessment of all relevant literature to inform the impact assessments conducted to assess potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals in the Environmental Plan (EP). These findings can be found in E2, E3, E4, E5, E6, and E7 under Section 8: Predicted Levels of Impact. Additional assessments of key receptors were also completed to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level (F3). Titleholder also conducted an assessment to investigate potential impacts to other marine users from physical presence resulting from the activity (E1).	2383
4537	The stakeholder raised an objection to seismic surveys as they negatively affect the fishing industry, local economy and environment.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of commercial fish species and sensitive species within the area of operation. The MSS will also not impact the local economy. Mitigation plans are in place to reduce any impacts to as low as practicable.	424
4390, 4414	The relevant person was concerned about the evidence related to potential regional population impacts of seismically induced krill mortality within the ASA.	In the online meeting, Regia's marine scientists explained that the natural variation in the ecosystem was much larger than the potential impacts their model suggested. They also pointed out that the literature did not support the stakeholder's model and that there was no evidence of a population collapse or catastrophic effects on krill from seismic activity. The stakeholder was encouraged to refine his work, particularly regarding the historical	6420

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		effects of seismic surveys, and consider the scale and natural variability of the ecosystem (Event ID 6890).	
4391	Stakeholder claims there is a threat of serious harm to the regional krill population if the Regia seismic survey occurs and a lack of full scientific certainty on the effects, therefore the Precautionary Principle should be applied.	The precautionary principle needs only be applied when there is a threat of serious or irreversible harm and a lack of full scientific certainty. In relation to the effects of sound on plankton and larval krill it is CGG's view that neither of these preconditions are met. Nevertheless, we have adopted precautionary measures as evidenced by: 1. >39% reduction in acquisition area. 2. Avoidance of the key summer months despite this time providing the best conditions for survey. 3. The 60-day limitation on acquisition. (Event ID 5304) The NOPSEMA quote they have used to support their case has been misinterpreted by the stakeholder, that encourages a precautionary approach rather than describes principle: s391(2): The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage. (Event ID 6517) The Regia EP provides scientific estimates on the natural variations in plankton (including krill) communities globally and regionally, as well as mortality levels in these communities.Based on the long history of seismic surveys in the region, there is no evidence of significant harm to plankton populations, suggesting that serious harm is unlikely. These findings help define what constitutes "serious harm." The stakeholder lacks valid data to support their claim of large-scale harm to regional krill populations. (Event ID 6815)	6432
4392	Claims there will be impact to Bonney Upwelling via krill larvae originating from within the MSS zone.	The claim that some krill larvae from the proposed Regia MSS area may reach upwelling regions is acknowledged, but there is no evidence to support the idea that this area is a key source for krill in the Bonney Upwelling system. Krill larvae from across the broader region could also end up in the upwelling area. No cause-and-effect pathways have been identified that show the Regia MSS area as uniquely important for krill supply in the region. (Event ID 6815)	6432
4393, 4409, 4411, 4413	As krill is a critical food source for whales, no seismic should be done between the months of November to April.	The claim that krill is a critical food source for whales is well-established, as whales migrate to upwelling areas to support sufficient densities of their preferred food source. However, the stakeholder provides no scientifically	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		supported cause-and-effect pathways or evidence to justify the prohibition of seismic surveys from November to April. The Regia EP offers scientific evidence showing the fluctuating abundance of krill and its connection to whale feeding patterns. While upwelling events can occur at various times and locations, there is a clear understanding of what constitutes major upwelling events and when they occur – as has been identified clearly in the EP. Whales feed throughout the upwelling season, primarily when krill density is highest, and continue their migrations each year despite significant fluctuations in krill abundance between years. (Event ID 6815)	
4394, 4412	Stakeholder claims their modelling indicates that by actively monitoring currents across the Active Source Area (ASA) and defining appropriate operational limits (no active source if mean currents across ASA (stratified) are > 0.5m/s), CGG can reduce mortality of larval Nyctiphanes australis by up to 80%, as stronger currents increase the volume of water exposed to lethal doses of seismic. This would, in turn, minimize the impacts on the blue whale feeding zone and the broader Bonney Upwelling ecosystem.	The stakeholder's model does not consider the following points: Plankton and larval krill abundance and density are not uniformly distributed in the water column either vertically or horizontally. The meso-scale biological and physical characteristics that are the more appropriate scale for investigating flow-on effects on whale populations or other relevant taxa (i.e. at the population level and not the effect to individuals). The vast differences in abundance of plankton (~krill) month-by-month and year-by-year and the significance of CGG's decisions: To avoid the peak upwelling times, where there is traditionally the highest abundance of plankton and larval krill (January, February and March). To limit the survey duration to 60 days of total acquisition. Any of the 30+ peer-reviewed scientific papers beyond the McCauley and Richardson papers about the Bonney Upwelling and the effects of impulsive sound on plankton and krill. The ecological context and purpose of zooplankton and larval krill: In primary productivity in the region regardless of the state of their physical condition, evidenced by the high levels of natural mortality. As a primary food source for Blue Whale. The ± 50% interannual variation in area extent of upwelling (~population abundance of krill) which is driven mostly by climate influences and within which whale populations continue to recover. In austral summer 2008/09 the upwelling season was constrained to the single month of February – we cannot find any scientific literature that describes this season as catastrophic for the visiting whale population. In addition, assumptions are made	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		about krill behavior, distribution, and density, as well as how the model accounts for patchiness and current speeds. The model's treatment of water and krill as uniformly distributed contradicts scientific understanding of their distribution in space and time. The Regia EP provides evidence of the natural variability in marine systems and highlights the resilience of zooplankton communities, including krill, due to high birth, growth, and mortality rates. These communities exhibit high turnover and production-to-biomass ratios, making them resilient to disturbances. Citing the work of Hosie (1982), the EP emphasizes that Nyctiphanes species have higher turnover rates than Euphausid krill, and that similar mortality rates (88-90%) can be expected in both. The assumptions about krill mortality in the EP are based on well-established scientific literature. (Event 6815)	
4395	The project is adjacent to Warrnambool's Logans Beach Whale Nursery for Southern Right Whales and upstream of the Bonney Upwelling Key Ecological Feature, which could be affected.	The titleholder acknowledges this and has spent two years preparing a comprehensive Environmental Plan (EP). This process included ongoing consultations with communities and individuals, summarizing the EP into webinars, information sheets, and holding in-person meetings. The team recognizes the Otway region's marine environment as both spectacular and dynamic and believes environmental assessments must be thorough and detailed to respect its importance. Impacts are assessed in the Environmental Plan (EP) and can be found in Appendix E7 and F3. Measures to minimise adverse impacts to whales and ensures the Regia MSS does not prevent SRW and BW utilising their BIAs include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in Appendix E7 Section 9 and G1. The claim that some krill larvae from the proposed Regia MSS area may reach upwelling regions is acknowledged, but there is no evidence to support the idea that this area is a key source for krill in the Bonney Upwelling system. Krill larvae	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		from across the broader region could also end up in the upwelling area. No cause-and-effect pathways have been identified that show the Regia MSS area as uniquely important for krill supply in the region. (Event ID 6815)	
4396	Stakeholder objects to Regia's dismissal of the importance of current strength in mitigating impact on krill and Bonney Upwelling biomass as both currents and krill distribution vary with depth, making monitoring at multiple depths beneficial. In the ASA, where water depth is typically less than 200m, larval krill are likely exposed to lethal seismic doses, as noted by McCauley et al. (2017). This region serves as a transport corridor for larval N. australis heading toward the Bonney Upwelling, with a westward current from November to April likely transporting larval krill into nutrient-rich upwelling zones.	The suggestion to monitor all depths lacks a clear rationale or explanation. The assumption that all krill within a specific volume of water will be killed by seismic activity is not supported by evidence. Given the lack of observed effects from past seismic surveys in the region, the model's conclusions are unsupported. If krill and currents are not uniform throughout the water column, the model's assumption of uniform distribution is flawed. The claim that some krill larvae from the proposed Regia MSS area may reach upwelling regions is acknowledged, but there is no evidence to support the idea that this area is a key source for krill in the Bonney Upwelling system. Krill larvae from across the broader region could also end up in the upwelling area. No cause-and-effect pathways have been identified that show the Regia MSS area as uniquely important for krill supply in the region. The model, which originally aimed to show massive krill mortality, takes a simplistic approach based on basic physical principles, such as the effect of current speeds, but ignores the complexity and scale of regional ecosystem dynamics. The model lacks validation and fails to account for key factors in the region's ecology. (Event ID 6815)	6432
4397	Stakeholder objects to the idea that meso-scale biological and physical characteristics are more appropriate for assessing impacts on whale populations or other taxa at the population level, not individual effects, claiming that individual krill disturbances can scale up to affect whale foraging success and overall population dynamics, quoting Williams 2016, Lagos 2022, Guilpin et al 2020, Santora 2011, and Kampf 2024.	Williams (2016) has been used superficially by the stakeholder. A more thorough reading reveals that the paper pertains to Humpback Whales, which show minimal response to food source reductions below 50%. The paper is useful for demonstrating the variability of ecosystems, which is discussed in detail in the Regia EP. Lagos (2022) is cited by the stakeholder to support a general statement about stress, but the thesis actually focuses on ocean warming and UV radiation impacts on krill—large-scale factors, which the Regia EP identifies as primary drivers of population changes. A small-scale disturbance like the MSS does not align with these larger impacts, which the stakeholder dismisses despite citing related studies. The stakeholder also references Guilpin et al. (2020) (not included in the bibliography). This study models how changes in krill density affect blue whale	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		foraging success, but it highlights that climate change and fishing, not seismic surveys, drive population changes. This supports the Regia EP's focus on large-scale impacts. The stakeholder's citation of Santora (2011) on California upwelling misrepresents the information. The Bonney Upwelling area is well-defined, and the stakeholder is encouraged to consult the DCCEEW website for clarification. Kampf (2024) is used by the stakeholder to suggest upwelling outside the Bonney area, a known fact. The Regia EP addresses how Blue Whale interactions with the MSS will be managed. Kampf's work builds on existing knowledge of upwelling mechanisms, and the stakeholder is encouraged to consider it as a model for understanding ocean dynamics. (Event ID 6815)	
4398	Objects to CGG's actions to avoid peak upwelling (misinterpreted as January–March) and limit survey duration to 60 days, stating that krill populations do not recover linearly after intense disturbances and the life cycle of N. australis is not necessarily aligned with the phytoplankton blooms of the Bonney Upwelling.	The stakeholder cites a study by Rau (2019) to argue that even small disruptions can affect the Southern Ocean food chain. This citation is a clear example of selective use of literature. Rau (2019) is based on aquarium experiments in a freshwater lake in Berlin, and the stakeholder is invited to clarify the relevance of Lake Muggelsee to the Southern Ocean. It appears the stakeholder did not properly review the paper. The peak upwelling season for the Bonney region is well-established through various studies, as noted in the Regia EP. Upwelling is defined by sea surface temperatures (SSTs) and chlorophyll-a (Chl_a) levels, not by wind patterns, as confirmed by the cited Barlow et al. (2021). The stakeholder's assertion that krill exist before upwelling occurs is self-evident. The stakeholder's reference to the Gill (2011) study is also inappropriate, as it does not discuss the lack of synchronization with Bonney upwelling. Furthermore, the stakeholder argues that krill are not closely linked to phytoplankton blooms in the region, contrary to established scientific knowledge. Krill rely on phytoplankton as a primary food source, and upwelling conditions concentrate this food, boosting krill reproduction and survival, which is critical for baleen whales such as Blue Whales.The stakeholder also suggests that whales are not synchronized with upwelling events, despite clear evidence that whales feed in areas where localized upwelling occurs. The Bonney Upwelling is the main upwelling center, but other regions also experience upwelling,	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		albeit less intense, as documented in the Regia EP. Recent work by Kampf (2024, 2025) has provided insights into the mechanisms behind these upwelling events. (Event ID 6815)	
4399	Stakeholder claims that with the potential impact on krill mortality and EPBC protected Blue Whales, the proponent excluding current modelling is not consistent with ALARP framework.	The criticism raised by the stakeholder is unfounded and reveals a misunderstanding of ALARP principles. ALARP involves assessing control measures by balancing environmental benefits with the costs of implementation. The stakeholder's arguments are flawed as they incorrectly suggest mitigation measures should be evaluated independently, only to contradict this by stating that ALARP is about layering controls to reduce risk and they assume their model is a reliable predictor of impacts, yet the model lacks credibility, and there is no justification for assuming mitigation measures will provide any environmental benefit. Timeframe limitations are not control measures but are self-imposed to comply with legislation and support coherent assessments. (Event ID 6815)	6432
4400	The stakeholder claims that CGG's statement fails to consider cumulative effects of seismic blasting, which can push krill populations beyond their ability to recover and disrupt population dynamics. have ecosystem level impacts, disrupting the balance of an evolved system that ensures population stability.	The key point about natural mortality rates is that plankton populations can naturally endure high mortality rates, sometimes exceeding 90%, and still thrive despite large-scale environmental changes like temperature and wind variations. This is well-documented in the Regia EP. There is no evidence to suggest that a single, spatially and temporally limited seismic survey could cause ecosystem changes at the implied scale. The Regia EP explains that planktonic communities can withstand high natural mortality rates and changes in key environmental factors. The comparison of seismic impacts to other natural events, like predation is irrelevant, as predation is a natural process. While climate change and fishing are the most significant drivers of change in marine ecosystems, seismic activity does not pose a comparable threat. The claims about seismic activity's impact on breeding krill lack any relevant scientific support, along with statements about the ripple effects of localized krill reduction. (Event ID 6815)	6432
4401	Objects to CGG's claim that impacts won't be "measurable", arguing that the absence of immediate measurable effects doesn't mean there isn't significant harm.	The case for acceptability does not rely on calculated mortality and recovery levels. Instead, the case is based on the immense size and dynamic nature of the ecosystem. The effects of the seismic survey are considered negligible because they are completely overshadowed by natural variations and dynamics, making any measurable	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		calculation impossible. This argument is further supported by the fact that the survey avoids peak upwelling times, which are when krill populations are expected to be most productive. Additionally, when considering cumulative impacts, any extra mortality caused by the survey is expected to be quickly absorbed by the natural variations and dynamics of the ecosystem, likely within days of the survey's completion. (Event ID 6514)	
4402	Stakeholder claims that equating seismic mortality with natural mortality overlooks the fact that natural mortality is an inherent part of an evolved system that maintains population stability. In contrast, human-induced mortality disrupts this balance by targeting individuals indiscriminately, including those crucial for reproduction and survival.	The Regia EP does not equate seismic mortality with natural mortality. Instead, it defines the scales of natural mortality in plankton populations to provide context for seismic effects. It is clearly stated that the two are not equivalent in any way. The stakeholder seems to misunderstand marine population dynamics, espousing a view of the natural world that was debunked in the 1970s, namely the idea of a stable or climax community where any disturbance disrupts balance. As demonstrated by Connell (1978), high diversity in ecosystems like tropical rainforests and coral reefs is only maintained in a non-equilibrium state. Wu and Loucks (1995) further emphasized that the classical equilibrium view fails because equilibrium conditions are rare in nature, and stability should consider heterogeneity and scale multiplicity. Stability, in ecological terms, is better measured by the ability of a population to continue reproducing through time, ensuring its persistence. For plankton communities like krill, this stability is defined by life-history traits such as rapid population turnover rates, enabling them to withstand extreme fluctuations in numbers and persist over time. Large variations in krill biomass are a fundamental characteristic of stable populations. (Event ID 6815)	6432
4403	Claim of ecosystem impact, as any Krill killed by seismic will become unavailable to predators.	Food chain dynamics in the open ocean are primarily supported by detritus, which serves as the foundation for energy transfer up the food chain. This detritus is mainly composed of dead plankton, with krill carcasses being a significant component, including those potentially killed by seismic activity. Such organic material is consumed by bacteria and other organisms, contributing to the marine food web. However, as demonstrated scientifically, the act of krill falling as marine snow does not cause a large-scale impact. In fact, some models suggest that this process can trigger a positive feedback loop, resulting in a surge in	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		phytoplankton and zooplankton productivity (Skartsaeterhagen et al., 2024). (Event ID 6815)	
4404, 4408 4410	Stakeholder claims that disruptions to krill populations can directly affect Blue Whale feeding, as these whales depend on dense krill aggregations for their energy requirements. Reduced prey densities may impact whale migration and breeding success.	Krill are naturally subject to mortality rates as high as 90%, and their food source fluctuates spatially and temporally, shrinking by up to 50% between and within years. The size, duration, and location of krill swarms also vary. Whales continuously feed across this dynamic space and return annually. The Regia EP argues that there is no evidence suggesting a spatially and temporally constrained MSS would cause a disturbance greater than what already naturally occurs. The stakeholder demonstrates a lack of understanding of how stability is measured in marine environments. The energy whales derive from krill fluctuates month to month and year to year due to natural dynamics in the food chain. The scale of disruption to whale feeding energy when upwelling shrinks by 30% or 50% is far greater than any MSS disturbance. The stakeholder's general statements regarding the MSS's impact lack scientific support. (Event ID 6815)	6432
4405	objects to the assertion that ± 50% interannual variation in upwelling extent, mostly climate-driven, has not constrained whale population recovery.	Whales have evolved to handle significant fluctuations in their food source, with some years yielding more biomass and others less. The Regia EP provides references to support this argument. Upon closer examination of Wiedenmann et al. (2011), which the stakeholder cites, it becomes clear that while whales can adapt to decreases in krill abundance in a particular area, the net effect on their population vital rates is negligible. Wiedenmann et al. (2011) also suggest that blue whales may adjust their foraging behaviors in response to changes in local environmental conditions, mitigating the impacts of declines in krill abundance. They note that blue whales exploit different feeding areas based on large-scale prey abundance and can concentrate in productive areas when prey is scarce, such as during El Nino years (Benson et al. 2002, Bailey et al. 2010). Furthermore, Wiedenmann et al. (2011) propose that blue whales are better equipped to cope with environmental changes than species with more restricted foraging areas, thanks to their adaptive foraging behaviors and ability to travel long distances in a foraging season. (Event ID 6815)	6432
4406	The sender claims that the absence of a defined acceptable threshold	The case for acceptability does not rely on calculated mortality and recovery levels. Instead, the case is based on the	6507

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	for krill mortality in the Regia EP is a core issue.	immense size and dynamic nature of the ecosystem. The effects of the seismic survey are considered negligible because they are completely overshadowed by natural variations and dynamics, making any measurable calculation impossible. This argument is further supported by the fact that the survey avoids peak upwelling times, which are when krill populations are expected to be most productive. Additionally, when considering cumulative impacts, any extra mortality caused by the survey is expected to be quickly absorbed by the natural variations and dynamics of the ecosystem, likely within days of the survey's completion. (Event ID 6514)	
4415	The percentage figure in Appendix E2, Section 4.1 has errors.	The Tang et al. (2014) paper was referenced to discuss non-predatory mortality in zooplankton samples from various marine environments. The stakeholder claimed that this rendered the estimated numbers used in the comparison irrelevant. However, Tang et al. provides a range estimate for non-predatory zooplankton mortality (11.6% to 59.8%) in these samples, which is relevant to the impact assessment. While CGG agree that directly extrapolating these mortality ranges to the entire Otway marine region might be overly simplistic and therefore doesn't carry significant weight in our overall argument, it is still a reasonable and relevant consideration. These ranges can be compared with the potential additional mortality resulting from factors such as predation, other anthropogenic sources, and the proposed survey. (Event ID 6518)	6890
4418	The relevant person raised concern about impacts to plankton and interpretation of the UTAS research in this area within the Regia EP.	Event ID 6321 - The Regia team responded that during consultation, concerns around plankton and the Bonney Upwelling were highlighted by multiple individuals and groups. They explained that they undertook a thorough impact assessment, which can be found in Appendix E2 of the Environment Plan (EP). Following publication of E2, the Regia team continued to receive feedback and as such now have Appendix F3 that provides further assessment of this key sensitivity on Page 48, and updated the appendices analysis with the latest literature, including the ZoopSeis research project funded by the Norwegian Research Council. Despite our assessment outcomes not resulting in the need for the precautionary principle to be applied, the Regia team had adopted measures	6329

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		to assuage the concerns of stakeholders. These are as follows: 1. >39% reduction in acquisition area. 2. Avoidance of the peak upwelling times (January/February/March), where there is traditionally the highest abundance of plankton and larval krill 3. To limit the survey duration to 60 days of total acquisition. Taking these measures into account, along with considering the ecological context and purpose of zooplankton and larval krill (being In primary productivity in the region regardless of the state of their physical condition, evidenced by the high levels of natural mortality, and as a primary food source for Blue Whale), has allowed the Regia team to demonstrate that they have reduced the impact on plankton and larval krill from the Regia MSS to ALARP.	
4419	Concern about the potential impacts of seismic surveys on the planktonic phyllosoma stage of Southern Rock Lobster.	Event ID 6820 - The Regia team responded that the information already provided on Southern Rock Lobster shows the scales of connectivity and dispersal that are intrinsic to the stock of Southern Rock Lobster. They show how any impacts to individual rock lobster larvae within the intended area of seismic will be immeasurably small relative to the mortality that is operating across the regional distribution of this species. Such a well-connected, genetically homogenous stock is, by definition, highly resilient to localised disturbances. Evidence of impacts to individual larval lobsters is not evidence of impacts to the stock of southern rock lobsters. This conclusion is based on published papers presented in the previous document and an understanding of life-history dynamics in marine invertebrates.	6411
4440	Concerned about the impacts of seismic activities on zooplankton.	Event ID 6876 - The Regia team responded in-meeting and provided an outline of the natural dynamic of zooplankton. Explained there may be short term destabilisation but it does not been the impact is additive. Directed fisher to a model study about zooplankton.	6876
4417	The relevant person was concerned that about the proposed seismic activity effecting the behaviours of certain species.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act.	6880

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4491	Claims about the SRW and BW BIAs. States proposed activity will cause unacceptable impacts to all Karntubul species, including temporary & permanent hearing loss, displacement from BIAs, vessel strike, prey depletion during peak feeding/migration period, calving interruption, and impact to ecosystems and cultural landscapes as a result of the cumulative impact of these.	CGG has identified all Biologically Important Areas (BIAs) relevant to blue whales (BWs) and southern right whales (SRWs) and incorporated seasonal BIA use into the survey design through substantial temporal and spatial restrictions detailed in the EP. Predicted underwater-sound impacts on these Karntubul species, along with mitigation measures presented in Appendices E7 and F3, demonstrate impacts will remain acceptable and will avoid auditory impairment or displacement from BIAs or Habitats Critical to Survival (HCTS). CGG further notes that vessel-strike risk is already extremely low during seismic surveys and that additional controls in Appendix D2 ensure this risk is prevented and acceptable. It concludes that no changes to ecosystem structure, diversity, or function are expected from the one-off survey, with sound exposure too limited in extent and duration to affect prey, food webs, or predator–prey relationships. A cumulative impact assessment found residual cumulative effects to be low, reduced to ALARP, and acceptable, with no impacts predicted for regional marine parks. CGG also asserts consistency with the National Recovery Plan for Southern Right Whales and the Blue Whale Conservation Management Plan, stating that their objectives and recommended measures have been incorporated. Finally, CGG maintains that all marine mammal species likely to occur in the region have been adequately assessed using up-to-date EPBC Protected Matters data, and that mitigation measures ensure impacts to all listed species will remain acceptable and not inconsistent with EPBC Act protection provisions.	EVT352
4492	Claims that the eastern population of the Southern Right Whale, estimated at only 200–300 individuals, is at particularly high risk because its migration and reproduction Biologically Important Areas (BIAs) overlap directly with CGG's Operational Area and sound propagation footprint. According to the Southern Right Whale Recovery Plan, these whales use the affected region for reproduction between May and September and for migration between April and October. The Recovery Plan also notes that Southern Right Whales do not feed in coastal waters but are expected to feed, and possibly	The Recovery Plan explains that BIAs can be designated for key behaviours such as reproduction, foraging, migration, and resting. While Southern Right Whale BIAs in the Plan cover reproduction and migration, the Plan notes that foraging occurs across a much broader offshore latitudinal range (30°S–65°S) and is not linked to these BIAs. Because the Regia MSS is not located in Antarctic waters, it will not affect cetaceans that forage there. CGG states the survey will avoid peak SRW abundance in the mapped BIA and apply mitigation measures to ensure no SRWs are harmed, injured, or interfered with.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	conceive, within the Australian Whale Sanctuary—an area entirely overlapped by the proposed Regia MSS activity. As a result, the seismic survey could occur within, or affect, conceiving, calving, and feeding grounds for this critically endangered sub-population. The species is particularly vulnerable to human impacts due to its low reproductive rate, long lifespan, and strong site fidelity to key habitats. The submission therefore emphasises the relevance of underwater noise, habitat degradation, and vessel-strike risks in the context of the proposed seismic activities.		
4496	GMTOAC objects to CGG removing a previous control measure limiting seismic discharge in the Pygmy Blue Whale foraging BIA during periods of low whale presence, replacing it with a vague condition requiring CGG to determine whether whale presence is "compatible" with proceeding. GMTOAC argues this new measure lacks detail on how whale presence or "unacceptable disturbance" will be assessed, and that it fails to reference Recovery Plans which define unacceptable impacts. GMTOAC warns that the proposed survey timing (April–June 2026) coincides with peak Pygmy Blue Whale foraging season and Southern Right Whale migration and calving periods, meaning the seismic survey is likely to occur when both species are using their BIAs. Preventing whales from accessing these areas, or exposing them to injury while they remain, would constitute unacceptable impacts inconsistent with Recovery Plan objectives.	CGG has further reduced the likelihood of interactions with marine mammals by excluding the April–June period and commencing the survey only after 15 September. Because blue whales typically do not arrive from Western Australia until November, CGG argues that most of the survey will occur when blue whales are absent from the area. It adds that sighting data show very few blue whales in November and December, with peak abundance occurring later, from January to March during the Bonney Upwelling.	EVT352
4502	GMTOAC objects to the seismic survey's potential impacts on krill populations, including larval krill, which form a foundational part of the marine food web in Nyamat Mirring and are a critical food source for culturally significant species such as Pygmy Blue Whales and Southern Right Whales. They state that CGG's EP downplays potential impacts by comparing them to natural fluctuations in krill abundance, a framing GMTOAC considers inappropriate because it subsumes an anthropogenic disturbance within natural variability rather	CGG undertook an extensive review of the scientific literature to understand regional upwelling systems and their dynamics, assessing more than 65 publications to support the confidence of its analysis. Detailed assessments of upwelling and krill are provided in Appendices E2 and F3 of the EP. CGG does not agree with the suggestion that the assessment is trivial and remains confident in the robustness of its findings. CGG also remains open to receiving questions or new relevant information. Additionally, CGG notes that references to Panama upwelling processes are not applicable to the Regia MSS assessment and maintains	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	than assessing it cumulatively. GMTOAC emphasises that Nyamat Mirring and the broader oceanic system are already under significant stress from climate change and other human impacts. They point to the catastrophic Karenia mikimotoi algal bloom in South Australia as an example of how cumulative pressures can destabilise marine ecosystems. GMTOAC also references the recent failure of the Panama Upwelling, the first such event recorded in over 40 years, as further evidence that natural oceanographic processes are increasingly vulnerable to cumulative stressors. They argue that these examples undermine CGG's assumptions about the robustness of the system and highlight the need for a more precautionary, cumulative-impact-focused assessment.	confidence in the supporting literature base.	

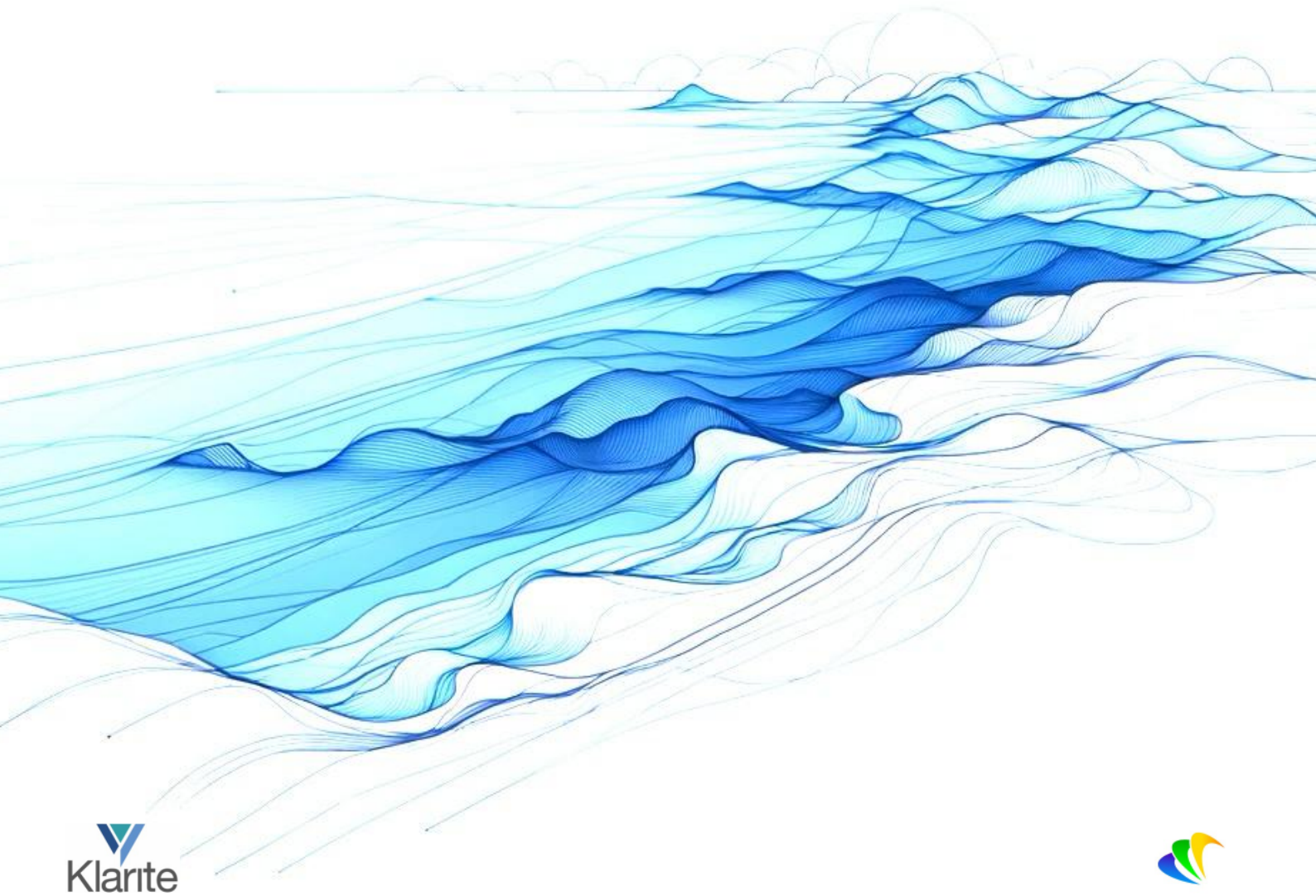
REGIA
Marine Seismic Survey

Impact Assessment
Underwater Sound: Fish

Appendix E3: REG-EP-022-E3

Rev 5

December 2025



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Contents

1 Introduction 5
1.1 Purpose and Scope 5
1.2 Consultation in Preparation of the EP 5
1.3 Modifications Arising from Further Assessment 5
2 Aspect – Underwater Sound 6
2.1 How the Aspect Occurs 6
2.2 Extent and Duration of the Aspect 6
3 Cause-Effect Pathway 7
4 Description of the Existing Environment That May be Affected by the Activity 8
4.1 Protected Species with Swim Bladder 8
4.1.1 Australian Grayling (*Prototroctes maraena*) 8
4.1.2 Blue Warehou (*Seriolella brama*) 9
4.1.3 Orange Roughy (*Hoplostethus atlanticus*) 10
4.1.4 Southern Bluefin Tuna (*Thunnus maccoyii*) 10
4.1.5 Syngnathids 11
4.1.6 Eels (*Anguilla spp.*) 11
4.2 Protected Species without Swim Bladder 13
4.2.1 Grey Nurse Shark (*Carcharias taurus*) 13
4.2.2 Little Gulper Shark (*Centrophorus uyato*) 13
4.2.3 School Shark (*Galeorhinus galeus*) 13
4.2.4 White Shark (*Carcharodon carcharias*) 14
4.3 Commercial Fish Species with Swim Bladder 14
4.3.1 Australian Salmon (*Arripis truttaceus* – Western Australian Salmon, *Arripis trutta* – Eastern Australian Salmon) 14
4.3.2 Australian Sardine (*Sardinops sagax*) 15
4.3.3 Bigeye Tuna (*Thunnus obesus*) 16
4.3.4 Blue Grenadier (*Macruronus novaezelandiae*) 16
4.3.5 Blue Mackerel (*Scomber australasicus*) 16
4.3.6 Blue-eye Trevalla (*Hyperoglyphe antarctica*) 16
4.3.7 Broadbill Swordfish (*Xiphias gladius*) 16
4.3.8 Eastern School Whiting (*Sillago flindersi*) 17
4.3.9 Jack Mackerel (*Trachurus declivus* and *T. murphyi*) 17
4.3.10 King George Whiting (*Sillaginodes punctatus*) 17
4.3.11 Pink Ling (*Genypterus blacodes*) 18
4.3.12 Redbait (*Emmelichthys nitidus*) 18
4.3.13 Ribaldo (*Mora moro*) 19

4.3.14 Striped Marlin (*Kajikia audax*) 19
4.3.15 Snapper (*Chrysophrys auratus*) 19
4.3.16 Southern Garfish (*Hyporhamphus melanochir*) 20
4.3.17 Tiger Flathead (*Platycephalus richardsoni*) 20
4.3.18 Yellowfin Tuna (*Thunnus albacares*) 20
4.3.19 Wrasse (multiple species) 20
4.4 Commercial Fish Species without Swim Bladder 21
4.4.1 Albacore Tuna (*Thunnus alalunga*) 21
4.4.2 Elephant Fish (*Callorhinchus mili, Harriotta haeckeli* and *H. raleighana)* 21
4.4.3 Gummy Shark (*Mustelus antarcticus*) 21
4.4.4 Saw Sharks (*Pristiophorus cirratus - Common*, *P. nudipinnis - Southern*, *P. peroniensis-Eastern)* 21
4.5 People and Communities 22
4.5.1 Social and Economic Features 22
4.5.2 Cultural Features 22
5 Relevant Legislative and Other Requirements 23
6 Defining Acceptable Levels of Impact 24
7 Consultation Input 28
8 Minimisation of Impacts Through Activity Design 29
8.1 Elimination 29
8.2 Substitution 30
9 Predicted Levels of Impact 31
9.1 Change in Fauna Behaviour, Hearing Capacity, and Physical Condition 31
9.1.1 Mortality and Potential Mortal Injury and Recoverable Injury 31
9.1.2 Temporary Threshold Shift 32
9.1.3 Change in Behaviour 33
9.1.4 Change in Commercial Catch 35
9.2 Measures Adopted to Manage Environmental Impacts 38
10 Demonstration Impacts will be of an Acceptable Level 39
10.1 Principles of ESD 39
10.2 Biological and Ecological Categories 39
10.3 Economic, Cultural and Social Categories 40
10.4 Consistency with Company Processes 40
11 Environmental Performance Outcomes 41
12 Recommendations 43
13 Document Control 44
14 References 45
Annex 1 51

Public Comment 51
Annex 2 52
Objections and Claims Raised from Consultation 52
Annex 3 90
Underwater Acoustic Sensitive Species 90

1 Introduction

Underwater Sound was identified through the Preliminary Environmental Impact and Risk Assessment (**PEIRA**) (Appendix B4) as an Aspect needing further assessment. Hence this document presents a detailed examination of Underwater **Sound**, as will typically be produced during the proposed Regia Marine Seismic Survey (**Regia MSS**), and its interaction with the environmental Receptor we are collectively calling **Fish.**

This assessment is built on the information contained in the following four core studies, which should be read in the order they are listed:

1. PEIRA
2. Seismic Sound Studies Report (Appendix B8)
3. Sound Emissions Modelling Reports (Appendix B7)

1.1 Purpose and Scope

The purpose of this document is to assess all acceptable sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document was initially published in draft form and uploaded to the Document Library of the Regia MSS Consultation Hub on 11 September 2023 as a stand-alone document, rather than as part of the much more substantial total EP document. This was done to maximise the ability of interested members of the public to read, interpret and respond within the mandated 30-day public comment period.

As such, public and Relevant persons were invited to comment on the document with an explicit request for feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

1.3 Modifications Arising from Further Assessment

To ensure this environmental assessment remains contemporary, accurate, and reflects feedback from the regulator and relevant persons, this document will be updated from time-to-time. In particular, the CGG environmental assessment process requires consideration of whether further assessment was needed to verify, or dive deeper into a topic, to further improve the predictive quality of the assessment. When this has occurred, reference to such changes will be communicated in the Recommendation section and identified at relevant points in the assessment.

2 Aspect – Underwater Sound

2.1 How the Aspect Occurs

The primary sound source will be impulsive underwater acoustic emissions coming from the seismic source releasing compressed air (seismic pulse) and creating a sound wave directed downwards towards the seabed.

Secondary sound sources will include continuous underwater acoustic emissions generated by the survey and support vessels and helicopters. Sounds from vessels are generated by thrusters, engines, and propellers. Underwater acoustic emissions from helicopters are generated via the engine and rotors. Underwater acoustic emissions from Ultra-Short BaseLine positioning beacons are generated within the streamer spread.

An overview of underwater sound and studies relevant to seismic is in Appendix B8.

2.2 Extent and Duration of the Aspect

Impulsive Sound

Duration: 60 days

Extent: Active Source Area + 86 m – 10.95 km based on the furthest distance to modelled sound effect criteria. [Updated in response to Matter: F17]

Active seismic acquisition will occur for up to 60 days within the Active Source area.

Continuous Sound

Duration: 90 days

Extent: Operational Area +1.6 km based on the assessment of vessel sound.

The survey and support vessels will be active in the Operational Area for the duration of the survey undertaking support activities and acquisition.

3 Cause-Effect Pathway

The PEIRA (Appendix B4) identified a cause-effect pathway for impulsive (seismic) underwater sound for the following environmental receptors and their social, cultural, and economic features:

- Fish (including eels and sharks).
- People and communities.

In addition, indirect impacts were identified to the following, via relevant person consultation:

- Commercial fisheries and fishing tour operators

Potential environmental impacts to fish identified from the PEIRA are:

- Change in fauna behaviour.
- Change in hearing capacity.
- Change in physical condition.

Species are grouped according to their sound modelling characteristics which are influenced by the presence or absence of a swim bladder, as defined by Popper et al. (2014) Most bony fishes have a swim bladder which is used for buoyancy control but may also be used for hearing, sound production, and/or respiration. Species with a swim bladder have a greater potential to suffer from physiological trauma than those without. Fish species that lack a gas-filled cavity, such as elasmobranchs (sharks, skates, and rays) some tuna species and other pelagic and deep-sea species, are not as vulnerable to trauma from extreme sound pressure changes as fish with a gas-filled space (Popper et al 2014).

In 2006, the Working Group on the Effects of Sound on Fish and Turtles was formed to continue developing noise exposure criteria for fish and turtles, work begun by a panel convened by NOAA two years earlier. The resulting guidelines included specific thresholds for different levels of effects and for different groups of species (Popper et al. 2014). These guidelines defined quantitative thresholds for three types of immediate effects: ·

- Mortality, including injury leading to death.
- Recoverable injury, including injuries unlikely to result in mortality, such as hair cell damage and minor haematoma.
- TTS

PTS was not identified by Popper et al (2014), thus there is no cause-effect pathway for PTS effects to fish.

4 Description of the Existing Environment That May be Affected by the Activity

For a description of the baseline soundscape in the region relevant to the Regia MSS, refer to Section 1.1 of Appendix B8.

To identify fish species (including sharks and rays) that are covered by the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and that may be present within the area affected by underwater sound, a PMST search was undertaken. The PMST search area was defined as the Active Source Area plus an 8 km buffer. This buffer distance was based on the furthest distance to modelled sound effect criteria for fish of 8.35 km at the time of searching. The PMST Report is available in Appendix B5. Annex 3 provides details on these protected fish species and relevant conservation advice or management plans.

.PMST searches were run multiple times prior to resubmission to ensure any changes to species or listings were identified to control for passage of time. Yarra Pygmy Perch and Eastern Dwarf Galaxia have been removed from the 2025 PMST search for the underwater sound EMBA that may impact fish. Conservation Advice has also been updated for several species and subsequent changes have been made to Annex 3.

Changes relevant to the assessment of underwater sound and fish are:

- Southern Bluefin Tuna (*Thunnus maccoyii*) has been removed from the February 2025 PMST reports for all areas searched, as it is no longer listed as a threatened species under the EPBC Act (DCCEEW 2024k). This species has been retained for assessment based on a precautionary approach remains appropriate to assess this species that was only recently delisted, the species known relevance to regional fisheries, and to accurately reflect the passage of time over which this EP has been constructed.
- Grey Nurse Shark (*Carcharias taurus*) has been added to list as species or species habitat may occur within area.

[Section added in response to Matters: I16 and I17].

In addition to the fish species identified from the PMST searches, all commercial species of relevance as identified from a review of Appendix B6: Commercial Fisheries Analysis Report (Appendix B6) are described here.

Stakeholder consultation concerns were raised about the potential impact of seismic sound on eels, hence they are also included.

4.1 Protected Species with Swim Bladder

4.1.1 Australian Grayling (*Prototroctes maraena*)

The Australian Grayling is a small to medium-sized, slender, silvery fish with soft-rayed fins lacking any spines. It is endemic to south-eastern Australia, including Victoria, Tasmania, and New South Wales, and is a migratory species that inhabits estuarine waters and coastal seas as larvae/juveniles, and freshwater rivers and streams as adults (Backhouse et al. 2008) i.e. amphidromous. Australian Grayling generally migrate downstream to the lower freshwater reaches of rivers to spawn, usually over a two-week period, typically from late-summer to mid-winter (TSSC 2021). Fecundity of this species varies between 25,000 and 68,000 eggs, with an average of 47,000 eggs (TSSC 2021). Eggs hatch between 10 and 20 days after being laid. Larvae emerge at 6.5 mm in length, are buoyant, and while they are free swimming, they are typically swept downstream into marine habitats by river flow (TSSC 2021). A lack of genetic diversity between Australian Grayling collected from coastal rivers in Victoria suggested that a single population occurs in Victoria, as larvae are most likely dispersed during the marine stage of their life cycle (TSSC 2021). This result indicates that the marine larval and juvenile phase facilitates extensive gene flow among coastal rivers. Such a dispersal strategy would enable recolonization of rivers that experience localized extinction provided that connectivity between freshwater habitats and the sea is sufficient to permit migration and that enough source populations remain intact to support viability of the wider population. Similarly to the freshwater eels (Anguiulla sp.) the key threats to Australian Grayling come from pollution, loss and fragmentation of

their riverine habitat. The key riverine habitats for this species are all located to the east of the Regia MSS, along the south-east axis of Victoria and extending up into NSW (Figure E3-1).

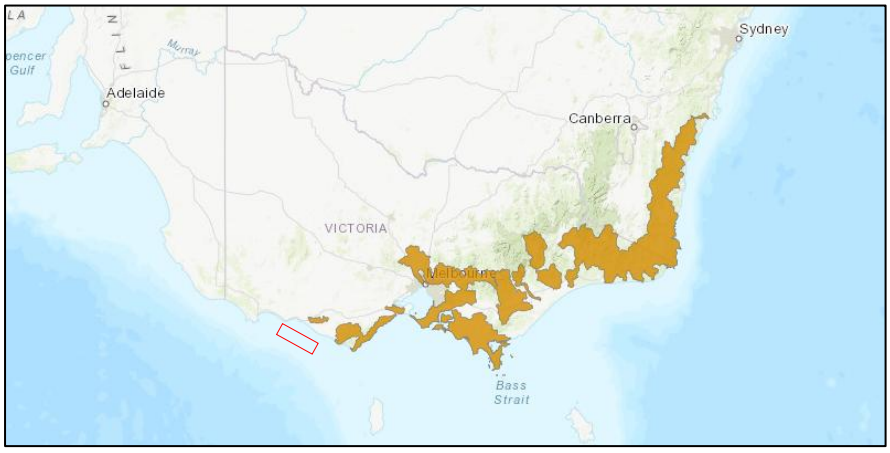

Figure E3-1 - Geographic range of the Australian Grayling (from Lintermans et al 2019 IUCN Red List Assessment). Red box is approximate location of proposed Regia MSS

4.1.2 Blue Warehou (*Seriolella brama*)

The Blue Warehou is a medium-sized, deep-bodied fish, reaching a maximum total length of 90 cm and a maximum weight of 7 kg (TSSC 2015). Globally, the Blue Warehou is confined to Australian and New Zealand waters predominantly in coastal shelf, upper continental slope, and seamount waters offshore from New South Wales, Tasmania, Victoria and South Australia (TSSC 2015). It is nevertheless a highly mobile species that is genetically well-connected over its range. [Paragraph updated in response to Matter: F03]

Blue Warehou is a bentho-pelagic species that inhabits continental shelf and slope waters. Adults can be found at depths from 50 - 300 m. Blue Warehou is a schooling fish and usually aggregates close to the seabed. Juveniles can sometimes be found schooling close to the surface in estuaries, often in association with jellyfish (AFMA 2023).

Spawning occurs during winter and early spring. Larval sampling has found that the major spawning locations are along the west coast of Tasmania (Figure E3-2 from Bruce et al 2001).

On average female's spawn around three times per season, producing 430,000 – 1,350,000 eggs per spawning event depending on their body size (AFMA 2023). [Paragraph updated in response to Matter: F03]

While Blue Warehou is a target species for the Southern and Eastern Scalefish and Shark Fishery and Tasmania Scalefish Fishery, catch levels are extremely small at ~4T and 1T per fishery respectively. AFMA (2023) states that the stock are depleted and actively avoided by fishers.

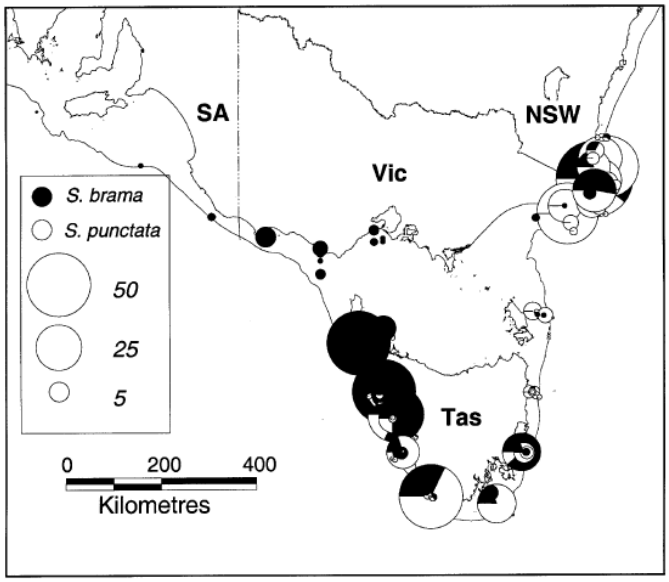

Figure E3-2 Distribution of S. brama larvae and S. punctata larvae in southern Australia (all sizes combined). Scale, number of larvae per 1000m³ (from Bruce et al 2001).

4.1.3 Orange Roughy (*Hoplostethus atlanticus*)

Orange Roughy are a deepwater species that inhabits waters over steep continental slopes and ocean ridges. They are usually found dispersed over rough bottoms and steeps at depths of 700 - 1400 m (AFMA 2023a). Orange Roughy form dense spawning aggregations in winter, with non-spawning aggregations occurring sporadically in summer and autumn. Aggregations usually occur from 5 - 10 m above the seabed, with some extending over 50 m in height from the sea floor. Aggregations are usually associated with submerged hills or pinnacles. Excluding substantial migrations to spawning grounds, Orange Roughy are a relatively sedentary species (AFMA 2023a).

Orange Roughy reach reproductive maturity at 27-32 years of age. Spawning aggregations form between mid-July and late August. Adult males appear to spawn over a 1–2-week period, with females spawning for up to 1 week. Females produce 10,000 -,90,000 eggs in a single spawning event each season. The eggs float to the surface after fertilisation before sinking again to hatch close to the sea floor. Hatching is thought to occur 10-20 days after fertilisation. It is likely that females do not spawn every year (AFMA 2023a).

The Orange Roughy is a demersal fish targeted by the Southern and Eastern Scalefish and Shark Fishery. They are widely distributed throughout the world and form dense spawning and feeding aggregations on or near topographic features such as seamounts, canyons, and plateaus (DCCEEW 2023b). No spawning or feeding aggregation areas have been identified in the Operational Area, with their major spawning locations located on the east coast of Tasmania (Knucky & Smith 1997). [Paragraph updated in response to Matter: F03]

4.1.4 Southern Bluefin Tuna (*Thunnus maccoyii*)

Southern Bluefin Tuna can grow to 225 cm in length and 200 kg in weight (TSSC 2010). They are a highly migratory species that occurs globally in waters between 30°S and 50°S. In Australian waters, they range from northern Western Australia, around the southern region of the continent, to northern New South Wales (TSSC 2010). Southern Bluefin Tuna forms a single, widely distributed population in the southern, temperate oceans, but with a single known spawning ground in the Indian Ocean, between Java and northern Western Australia (TSSC 2010). Southern Bluefin Tuna are known to be among the fastest ocean swimmers in the world and can travel in speed bursts of up to 70 km/hr while feeding (TSSC 2010).

Southern Bluefin Tuna are a target species for the Southern Bluefin Tuna Fishery and in Australian waters, they are found mainly in the Great Australian Bight (AFMA 2023b) where they are most caught

during the summer months (December to April). They are also caught off the New South Wales coastline during winter (AFMA 2023b).

Southern Bluefin Tuna is not commercially caught in the Operational Area. It is sometimes caught recreationally off Victoria.

4.1.5 Syngnathids

Most of the listed marine ray-finned fish species identified in the PMST report are syngnathids, which includes seahorses and their relatives (sea dragon, pipehorse and pipefish). However, of the 26 species listed in the report all of them are assessed as "Species or species habitat may occur within area", which reflects the almost complete lack of evidence to support their presence. Nevertheless the majority of these species are associated with seagrass meadows, macroalgal seabed habitats, rocky reefs and sponge gardens which are all located in shallow, inshore waters such as protected coastal bays, harbours and jetties less than 50 m deep (Fishes of Australia, 2015). They can also be found in deeper offshore waters, where they are 'rafting' around floating seaweed such as sargassum, seen as a method of dispersal between locations.

The most common habitats they associate with in temperate waters are dominated by seagrass and algae (Foster & Vincent 2004) while also being regularly associated with anthropogenic features, such as aquaculture pens, moorings, swimming (shark) nets and jetty pylons (Clynick, 2008;;Harasti et al., 2010) to the extent that these features are likely important habitats for some, or even many, species.

Identified threats to Syngnathids include physical habitat modifications, decreased water quality and bycatch from commercial fishing.

There is a dearth of literature on effects of underwater noise on Syngnathids however Vincent et al (2011) noted a study by Anderson (2009) that found seahorses exposed to loud aquarium noises for a month displayed multiple stress responses but without any measured changes in reproduction or feeding. They also highlighted the work of Simpson et al (2008) that found Syngnathids showed a positive response to high frequency noise.

Given the lack of compelling evidence for significant populations of seahorses along the Otway Coast region and their prevalence for seagrass and algae dominated habitats, which are mostly confined to sheltered bays and estuaries in shallow water, there is no further assessment conducted on this group.

4.1.6 Eels (*Anguilla spp.*)

The Short-finned Eel (*Anguilla australis australis*) and the Long-finned Eel (*A. reinhardtii*) both occur naturally within Victoria and are the target species of the Victorian Eel Fishery. The eels have differing but overlapping distributions east and south of the Great Dividing Range in estuarine and freshwater catchments (VFA 2023) (Figure E3).

The Short-finned Eel is widespread across the southern parts of the Victoria and occurs occasionally in northern streams draining into the Murray River, while the Long-finned Eel is found within southeast parts of Victoria only (VFA 2023). Both species spend the majority of their life cycle in fresh water or estuaries before travelling to the ocean to spawn once before dying (VFA 2023). The Operational Area or area potentially impacted by underwater sound does not overlap habitat associated with the Long-finned Eel and hence is not discussed further.

Both species migrate to the ocean once matured; male Short-finned Eels generally mature at 8-12 years of age, whilst females mature at 10-20 years. Migration occurs during late summer to autumn (VFA 2023a). Spawning is thought to occur in the vicinity of the Coral Sea, although no precise spawning location for either species has been identified. Eggs are thought to be pelagic and hatch after about two days. Larvae are transported southwards along the east coast of Australia where they metamorphose into glass eels and swim into coastal bays and estuaries (VFA 2023). Most Short-finned glass eels migrate in the winter and spring, although glass eels may continue to arrive anytime throughout the year (VFA 2017).

The distributions of Short-finned Eels are extensive from subtropical Queensland to western Victoria, Tasmania, and New Zealand (VFA 2023).

Koster et al (2021) tracked the Short-finned Eel spawning migration for the first time in Australia. Sixteen eels were collected and tagged from the Hopkins and Fitzroy River estuaries as they migrated from the river mouths outwards to the Southern Ocean over a sandbar in 2019. They were then released at either Warrnambool Harbour, Hopkins mouth beach or Killarney beach. Of the 16 tags twelve returned data. The results showed that the Short-finned Eels exhibit diel vertical migration, where they travel in the top layers of water during the night and travel further down in the water column during the day (Koster et al. 2021). Of the small number of eels that made the entire journey to the spawning location their last movements were recorded in the Coral Sea. Many of the eels (about 30%) migrations were cut short due to predation, suspected by sharks, tuna, or other marine mammals.

It has been noted by Van Wichelen, et al (2022) that glass eels feeding during their migration is highly restricted, therefore when discussing impacts to glass eels, this has been considered.

Short-finned Eel is listed as 'near threatened' on the IUCN red list, with barriers to riverine movement and freshwater habitat loss being key threats. Additionally changes in ocean currents, primary production, and thermal regimes may also affect eel migration, spawning success, and recruitment (Koster et al. 2021). The long-finned eel is listed as 'least concern' by the IUCN. Short-finned Eel is not listed under the EPBC Act and is fished by the Victorian Eel Fishery.

Victorian Eel Fishery

Both the Long-finned and Short-finned Eel are the target species for the Victorian eel fishery. The first commercial catches of eel were recorded in 1914, and up until 1950 eel was primarily fished for bait. Export of frozen Short-finned eel to Europe began in the 1960s (VFA 2023a). Eel are harvested in Victorian coastal river basins south of the Great Dividing Range using fyke nets, with a maximum of 18 licences allowed in Victoria. Certain waterways are closed to fishing to allow for eels to escape and spawn (VFA 2023a). Short-finned Eels are the most abundant and the most keenly targeted eel species in Victoria, productivity from the fishery is highly susceptible to short and long term and seasonal environmental variations, particularly drought (VFA 2017).

The eel fishery comprises both a wild catch sector and a culture (stock enhanced) sector. The culture sector has developed strategies for growth consistent with the species life cycle by translocating juvenile eels from other parts of Victoria into lakes and impoundments (culture waters) in western inland Victoria where they continue to grow (VFA 2017). Fishing for glass eels has been of limited success due to the highly variable abundance in Victoria. Most of Victoria's eel catch is taken by commercial fishers and is comprised of adult eels during different stages of their migration.

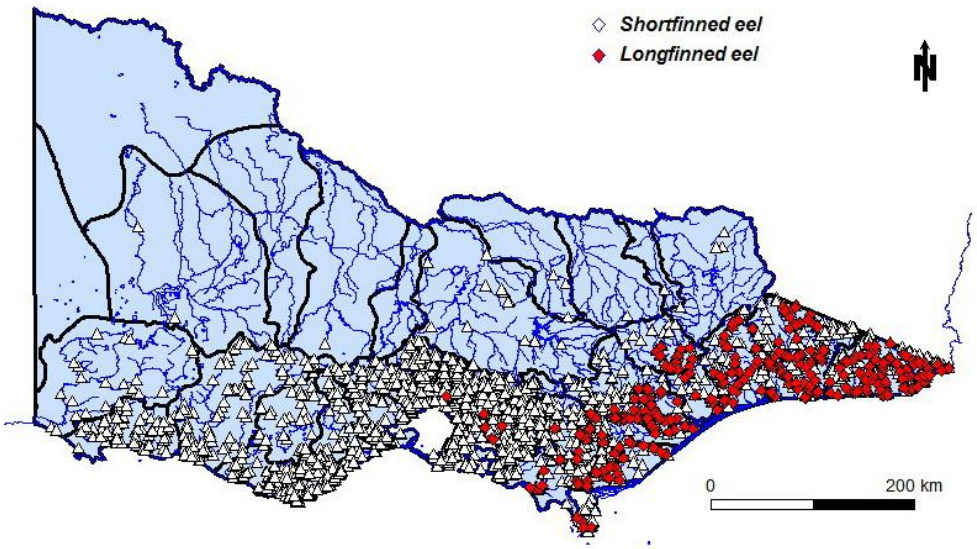

Figure E3-3: Distribution of Long-finned and Short-finned Eels in Victoria (VFA 2017)

4.2 Protected Species without Swim Bladder

4.2.1 Grey Nurse Shark (*Carcharias taurus*)

The east coast population status for the Grey Nurse Shark is critically endangered under the EPBC Act. In addition, this species is also protected in the coastal waters of Victoria under the Fisheries Act 1995. The recovery plan for this species highlights that all but one of the nineteen key aggregation sites for this species are listed as 'habitat critical for the survival of the species'. Of most relevance here is that none of these key aggregation sites are in waters off the Victoria coast (CoA 2014).

The Grey Nurse Shark is reported to have two distinct populations in Australia: a west coast population and an east coast population. This shark species is found mostly in inshore regions in cool temperate to sub-tropical waters (Compagno, 1984; Last & Stevens, 2009). The east coast population covers a range of approximately 2,700 km and extends from the Capricornia coast (central Queensland) to Narooma in southern New South Wales. Sightings data from the New South Wales Department of Primary Industries (NSW DPI) includes sightings as far south as the NSW/Victoria border (CoA 2014). Grey Nurse Sharks tend to live in shallow inshore waters with their preferred habitats being sandy-bottomed gutters or rocky caves and close to inshore rocky reefs or islands (DCCEEW 2021).

The Grey Nurse Shark is slow growing and long-lived with late onset sexual maturity and low fecundity. Lifespans of this species have been known to reach at least 40 years for females and 34 years for males (Passerotti et al. 2014, Harry 2018). The longest records for wild *C. taurus* in mark and recapture studies are 22 years (male) off the south coast of Western Australia and 26 years (female) off the coast of South Africa (Jakobs & Braccini 2019, Hoschke et al. 2023). The east coast population is currently estimated to be around 2,000 individuals with recovery of this population considered slow (DCCEEW 2023a).

As highlighted in this species' recovery plan, the principal threats to this population and contributors to the lack of Grey Nurse Shark recovery in Australia are mortality resulting from incidental (accidental and/or illegal) capture by commercial and recreational fishers and from shark control activities. Other potential threats to the species mentioned in the recovery plan include impacts from ecotourism, collection for public aquaria, pollution and disease and ecosystem effects as a result of habitat modification and climate change. Exploration activities, including seismic, have not being identified as key threats to this species (CoA 2014).

4.2.2 Little Gulper Shark (*Centrophorus uyato*)

The Little Gulper Shark is listed as Conservation Dependent. Gulper Sharks are targeted by the Southern and Eastern Scalefish and Shark Fishery but are mostly taken as bycatch in the trawl fishery. They are endemic to Australia, occupying demersal habitats on the upper slope of the southern continental shelf, between 180 m to 900 m (Williams et al. 2012). There are likely to be three distinct stocks of Gulper Shark:

- An eastern stock along the east coast of Australia down to eastern Tasmania.
- A central stock from western Tasmania through the Great Australian Bight.
- A western stock from the western Great Australian Bight, southwestern Australia.

Gulper Sharks have life history characteristics that make them vulnerable to overfishing, which is the biggest driver of declines in this species. These include slow growth, late age-at-maturity, low fecundity, and low natural mortality (TSSC 2013a). Young are born live, and reproduction is continuous and non-seasonal (TSSC 2013a). Estimated foraging range for Gulper sharks is up to 50 nm based on acoustic telemetry data (Williams et al. 2012). They undertake day-night migrations across their depth range from relatively deep day time residence depths (1000 m) to shallower nighttime feeding depths (to 200 m) (Williams et al. 2012). [Section updated in response to response to Matter: F03]

4.2.3 School Shark (*Galeorhinus galeus*)

School Shark are a temperate demersal species found on the continental shelf and slope. They can be found to depths of 550 m and often move up into the water column at night. School shark segregate into schools according to size and sex (AFMA 2023). Size generally increases from inshore to offshore. Pups and juveniles aggregate in shallower 'nursery' waters during the spring and

summer. School Shark undertake long migrations of up to 1400 km along the southern coast of Australia, which are thought to be associated with homing to natal mating and pupping grounds (Last and Stevens 1994). However, while extensive migrations within regions have been recorded, studies of different global populations indicate that each region hosts a genetically distinct population. Within regions, it is suspected that there may be localised subpopulations (TSSC 2009a).

School Shark are a target species for the Southern and Eastern Scalefish and Shark Fishery but are also taken as bycatch in the trawl fishery.

School Shark is listed as Conservation Dependent. It appears to have undergone a significant reduction in numbers as a result of commercial fishing in southeastern Australian waters (TSSC 2009a). School Sharks move extensively throughout the waters of southern Australia. School Shark is primarily a deep water demersal (bottom-dwelling) species, although individuals have been recorded undertaking daily vertical migrations, remaining at depths of around 500 m during the day and moving up to around 100 m at night (McLoughlin, 2007). Females and juveniles utilise inshore coastal areas around Victoria, Tasmania, and parts of South Australia for nursery areas (Pogonoski et al., 2002). Birth occurs in early summer after a gestation period of 12 months. Pups are born in shallow bays and estuaries (AFMA 2024).

4.2.4 White Shark (*Carcharodon carcharias*)

The White Shark is listed as Vulnerable. White Sharks are long-lived, living for 30 years or more (Bruce 2008), and are found throughout temperate and sub-tropical regions in the northern and southern hemispheres (Last & Stephens 2009). The species is also commonly found in inshore waters in the vicinity of islands, and often near seal colonies (Malcolm et al. 2001). The White Shark foraging BIA within the area that may be impacted by underwater sound above the behavioural threshold for sharks, is centred on Lady Julia Percy Island which is a known seal breeding colony (Appendix B12 MAP-REG-EPM-077).

4.3 Commercial Fish Species with Swim Bladder

The following commercial fish species were identified from the Commercial Fisheries Analysis Report available in Appendix B6.

4.3.1 Australian Salmon (*Arripis truttaceus* – Western Australian Salmon, *Arripis trutta* – Eastern Australian Salmon)

The following is from;

https://www.fish.gov.au/report/351-Western-Australian-Salmon-2023

https://www.fish.gov.au/report/350-Eastern-Australian-Salmon-2023

The Western Australian Salmon biological stock is distributed from Kalbarri in Western Australia southwards to South Australia, Victoria and the west coast of Tasmania. The species spawns in Western Australia and eggs and larvae are dispersed by the Leeuwin Current. The fish then grow and mature in eastern waters before moving back towards their spawning areas in the west.

This cross-jurisdictional biological stock has components in Western Australia, South Australia and Victoria. The status presented here for the entire biological stock has been established using evidence from all jurisdictions. However, the breeding component of this stock resides exclusively in Western Australia, with only immature/nonbreeding fish occurring in South Australia and Victoria [Cappo et al. 2000].

In Victoria, Western Australian Salmon are subject to very low exploitation by recreational and commercial fisheries. The species is not a common target in the major Victorian bay and inlet fisheries; for example, “Salmon” were listed as the primary target species by only 0.38% of recreational fishers interviewed in creel surveys in Port Phillip Bay [Bell et al. 2023]. Western Australian Salmon are targeted in small-scale recreational fisheries elsewhere (e.g., in estuaries and along the coast), however these catches are likely small within the context of the species' wide-ranging behaviour and ability to use a diverse range of habitats [Bell et al. 2023].

The above evidence indicates that the biomass of this stock is unlikely to be depleted, recruitment is unlikely to be impaired, and the current level of fishing mortality in each jurisdiction is unlikely to cause the stock to become recruitment impaired.

In Victoria, the Eastern Australian Salmon stock is targeted by the commercial purse seine ocean fishery, mostly off eastern Victoria, with small catches also taken from Corner Inlet and the Ocean Fishery. This cross-jurisdictional biological stock has components in New South Wales, Victoria and Tasmania. The entire Eastern Australia biological stock is classified as a sustainable stock.

Australian Salmon is a target of the Victorian Multispecies Ocean Fisheries.

4.3.2 Australian Sardine (*Sardinops sagax*)

The following is from AFMA 2023d ((https://www.afma.gov.au/species/australian-sardine)).

Australian Sardine is found primarily in temperate waters throughout the eastern Pacific Ocean. They are a coastal species that can usually be found from inshore waters to the edge of the continental shelf, down to depths of about 200 m. Australian Sardine is often found in large schools. Feeding is thought to mainly occur during the day.

Australian Sardines are a key food source in marine food chains throughout their range, being targeted by marine mammals, birds and pelagic fish species such as tuna. They are the dominant clupeoid in the region occurring throughout coastal and shelf waters in contrast to the Australian Anchovy which is mostly confined to inshore waters (Ward et al 2020).

There are four recognised sub-populations centered on Southwestern Australia, Eastern Australia, Southeastern Australia and Southern Australia. The major fishing grounds are in South Australia. Stocks are considered sustainable. Spawning occurs during spring-summer in the southern part of its range, and in summer-autumn in the northern part (Figure E3 - 4). It was previously thought that Australian Sardine only spawn once or twice in a season, but research on similar species suggests that they may spawn multiple times. Females produce 10,000 – 45,000 eggs per spawning event depending on their body size.

A recent study has discovered a hitherto unestimated large Australian Sardine resource off South Eastern Australia (Ward et al 2023). The new estimates suggest that catches could be increased by an order of magnitude without endangering the sustainability of the stock.

Australian Sardine is a target species for the Small Pelagic Fishery and the Southern and Eastern Scalefish and Shark Fishery. [Section updated in response to Matter: F03]

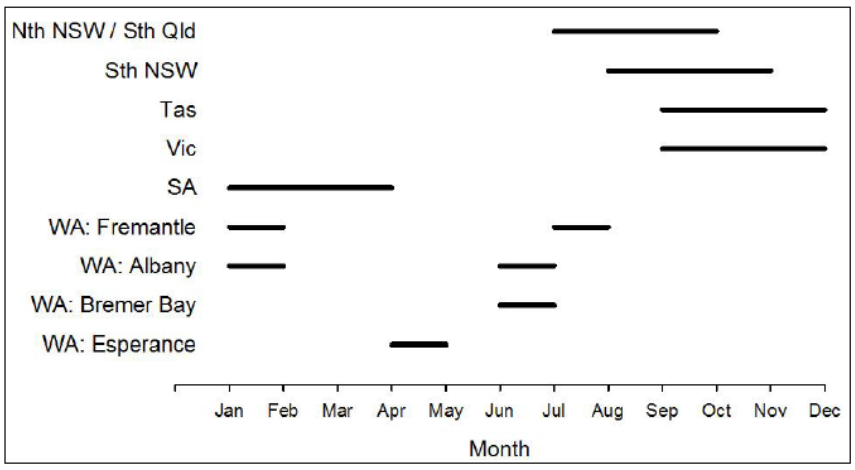

Figure E3 - 4 Periods of peak spawning of Australian sardine throughout its Australian distribution (from Izzo et al 2012).

4.3.3 Bigeye Tuna (*Thunnus obesus*)

The following is from AFMA 2023e.

Bigeye Tuna is a highly migratory species, swimming continuously over large distances. They are found commonly in eastern Australian waters, but they are also found in the waters of other countries within the Pacific and Indian Oceans.

In Australia, Bigeye Tuna is caught anywhere along both the east and west coasts and is a targeted species by fishers in both the Eastern Tuna and Billfish Fishery and the Western Tuna and Billfish Fishery.

Bigeye Tuna is a tropical tuna species and prefers warmer oceanic waters and is not likely to be present in the Otway area of the Operational Area.

4.3.4 Blue Grenadier (*Macruronus novaezelandiae*)

The following is from AFMA 2023f.

Blue Grenadier is a deepwater species that occurs on the continental slope. They can be found at depths of 200 - 700 m. Juveniles often occur in shallower bays and inlets. Blue Grenadier aggregate near the seabed during the day and move up into the water column at night. Spawning occurs in winter and early spring. The main spawning ground for blue grenadier is on the west coast of Tasmania. Females release about 1 million eggs in a single spawning event.

Blue Grenadier is a target species for the Southern and Eastern Scalefish and Shark Fishery. Catch rates in Australia are highest off the west coast of Tasmania on the shelf slope during winter where the species aggregates to spawn, and this region has been confirmed as a major spawning ground for the species (Gunn et al. 1989, and Bulman et al. 1999). [Paragraph updated in response to Matter: F03].

4.3.5 Blue Mackerel (*Scomber australasicus*)

The following is from AFMA 2023g.

Blue Mackerel are a schooling pelagic species that occurs in tropical and temperate waters of the Pacific Ocean. They can be found to depths of 200 m over the continental shelf, although juveniles inhabit inshore waters and shallower waters. Blue Mackerel tend to school by size, as well as with other fish such as jack mackerels. Feeding is thought to occur during the day.

Blue Mackerel reach reproductive maturity at about 3 years of age. Spawning occurs in spring and summer in outer continental shelf waters off northern New South Wales and southern Queensland.

Fishing for Blue Mackerel in the Small Pelagic Fishery has historically been focused off southeast NSW, eastern Tasmania, and South Australia. These areas are outside of the Operational Area.

4.3.6 Blue-eye Trevalla (*Hyperoglyphe antarctica*)

The following is from AFMA 2023h.

The Blue-eye Trevallas are stout-bodied fish with a blunt snout and small scales. The Blue-eye Trevallas are benthic species that are associated with rocky ground on continental slopes often found in continental shelf and upper slope waters at depths from 100 - 600 m and on seamounts and undersea features. They generally remain close to the seabed during the day and move up into the water column at night. Spawning occurs in summer and autumn. Mature fish are thought to move into shallower waters and aggregate over specific areas for spawning. Most spawning activity occurs in waters from central New South Wales to north-eastern Tasmania (AFMA 2024). [Reference added in response to Matter: F03]

Blue-eye Trevallas are a target species for the Southern and Eastern Scalefish and Shark Fishery.

4.3.7 Broadbill Swordfish (*Xiphias gladius*)

The following is from AFMA 2023i.

Broadbill Swordfish is an oceanic species and is caught worldwide throughout tropical, temperate, and occasionally cold waters. They are commonly found in eastern Australian waters, but they are also found in the waters of other countries within the Pacific and Indian Oceans.

In Australia, Broadbill Swordfish are caught anywhere along both the east and west coasts, and it is a targeted species by fishers in both the Eastern Tuna and Billfish Fishery and the Western Tuna and Billfish Fishery.

Broadbill Swordfish are not commercially caught in the Operational Area.

4.3.8 Eastern School Whiting (*Sillago flindersi*)

The following is from AFMA 2023j.

Eastern School Whiting is a benthic species found from shallow tidal flats down to depths of 180 m on the continental shelf. They are usually associated with sandy substrates. Juveniles tend to be found in shallower waters than adults.

Spawning is regionally variable and occurs from October to March in the eastern Bass Strait, late summer in Tasmania, and during winter in northern New South Wales. Females spawn twice each year in deeper waters. Females produce 30 000-110 000 eggs per spawning season depending on their body size.

Eastern School Whiting is a target species for the Southern and Eastern Scalefish and Shark Fishery.

4.3.9 Jack Mackerel (*Trachurus declivus* and *T. murphyi*)

The following is from AFMA 2023m.

Jack Mackerel are a pelagic schooling species found around the southeast and southern coasts of Australia over the continental shelf and outer shelf margin. They are commonly found at depths of 20 - 300 m. Jack Mackerel school by size. Juveniles tend to be found in shallower waters than adults. Feeding is thought to occur both during the day and at night.

Spawning occurs during late spring to early summer. Spawning begins off the southeast coast of Australia and moves progressively southwards over the summer.

Fishing for Jack Mackerel in the Small Pelagic Fishery has historically focused on the area of waters off Southeast NSW, Eastern Tasmania and South Australia.

4.3.10 King George Whiting (*Sillaginodes punctatus*)

King George Whiting are found within the bays, estuaries, and coastal waters of Victoria. They are a popular target of recreational fishers with most fish taken within the semi-sheltered waters of Port Phillip Bay (PPB), Corner Inlet-Nooramunga (CI) and Western Port (WP), where commercial fishers are also located. Population dynamics are strongly influenced by climatic factors determining numbers of larvae transported to bay and estuarine nurseries from coastal spawning areas in spring [Jenkins and May 1994, Hamer and Jenkins 1996, Jenkins et al. 2000, Jenkins 2005]. As most King George Whiting leave the bays and inlets permanently by four years of age (prior to adulthood) [Hamer et al. 2004], these fisheries are based on just a few age classes at any one time, making catches highly variable over relatively short time scales. Over the past 60 years catches have shown peaks and troughs at about 10 to 12-year intervals. These cycles are thought to be related to variation in westerly winds driving larval transport and survival (Jenkins 2005). Because fishing effort is concentrated in bays and inlets, adults in coastal waters are likely subject to low fishing mortality.

King George Whiting has a complex life history, exhibiting ontogenetic shifts in habitat at different life history stages (Fowler and Jones, 2008). Spawning occurs during late autumn and early winter at offshore reefs, shoals, and mounds in relatively deep water (30 – 100 m) in exposed locations (Fowler, 2000, Fowler et al., 1999, Steer et al., 2018). The larvae of King George Whiting can be advected across hundreds of kilometers over a prolonged pre-settlement period (3 – 5 months), dispersing larvae from the offshore spawning grounds to the shallow water nursery areas in protected shallow bays (Fowler et al., 2000b, Rogers, 2019). Juvenile fish develop and grow in the vicinity of these nursery areas until 3 - 4 years of age (Fowler et al., 2000a) when they move to their offshore spawning grounds to repeat the cycle (Fowler et al., 2000a, Fowler et al., 1999).

This species is a target species of the Marine Scalefish Fishery in South Australia as well as the Bays and Inlet Fisheries of Victoria.

Given the high level of significant interest from relevant persons further analysis and assessment of this species can be found in Appendix F3 - Further Assessment of Key Environmental Values and Sensitivities. Details of relevant references will also be found there.

4.3.11 Pink Ling (*Genypterus blacodes*)

The following is from AFMA 2023n.

Pink Ling are a demersal species that inhabits the continental shelf and slope. They can be found at depths of 20 - 1000 m. Juveniles tend to occur in shallower waters than adults. Pink Ling occur over a variety of substrates, from rock ground to soft sand and mud in which they burrow. Aside with some movement associated with spawning, pink ling are thought to be relatively sedentary.

Spawning occurs over an extended period during late winter and spring. Pink Ling are thought to be serial spawners, with egg batches being released in a floating gelatinous mass in each spawning event. Females produce about 333,000 eggs per spawning event depending on body size.

Spawning aggregations have been reported by commercial fishers off Strahan, Tasmania, Lakes Entrance Victoria, and Gabo Island NSW (Bruce et al 2002). [Sentence added in response to Matter: F03]

Pink Ling is a target species for the Southern and Eastern Scalefish and Shark Fishery.

4.3.12 Redbait (*Emmelichthys nitidus*)

The following description is from Ward et al (2019) except for paragraph 2 which is from AFMA website.

Redbait is widely distributed throughout the southern hemisphere, with the species reported from Tristan da Cunha in the southern Atlantic, the south-western coast of South Africa, St Paul and Amsterdam Islands, mid-oceanic ridges and seamounts through the Indian Ocean, Australia, New Zealand, submarine ridges in the south-eastern Pacific, and the southern coast of Chile (Markina and Boldyrev 1980, Meléndez and Céspedes 1986, Parin et al. 1997). Within Australian waters, the range of Redbait extends from mid New South Wales to south-west Western Australia, including Tasmania (Gomon et al. 2008).

They can be found at depths of 20 - 500 m and form schools by size and by depth. Juveniles tend to occur near the surface while adults are found in deeper water closure to the sea floor. Adults move up into the water column at night. They feed on large planktonic crustaceans, cephalopods and small fish and are themselves food for seals, seabirds and tunas (AFMA 2023o)

Redbait is an asynchronous batch spawner with indeterminate fecundity. Annual trends in Gonadosomatic Index (GSI) and macroscopic gonad stages indicated that Redbait from eastern Tasmania spawn between September and November, with a peak in activity during September and October (Ewing and Lyle 2009). A similar pattern was evident for south-western Tasmania, although the peak occurred one month later during October and November (Ewing and Lyle 2009). Spawning occurs along a 2.5 nautical mile (nm) corridor either side of the continental shelf break when mid-water temperatures are between 12 and 15.2°C (Neira et al. 2008). Redbait populations are spatially extensive and relatively abundant across southern Australia occurring continuously at the shelf break between southern NSW and south-western Western Australia (Ward et al 2019).

Redbait eggs are positively buoyant and hatch about 2–4 days after fertilisation depending on temperature (Neira et al. 2008). Newly hatched yolk sac larvae range from 1.9 – 3.3 mm TL. Little is known about the early life history of Redbait post-hatching, although the distribution of eggs and larvae off eastern Australia have been described by Neira et al. (2008).

The spawning habitat of Redbait was described from egg, larval and environmental data collected over shelf waters between north-eastern Bass Strait and lower south-western Tasmania in 2005 and 2006 (Neira et al. 2008).

Redbait is a target species of the Commonwealth Small Pelagic Fishery (Western sub-zone) however it is a minor component of the fishery with no catches reported for 2020-21 and 2021-22 for the CSPF and no state catches either (Status of Australian Fish Stocks – Redbait 2023).

4.3.13 Ribaldo (*Mora moro*)

The following is from AFMA 2023p.

Ribaldo are a temperate deepwater species that occurs on the continental shelf. They can be found near the seafloor at depths of 450 - 2,500m and it appears to be most common at depths of 500 – 1000 m. Ribaldo are associated with sea mounts and rough seabeds. Juveniles may be pelagic.

Spawning occurs in winter and early spring. Ribaldo are not thought to form large spawning aggregations.

Ribaldo is a target species for the Southern and Eastern Scalefish and Shark Fishery.

4.3.14 Striped Marlin (*Kajikia audax*)

The following is from AFMA 2023r.

Striped Marlin is an oceanic species caught worldwide throughout tropical, temperate, and occasionally cold waters. They are found commonly in eastern Australian waters, but they are also found in the waters of other countries within the Pacific and Indian Oceans.

In Australia, Striped Marlin are caught anywhere along both the east and west coasts and is a targeted species by fishers in both the Eastern Tuna and Billfish Fishery and the Western Tuna and Billfish Fishery.

Though Striped Marlin is not commercially caught in the Operational Area it is sometimes caught recreationally off Victoria.

4.3.15 Snapper (*Chrysophrys auratus*)

The following is from;

https://www.fish.gov.au/report/365-Snapper-2023

Snapper is widely distributed in Australia and managed as twelve stocks. Six are sustainable, one is recovering, four are depleted and one is undefined. The Western Victoria stock is currently defined as 'sustainable'.

Snapper has a wide distribution in Australia, ranging from waters off the north coast of Western Australia, around the south of the continent, and up to northern Queensland around Hinchinbrook Island [Kailola et al. 1993]. Within this broad distribution, the biological stock structure is complex and there are considerable differences in the spatial scales over which populations are divisible into separate stocks.

Snapper to the west of Wilsons Promontory, including the important fisheries of Port Phillip Bay and Western Port, constitute the Western Victorian biological stock. This stock extends westward from Wilsons Promontory to near the mouth of the Murray River in south-eastern South Australia [Sanders 1974; Donnellan and McGlennon 1996; Hamer et al. 2011; Fowler et al. 2017].

The Western Victorian stock extends westward into south-eastern South Australia, and depends on recruitment into, and subsequent emigration from, Port Phillip Bay in Victoria. Port Phillip Bay, the main spawning and nursery area for the stock [Hamer et al. 2011]. Although this stock extends throughout the coastal waters of central/western Victoria and south-east South Australia, the main indicator data are derived from the major bay fisheries in Victoria: Port Phillip Bay and Western Port.

Snapper is a target of the Victorian Multispecies Ocean Fisheries.

Given the high level of significant interest from relevant persons further analysis and assessment of this species can be found in Appendix F3 - Further Assessment of Key Environmental Values and Sensitivities

4.3.16 Southern Garfish (*Hyporhamphus melanochir*)

The following is from Earl et al (2024) Stock Assessment Report to PIRSA Fisheries and Aquaculture.

Southern Garfish are productive fast-growing members of the Hemiramphidae family and endemic to southern Australia. They form large schools in shallow, inshore marine waters and are particularly abundant in South Australia's northern Gulfs.

They are a multiple batch spawning species that has a protracted spawning period of 6 months from October to March, with only a small proportion of the population in spawning condition at any one time. Population studies have shown that adult garfish are mostly associated with a particular area for much of their lives indicating that the state-wide population consists of numerous discrete populations.

Southern Garfish are caught within the Marine Scalefish Fishery which operates within South Australia. The area of most relevance to the REGIA MSS is the South-Eastern fishing zone which extends from Kangaroo Island to the SA-Victorian border. The SE fishing zone has been the least productive zone for the southern garfish fishery since 1983/84 with total annual catches usually < 2 tonnes. This stock is classified as sustainable.

4.3.17 Tiger Flathead (*Platycephalus richardsoni*)

The following is from AFMA 2023s.

Tiger Flathead are a demersal species that is found at depths of 10 - 400 m. Juveniles inhabit shallow waters of the continental shelf and move into the deeper outer shelf zone as they reach maturity. They are not an active species and normally rest in areas of mud and sand on the seabed during the day and move into the water column at night to feed. There is evidence that mature fish migrate to shallower waters prior to the spawning period. Spawning occurs over an extended period from spring to autumn, with some variation on the timing of spawning depending on location. Females produce 1.5-2.5 million eggs per spawning season.

Tiger Flathead is a target species for the Southern and Eastern Scalefish and Shark Fishery. The southern Australian population is considered sustainable under current fishing effort. [Section updated in response to Matter: F03]

4.3.18 Yellowfin Tuna (*Thunnus albacares*)

The following is from AFMA 2023t.

Yellowfin Tuna is a highly migratory species, swimming continuously over large distances. They are usually found in eastern and western Australian waters but are also found in the waters of other countries within the Pacific and Indian Oceans.

Spawning occurs throughout the year in tropical waters and seasonally in subtropical waters. The peak spawning period in the southern hemisphere occurs in summer. In tropical waters females spawn almost daily. Spawning occurs almost entirely at night. Females can produce over 0.2-8 million eggs per spawning event depending on their body size.

In Australia, Yellowfin Tuna are caught along both the east and west coasts and is a targeted species by fishers in both the Eastern Tuna and Billfish Fishery and the Western Tuna and Billfish Fishery.

Though Yellowfin Tuna is not commercially caught in the Regia MSS area it is sometimes caught recreationally off Victoria.

4.3.19 Wrasse (multiple species)

The following is from VFA 2023.

The Victorian Wrasse (Ocean) Fishery targets Bluethroat Wrasse and Purple Wrasse, also called Saddled Wrasse (*Notolabrus fucicola*). Small catches of Rosy Wrasse, Senator Wrasse and Southern Maori Wrasse are also caught.

Wrasse inhabit depths up to 160 m where individuals tend to remain close to a home reef and are territorial. They are relatively long lived and have a relatively long larval period (Bluethroat Wrasse: 44

to 66 days; Purple Wrasse: 40 to 87 days) leading to potentially wide dispersal that can repopulate depleted areas. The two species are thought to interbreed to produce hybrids.

4.4 Commercial Fish Species without Swim Bladder

4.4.1 Albacore Tuna (*Thunnus alalunga*)

The following is from AFMA 2023c.

Albacore Tuna is a highly migratory species, swimming continuously over large distances. They are found commonly in eastern Australian waters, but they are also found in the waters of other countries within the Pacific and Indian Oceans. In Australia, Albacore Tuna are caught anywhere along the east coast and is a targeted species by fishers in the Eastern Tuna and Billfish Fishery.

Though Albacore tuna is not commercially caught in the Operational Area it is sometimes caught recreationally off Victoria.

4.4.2 Elephant Fish (*Callorhinchus mili, Harriotta haeckeli* and *H. raleighana)*

The following is from AFMA 2023k.

Elephant Fish are the common name for Ghost Shark (*Callorhinchus mili) and S*pookfish *(Harriotta haeckeli and H. raleighana)*

Ghost Sharks are often found in shallow bays and large estuaries, but also to depths of 200 m on the continental shelf. Juveniles inhabit shallow coastal waters for about three years and gradually move into deeper water as they mature. Ghost Sharks appear to school by gender.

Spookfish are a deepwater species that occurs on the continental slope. They can be found in depths of 380 – 2,600 m. *H haeckeli* are generally found in deeper water than *H. raleighana*. Little is known about the habitat of spookfish. Adults and juveniles probably occupy different habitats.

Ghost Sharks are oviparous (lay eggs) and it is presumed that spookfish do as well.

Elephant Fish have a broad distribution across much of southern Australia, but actual biological stock structure is unknown. The species is caught in relatively low quantities in NSW, Victoria and Tasmania. In Victoria, Elephant Fish were historically landed in low to moderate quantities by commercial bay and inlet fisheries, particularly in Western Port Bay (WPB). Females move inshore to lay pairs of leathery egg cases on sandy or muddy bottoms (AFMA 2024). [Paragraph added in response to Matter: F03]

Elephant Fish is a target species for the Southern and Eastern Scalefish and Shark Fishery although it is reported as incidental catch.

4.4.3 Gummy Shark (*Mustelus antarcticus*)

The following is from AFMA 2023l.

Gummy Sharks are a demersal species that inhabits the continental shelf from the near shore region to depths of 80 - 350 m. They remain either on or near the seabed. Newborn and juvenile Gummy Sharks aggregate in many areas across southern Australia, while young and adult gummy sharks are more widely distributed. Gummy Shark are considered a single genetic stock across their entire range from Bunbury, WA to Jervis Bay, NSW, with 3 sub-stocks centred on Bass Strait, Tasmania and Southern Australia. Gummy Sharks are oviparous (lay eggs).

Gummy Sharks are a target species for the Southern and Eastern Scalefish and Shark Fishery where catches have remained stable for many years. [Section in response to Matter: F03]

4.4.4 Saw Sharks (*Pristiophorus cirratus - Common, P. nudipinnis - Southern, P. peroniensis-Eastern)*

The following is from AFMA 2023q.

Sawsharks are a common demersal species that inhabits the continental shelf and upper slope. They can be found in depths to 300 metres. Sawsharks are sometimes found in large schools or feeding

aggregations. Some species segregate according to age, with adults being found in deeper water than juveniles.

- *Common*: in depths of 40 – 310 m
- *Southern*: in depths of 40 – 165 m
- *Eastern*: in depths of 100 – 630 m

Sawsharks are relatively small sharks growing up to 1.5 m in length and 4.3 kg depending on species. Females grow slightly larger than males. Common sawsharks are generally slightly larger than southern sawsharks. Lifespans are up to 9 years for southern sawsharks and 15 years for common sawsharks.

Sawsharks reach reproductive maturity at about 2 years of age. They are aplacental viviporous (bear live young). Young are born during winter in shallow coastal areas after a 12-month gestation period. Common and southern sawsharks produce about 5 - 20 pups per litter and probably breed only every second year. The rostral teeth emerge before birth but lie flat against the snout of the foetus until after birth.

Sawsharks are a target species of the Southern and Eastern Scalefish and Shark Fishery (SESSF) - Shark Gillnet and Hook Sector.

4.5 People and Communities

4.5.1 Social and Economic Features

During consultation, as presented in Annex 2, objections and claims were raised regarding concerns of impacts on the local economy and environment. Species that may be affected, including commercial and recreationally fished species, are described above in sections 4.1 to 4.4.

4.5.2 Cultural Features

Eels were, and continue to be, an important resource for certain First Nation communities. Their use for communal gatherings and for barter and trade was extensive in pre-colonial times. Today, eel remains a popular food for community events (VFA 2017). Short-finned Eels in particular hold a cultural significance to First Nations people (Appendix F3, Sections 3.7, 3.15 and 3.16). For example, the Gunditjmara people of south-western Victoria built and used sophisticated aquaculture systems throughout the Budj Bim Cultural Landscape to exploit eel migrations at least 7,000 years ago. These systems are outside of the area that may be affected by underwater sound.

Perch are also identified as being culturally significant to the Eastern Maar People as a resource and in traditional, social and economic practices (EMAC, 2015). Blackfish are also harvested by both Eastern Maar and Gunditjmara peoples (Appendix F3, Section 3.16). The PMST report did not find Blackfish as occurring in the area affected by underwater sound, and since Perch is associated with freshwater no impact from underwater sound from offshore seismic is predicted, so these species are not discussed further.

5 Relevant Legislative and Other Requirements

CGG has considered all the relevant legislative requirements, conservation management and recovery plans for all fish species that may be affected (see Annex 3). No specific requirements related to the effect of sound on fish were identified through this process.

6 Defining Acceptable Levels of Impact

Although hearing ranges and sensitivities vary substantially between species (Ladich and Fay 2013), all fish species tested to date can detect sound and vibration to some degree (Dale et al. 2015). Fishes have developed two sensory mechanisms for detecting, localising, and interpreting underwater sounds and vibrations: the inner ear, which is tuned to sound pressure detection, and the lateral line system, which allows a fish to detect vibration and water flow. Inter-specific variations in hearing range and sensitivity result from the different adaptations in these systems for perceiving sound pressure and particle motion information (Popper and Fay 2011).

Because the presence or absence of a swim bladder has a role in hearing, Popper et al. (2014) classified fishes into three categories for assessment of sound effects.

1. Fishes without a swim bladder that can sink and settle on the substrate when inactive. e.g., mackerel, Scomberomorus spp., some species of tuna, Thunnus sp. and sharks (Casper et al. 2012, Popper et al. 2014, Carroll et al. 2017).
2. Fishes with swim bladders whose hearing does not directly involve the swim bladder or other gas volumes. e.g. snappers, emperors, groupers and rock cods (Lutjanids and Lethrinids such as *Pristipomoides* spp., *Lethrinus* spp., *Lutjanus* spp., and family Serranidae), and some species of tuna (*Thunnus* sp.) (Tavolga and Wodinsky 1963, Higgs et al. 2006, Braun and Grande 2008, Engineering-Environmental Management Inc. 2008, United States Department of the Navy 2008, Caiger et al. 2012, Bertrand and Josse 2000, Song et al. 2006).
3. Fishes whose hearing does directly involve a swim bladder or other gas volume. e.g., family Clupeidae (herrings, sardines, pilchards and shads) and some Haemulidae (grunters and sweetlips) (Nedwell et al. 2004, Braun and Grande 2008, Popper et al. 2014). Eels are included in this group (Jerko et al 1989).

The most relevant metric for perceiving underwater sound for most fish species is particle motion (Popper and Hawkins 2019, Popper et al. 2019) but, except for a few species (Popper and Fay 2011, Popper et al. 2014), there is an almost complete lack of relevant data on particle motion sensitivity in fishes (Popper and Hawkins 2019).

Most fish species detect sounds from below 50 Hz up to 500-1500 Hz. A smaller number of species can detect sounds to over 3 kHz, and a very few can detect sounds to well over 100 kHz. Whether a particular anthropogenic sound affects hearing is contingent on the hearing frequency range of the species and whether the sound level is above a calculated minimum threshold. For this impact assessment, it is assumed that all fishes can detect signals below 500 Hz and therefore can 'hear' the seismic source.

Sound exposure guidelines for fish have been established by the American National Standards Institute (ANSI) accredited report of Sound Exposure Guidelines for Fishes and Sea Turtles (Popper et al. 2014). The sound exposure guidelines from Popper et al. (2014) are based on the presence or absence of a swim bladder and ancillary structures which determines the level of susceptibility of fishes to injurious effects from exposure to intense sound. Accordingly, different exposure guidelines were developed for fishes without a swim bladder, fishes with a swim bladder not involved in perception of acoustic signals and fishes that use their swim bladders for hearing.

No studies to date have demonstrated direct mortality of adult fish in response to seismic emissions, even at proximity (within 1–7 m; DFO 2004, Boeger et al. 2006, Popper et al. 2014, Carroll et al. 2017). Nevertheless, exposure guidelines from Popper et al. (2014) were still modelled as part of the impact assessment process. Outcomes were less than or equal to recoverable Injuries hence they are not tabulated here but can be referred to in the modelling report if interested.

Based on the above discussion, Table E3-1 justifies and defines the acceptable levels of impact from underwater sound on fish. Further information on studies in relation to seismic acoustic emission impacts to fishes is provided in the Regia MSS Seismic Studies Summary available in Appendix B8.

CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that aspect specific statements

would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, Table E3-1 shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding aspect specific defined acceptable levels established for this assessment. Defining the acceptable levels is the starting point for the required demonstration that environmental impacts and risks of the activity will be of an acceptable level. The defined acceptable levels found in this section are subsequently carried through the prediction of impacts in this document, to the demonstration found in Section 10. [1]

Table E3-1 - Defined acceptable levels of impact from underwater sound effects to fish

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	Fish and aquaculture stocks continue to be assessed as having the same stock status they held prior to commencement of the activity.	This acceptable level draws on established fisheries management frameworks which monitor stock status to ensure sustainable harvest and ecological balance. Retaining stock status through and beyond the activity period reflects that no material or sustained impact has occurred. People and communities rely on commercial fishing and commercial catch such that protecting the stock levels / biomass available for fishing is an appropriate level of impact to set.
	The impact and risk assessment process is based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		

[1] Note: The acceptable levels related to demonstrating ALARP and the adoption of specific measures to ensure the effectiveness of control measures can be found in Appendix F2 and B3 respectively. As they are criteria integral to the acceptance of the Environment Plan, and they are documented elsewhere, these criteria are not discussed further in this assessment.

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.	No fish should be exposed to sound at or exceeding threshold levels for TTS set at 186 dB SEL24hr.	In fish with no swim bladder, TTS is a temporary reduction in hearing sensitivity caused by exposure to intense sound. After termination of the sound source normal hearing ability returns over a time that is variable, depending on the intensity and duration of sound exposure (Popper et al. 2014). Sound exposure guidelines proposed in Popper et al. (2014) use a cumulative sound exposure level of 24 hrs (SELcum24hrs) for TTS. Recoverable Injury: 216 dB SELcum24hr. TTS: 186 dB SELcum24hrs. In fish with a swim bladder not involved in hearing, pressure-related injuries may occur, but recovery is possible. TTS for this group is also set at 186 dB SELcum24hr, and recoverable injury at 203 dB SELcum24hr.
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.	As above for Principles of ESD.	
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	Reflects Commonwealth and State policy objectives for sustainable resource use and protection of ecosystem services.
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	This level reflects the principle of maintaining cultural values and heritage as protected under national and state legislation. It ensures that activities do not interfere with traditional practices, spiritual connections, or ongoing access to culturally significant areas.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons. The views of public have been considered in the impact and risk assessment.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	This level reflects broader social licence to operate, ensuring that environmental activities do not lead to degradation of public amenity, loss of recreational use, or impacts to non-Indigenous heritage values. It aligns with Commonwealth policies promoting public access, well-being, and sustainable use of the marine environment.

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Impacts Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of impact could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of underwater sound, elimination involves removing the source of underwater sound or preventing its generation in the first place. Five main options were considered and subsequently adopted:

No discharge of the sound source within the West Tasmania Canyons KEF

This measure eliminates potential noise impacts in a KEF characterised by complex bathymetry and high productivity, which may be important for spawning, feeding, or migration of fish. It has been applied by CGG to protect the ecological integrity and fish biodiversity associated with this KEF, which is recognised for its national environmental significance.

No MSS acquisition beyond 200 m depth contour

Deepwater habitats may support unique and less-studied fish assemblages that could be sensitive to noise and extending the survey beyond this boundary may increase environmental uncertainty and operational risk. The limitation was applied to confine the activity within a well-characterised depth zone and reduce exposure of deepwater species to anthropogenic sound.

No seismic acquisition within 17 km of Deen Maar / Lady Percy Julia Island

This limitation reduced the overlap with most fishing effort in the region and is protective for mobile or short ranging fish species that are more likely to be present in water depth < 50 m. The shallow depths are also where most lobster will settle when ready to do so. This measure was adopted to avoid disturbance to coastal and nearshore invertebrate communities and to prevent elevated acoustic energy in shallow, sensitive environments. This was confirmed during consultation with commercial fishers who agreed that the data was correct and most fishing activities occurred in shallower waters close to ports (Event ID 4107, Feedback ID 1277).

This island is known for its ecological significance, including nearby fish habitats and potentially sensitive species that rely on the surrounding waters. The buffer zone was applied to provide spatial protection for species utilising this ecologically and culturally important area, thereby reducing potential impacts. For derivation of the 17 km buffer refer to Table 6 in the EP document under the constraint “Protection for marine fauna associated with Deen Maar/Lady Julia Percy Island”.

No sound source discharges within the Orange Roughy research program areas.

During consultation (Event IDs 2002, 3350, 1649, 2003, Feedback IDs 4125, 4305, 4124, 4337) claims were raised by a fishing association to avoid interference with an Orange Roughy Research Program by ensuring there was no data acquisition, or turns, over the sample collection areas, with a buffer between the acquisition and sample areas, with preferred non-acquisition months to be April to October. As shown in map MAP-REG-EPM-050_B (Appendix B12), the activity was reduced to ensure there is no overlap of sampling areas with the active source area, including turns. A small portion of the central sampling area overlaps with the operational area; however, this will not have a greater impact than any other vessel transiting the area. Therefore, there is no break to the time series of the data, due to lack of overlap with the active source area. In addition, the Regia MSS is not prohibiting the ability of the research program to catch the fish required for the study to continue uninterrupted, negating the need for exclusionary months. CGG has since committed to an additional activity limitation to include no petroleum activity being carried out between 1 January and 15 September.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the impact. One option was considered and subsequently adopted:

Sound will not be emitted above the stated capacity

By selecting a sound source and operational settings that remain within a defined maximum acoustic output, the activity substitutes more harmful, higher energy alternatives for lower-intensity ones. This measure was adopted to ensure predicted effects on fish remain within modelled thresholds, avoiding excessive acoustic exposure that could disrupt behaviour or physiology.

9 Predicted Levels of Impact

To determine the predicted levels of impact of underwater sound on fish at this stage in the process requires the reader to have assimilated all prior relevant information that has been assessed on fish. The EP documentation is coded alphabetically to guide the reader through what is a natural process of temporal accumulation and review of evidence. The following documentation forms the evidence lineage for predictions on fish as described here.

- B5 – PMST Reports – The Protected Matter Search Tool was used to search for environmental values and sensitivities potentially located within the proposed Regia MSS planning area, with eight specific searches undertaken of which one was for Fish within the region defined by the Regia MSS Active Source Area with an included buffer area out to 8km.
- Commercial Fisheries Review – In August 2023 all commercial fisheries and their targeted species, associated with the Commonwealth and/or the states of Victoria were identified and mapped to indicate fishing effort relative to the proposed Regia MSS (Appendix B6: Commercial Fisheries Analysis Report. In March 2025, a further review was undertaken of the commercial fisheries to include the 2023 Commonwealth fishery data and the updated Operational Area. The outcomes of this latest review are detailed in Appendix E1 – Impact Assessment Physical Presence.
- B7 – Sound Modelling Reports - SLR performed a numerical modelling study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic impacts on key regional receptors including marine mammals, fish, turtles, benthic invertebrates, plankton and recreational divers and swimmers. Acoustic thresholds derived from this document are used to guide assessments of impacts.
- B8 – Seismic Studies Report – This report provides a detailed assessment of the scientific literature related to sound (and specifically seismic) effects on fish and other fauna. This literature is the key evidence base from which impact levels are derived and provides a template for how effects to fish can be assessed by following the recommendations of Popper et al (2014).

All species identified through B5 and the Commercial Fisheries Reviews (B6 and E1) have been assessed through the framework provided by B7 and B8. Because of commonalities among species in their sensitivity to seismic it is not necessary to describe effects to each species individually but rather as groups defined by swim bladder presence/absence.

9.1 Change in Fauna Behaviour, Hearing Capacity, and Physical Condition

As detailed from the underwater sound and studies relevant to seismic surveys (see Regia MSS Seismic Studies Summary available in Appendix B8), mortality and injury to fish are not predicted based on the received sound levels to these species.

Fishes were grouped and modelled according to the role of a swim bladder in their potential responses to seismic. However, in discussing predicted levels of impact here we group by type of impact. This is because modelled effects are very similar across the 3 groups.

9.1.1 Mortality and Potential Mortal Injury and Recoverable Injury

Maximum modelled distance to sound effect criteria for mortality/potential mortal injury and recoverable injury was 86 m – 2 km. The predicted effect level on these species is assessed as minor given the following:

- Mortality of fish (both immediate and delayed) is not predicted based on no scientifically documented cases of mortality in free-swimming fish exposed to seismic source emissions under experimental or field conditions (DFO 2004; Boeger et al. 2006; Popper et al. 2014; Popper et al. 2016; Carroll et al. 2017; Popper and Hawkins 2019).
- Injury impacts may occur if the seismic array commences at full power adjacent to fish. However, the implementation of the Fauna Management System requires the seismic source to be slowly ramped up to full power over 30 minutes. This would allow demersal and pelagic species to move away from the source before it is at full power. However, once

the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I04].

- Site-attached fish species are species that have a very high degree of site fidelity to the extent that they are unlikely or unable to flee an approaching seismic source and are likely to remain and/or seek refuge within habitat structures. Impacts to site-attached fish were studied by Woodside at Scott Reef during the Maxima 3D MSS activities (Miller and Cripps 2013) and no lethal or sub-lethal effects on fish were experienced nor any significant decreases in the diversity and abundance of fish after the seismic survey, compared with the long-term temporal trend before the survey.
- Commercially targeted fishes within the area of impact that are generally considered site attached include a range of commercially targeted species such as Blue-eye Trevalla, Eastern School Whiting, flathead, Gummy Shark, Orange Roughy, Pink Ling, Ribaldo and Sawsharks. Examination and testing of seismic effects on commercial catches of fish, (including flathead and shark species), in the Gippsland Basin region found little evidence of changes induced by seismic surveys for 12 species (Bruce et al. 2018).
- National Recovery Plans and Conservation List Advice for EPBC Act list and migratory for species do not identify underwater sound as a threat to the recovery of fish species.

The uncertainty level for impacts to fish causing mortality and potential mortal injury and recoverable injury from seismic sound is assessed as low based on:

- Sound effect criteria used in the impact assessment have been published in peer reviewed scientific journals.
- There is a significant body of published studies that demonstrate no cases of mortality in free-swimming fish exposed to seismic source emissions under experimental or field conditions.

Thus, the predicted level of impact based on the effect (minor) and uncertainty (low) is assessed as low. These validated impacts are of an acceptable level without further reduction measures being required.

9.1.2 Temporary Threshold Shift

As detailed in Table E3-1 maximum modelled distance to sound effect criteria for temporary threshold shift (TTS) is 10.95 km.

The predicted effect level to these species is assessed as minor because while impacts are predicted to have some effect on fish, they are not considered significant enough to affect the population given the following:

- The Popper et al. (2005) study that informed the Popper et al. (2014) TTS sound exposure guideline, was done using a static source (airgun array) and static receptors (fish in cages at 13-17 m from the array) and is therefore not representative of a marine seismic survey which is a moving source, and animals are not constrained in their movements. On this basis, the Popper et al (2005) study represents a worst-case scenario as the source is fixed and not moving (i.e. fish received five pulses of identical intensity over five minutes) and nor are the fish.
- Since the Popper et al. (2014) TTS sound exposure guidelines were developed Professor Popper has provided feedback on the appropriateness of using a 24-hour period to assess the potential for TTS and other effects associated with SEL_{cum} (Popper 2018). The review considered the potential impacts of cumulative seismic noise from the proposed Santos Bethany 3D seismic survey on fish, including TTS effects, and length of time for recovery and the applicability of a SEL24h metric. Though this information was based on another survey it is applicable to the Regia MSS as the premise for the modelling was a racetrack survey design that bought the vessel back to a similar starting point within 24 hours, thus receiving the closest shots within a 24-hour period. The review noted:
    - It is highly unlikely that there would be physical damage to fishes because of the survey unless the animals are very close to the source (perhaps within a few meters).

  - If TTS does take place, the duration of exposure to the most intense sounds that could result in TTS will be over just a few hours. Thus, accumulation of energy over longer periods than a few hours is probably not appropriate.
  - If TTS takes place, its level is likely to be sufficiently low that it will not be possible to easily differentiate it from normal variations in hearing sensitivity. Even if fishes do show some TTS, recovery will start as soon as the most intense sounds end, and recovery is likely to even occur, to a limited degree, between seismic pulses. Based on very limited data, recovery within 24 hours (or less) is very likely.
  - Little is known about the behavioural implications of TTS in fishes in the wild. However, since the TTS is likely very transitory, the uncertainty of it having a significant impact on fish fitness and survival is very low.

- As detailed above, Popper et al. (2005) reports that fish showing a TTS recovered to normal hearing levels within 18-24 hours, thus any hearing loss and subsequent decrease in fitness would be temporary with recovery taking place in a relatively short timeframe after the seismic source has moved away from the exposed fish. Based on this, the potential for impacts to individuals' fitness and survival is limited and impacts to fish community structures are not predicted.

The uncertainty level for impact to fish causing TTS from seismic sound is assessed as medium based on:

- The sound effect criteria used in the impact assessment have been published in peer reviewed scientific journals.
- Published studies show TTS impacts to fish are short lived (up to hours), however there are limited published studies on the effects of seismic sound on fish specifically in the Otway region.
- An absence of long-term monitoring data of the effects of seismic on fish in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (minor) and uncertainty (medium) is assessed as medium. For fish the predicted level of impact is clearly below the predefined acceptable levels of impact as detailed in Section 10.

9.1.3 Change in Behaviour

There are currently no quantitative exposure guidelines or criteria for behaviour or masking for fish for impulsive sounds. The Working Group on the Effects of Sound on Fish and Turtles (Popper et al. 2014) found that there was insufficient data available and instead applied a subjective approach using 'relative risk' to assess risk at three distances from the source. These are:

- Behavioural response: high at near (within tens of metres) and intermediate (hundreds of metres) distances from the seismic source and moderate at distances far (thousands of metres) from the source.
- Masking: low at near (within tens of metres) and intermediate (hundreds of metres) distances from the seismic source and moderate at distances far (thousands of metres) from the source.

Thus, the extent of the area of impact is predicted to be within thousands of metres of the seismic source. In the most recent acoustic modelling study (Appendix B7), a 150 dB threshold for behavioural disturbance for fish was applied. It is acknowledged in the report that the derivation and origin of the informal 150 dB threshold is not as well-defined as other thresholds. However, recent publications do not refute that behavioural disturbance for fish can occur around this level (Hawkins et al. 2014). The maximum predicted behavioural disturbance impacts for fish was predicted to be 13.81 km from the sound source. The predicted effect level to these species is assessed as minor because while the impacts are predicted to have some effect on fish, the effects are not considered significant or at a level high enough to affect the population given the following:

- Meekan et al. (2021) undertook a large-scale experiment that quantified the impacts of exposure of an assemblage of tropical demersal emperors, snappers and groupers targeted by commercial fisheries to a commercial-scale seismic source on the Northwest Shelf off Western Australia. They did not identify any short-term (days) or long-term (months) effects of exposure on the composition, abundance, size structure, behaviour, or movement of fishes at any exposure sites.
- Shark species are highly vagrant and naturally cover large distances. As such, short-term exposures from the transient seismic source are expected to result in localised behavioural responses and movements of sharks. Research by Bruce et al. (2018), which tagged two commercially targeted shark species (Broadnose Shark and School Shark) and monitored their movements in response to a seismic survey in Australian waters noted that both control sharks and exposed sharks moved freely in and out of the study area which did not indicate any changes in behaviour or distribution because of seismic sound exposure.
- No BIAs, critical habitats, or key aggregation sites have been identified within or adjacent to the area potentially affected by underwater sound for the critically endangered Grey Nurse Shark.
- The White Shark foraging BIA within the area that may be impacted by underwater sound above the behavioural threshold for sharks, is centred on Lady Julia Percy Island / Deen Maar which is a known seal breeding colony. The sound source will not be discharged within 17 km of Lady Percy Julia Island / Deen Maar which will significantly reduce the potential impacts of underwater sound on White Shark behaviour near the foraging BIA. [Point added in response to Matter F08 and F17]
- Fishes' awareness of the sound and any resultant behavioural responses may be limited to a few hours as the seismic source passes by, while significant behavioural responses (startle or avoidance) are more likely to be limited to a shorter period (less than an hour) when the seismic source is closest. As the seismic source will be transient (i.e., continuously moving) during seismic data acquisition, demersal fishes will only be exposed to significant sound levels for a relatively short period of time as the seismic survey vessel passes nearby before sailing away again.
- Impacts to site-attached fish were studied by Woodside at Scott Reef during the Maxima 3DMSS activities (Miller and Cripps 2013) and they determined that there was a lack of significant impacts to fish species considered sensitive because of their site-fidelity requirements (i.e., being restricted to reef habitat and unable move far when the seismic sound approaches) based on the following:
    - Behavioural responses were observed at close range with general movement from the water column to the seabed, however normal feeding behaviour returned within 20 minutes of the survey vessel passing and when the vessel was beyond 1.5 km.
    - No significant decreases in the diversity and abundance of fish after the seismic survey were detected compared with the long-term temporal trend before the survey.
- Any behavioural impacts are likely to be short-lived and fish would return to normal behaviours once the vessel has moved away based on research by Miller and Cripps (2013) and Wardle et al. (2001). Behavioural impacts to pelagic fish species are possible but would be temporary, localised, and unlikely to impact at a population level.
- Limited data on biochemical stress indicators in fishes exposed to seismic sound indicate there may not be any discernible change (e.g., McCauley et al. 2000, 2003). However, if fishes were to experience stress because of sound exposure, levels may return to normal within 72 hours (Santulli et al. 1999).

- Sardines are a key food source in the Otway region hence evidence of significant changes in behaviour of this species and other clupeids in response to a seismic MSS could have flow-on effects to their predators. However, research does not support significant changes in the behaviour of clupeids in the presence of MSS. A key reference that is cited to support seismic effects on penguins (Pichegru et al 2017) found there were no significant changes in distribution and/or abundance of small pelagic fish in the region compared to a few months

prior to or after the seismic operations (Pichegru et al 2017). An even more targeted study that exposed herring schools to a full-scale 3D seismic survey off Northern Norway found no changes in the behaviour of herring schools from a transmitting seismic vessel as it approached from a distance of 27 km to as close as 2 km (Pena et al 2013). The schooling behaviour of sardines is complex and varies within and among locations, days, months and years at both spatial and temporal scales (Ward et al 2011). This variability is clearly intrinsic to their behaviour and would influence feeding strategies and adaptability of those species that target them as a food source.

The uncertainty level for impact to fish causing a change in behaviour from seismic sound is assessed as medium based on:

- Published studies show behavioural impacts to fish are short lived with fish returning to normal behaviour once the vessel has moved away (in some cases within 20 minutes). While there are limited published studies on the effects of seismic sound on fish behaviour specifically in the Otway region there is no reason to expect different behaviour of similar species from different locations.
- An absence of long-term monitoring data of the effects of seismic on fish in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (minor) and uncertainty (medium) is assessed as medium. For fish the predicted level of impact is clearly below the defined acceptable levels of impact as detailed in Section 10.

9.1.4 Change in Commercial Catch

As detailed in the review of Commercial Fisheries (see Appendix B6 and subsequently updated in E1) the Operational Area overlaps with some fisheries to varying degrees.

Commonwealth Fisheries

Non-significant Overlap

- Bass Strait Central Zone Scallop (BSCZSF), Eastern Tuna and Billfish (ETBF), Small Pelagic (SPF) and Western Tuna and Billfish Fisheries (WTBF) all have allowable fishing areas located within some part of the Operational Area but with little or no active fishing in these areas for at least 10 years between 2010-2023. This is also the case for the Southern and Eastern Scalefish Fishery (SESSF) – Shark Hook sub-sector. Hence these fisheries are not assessed for impacts (refer to cited figures in B6 and E1 as needed).

Significant Overlap

- The SESSF- Commonwealth Trawl – Danish Seine sub-sector has seen declining fishing effort since 2019 however because it involves less than 5 fishers, confidentiality does not allow for assessment of fishing intensity.
- The SESSF – Shark Net sub-sector has significant fishing effort across the operational area including the acquisition area (MAP-REG-EPM-102_B). However, in the context of the entire fishery, it constitutes a tiny proportion of the fishing effort which is concentrated through Bass Strait and off South Australia (MAP-REG-EPM-130_B). The species targeted are elephant fish, gummy shark, saw sharks and school sharks.
- The SESSF – Trawl sub-sector has significant fishing effort in the southwest of the operational area (MAP-REG-EPM-103_B). However, in the context of the entire fishery, it constitutes a tiny proportion of the fishing effort which extends from northern NSW to Kangaroo Island South Australia (MAP-REG-EPM-131_B). The species targeted are blue-eye trevalla, blue grenadier, eastern school whiting, orange roughy, pink ling, ribald and tiger flathead. Danish Seine sub-sector
- The SESSF – Scalefish Hook sub-sector has a low level of fishing effort restricted to an area towards the SE corner of the operational area (MAP-REG-EPM-105_B). In the context of the entire fishery, it constitutes a tiny proportion of the fishing effort which is centred along the east coast of Tasmania and off the coast of Robe, South Australia (MAP-REG-EPM-133_B). However, because it involves less than 5 fishers, confidentiality does not allow for assessment

of fishing intensity. Species caught in this fishery have some overlap with the Trawl sub-sector, which is assessed.

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Victorian Fisheries

Non-significant Overlap

- The Bays and Inlets and Eel fisheries do not overlap with the operational area of the Regia MSS hence no impacts are expected. Nevertheless, further assessment has been done for Eels in response to feedback (see section 13).
- The Wrasse (Ocean) Fishery has minor overlap with the operational area in the northwest corner.

Significant Overlap

- While the multispecies Ocean Fishery has significant overlap with the operational area in terms of presence, less than 2% of >3000 days fished between 2011-2022 were within the operational area highlighting the relative lack of fishing that goes on inside this area (MAP-REG-EPM-113_B). The species targeted are gummy shark, school shark, Australian salmon and snapper.

In August 2023 a review of commercial fisheries was undertaken to identify Commonwealth and State (Victorian, Tasmanian, and South Australian) fisheries that fish or potentially fish within the Activity Planning Area and is available in Appendix B6: Commercial Fisheries Analysis Report. In March 2025, a further review was undertaken of the commercial fisheries to include the 2023 Commonwealth fishery data and the updated Operational Area. The outcomes of this latest review are detailed in Appendix E1 – Impact Assessment Physical Presence. Table E1-1. In summary

The following fisheries that target fish species were assessed as having or potentially having a high level of activity within the Operational Area:

- Commonwealth Southern and Eastern Scalefish and Shark Fishery
  - Commonwealth Trawl Sector.
  - Shark Gillnet Sub-sector.
  - Scalefish Hook Sector.

Impacts to commercial catch rates could occur through a number of pathways. The physical presence of seismic vessels could hinder the ability of fishers to access a fishing ground, and this type of disturbance is addressed in Appendix E1 – Impact Assessment Physical Presence.

The other pathway has two components – firstly, the impacts of seismic on individuals of a species or group i.e. the specific vulnerability to seismic according to their biological makeup and secondly, the impacts of seismic on the most vulnerable aspects of their life-history. This second component specifically refers to aggregation behaviours such as spawning which creates conditions where individuals are concentrated in relatively small areas such that if impacts from seismic are possible, they have the potential to be disproportionately harmful to a population. Because of the importance of commercial fishing and concerns raised by relevant persons further assessment has been undertaken for spawning behaviours of key fisheries species in Appendix F3 – Further Assessment of Key Values and Sensitivities under Section 3.14. This rationale is further explained in the Recommendations section of this document.

The effects of seismic on individuals has been assessed in B8 (Seismic Studies Summary) where the scientific literature has been interpreted and summarised to describe the consensus on seismic effects across species. Here is where the rationale for grouping species by the role of a swim bladder is clarified.

There have also been multiple studies looking at behavioural effects of commercial fish species in response to seismic sound to determine whether this has translated into reduced catches for commercial fishers.

Results across studies focussing on fisheries within Victorian waters have not been able to find clear, consistent, negative effects on commercial catch rates that can be attributed to seismic sound.

- A study by CSIRO and Geoscience Australia (Thomson et al. 2014) examined fisheries catches and catch rates for potential effects from 183 seismic surveys undertaken in the Gippsland Basin (Bass Strait). Fisheries catch and effort data was obtained from commercial logbooks for the following species: commercial scallops, school whiting, tiger flathead, eastern gemfish, silver warehou, jackass morwong, blue eye trevalla, arrow (Gould's) squid, school shark, and gummy shark. No clear or consistent relationships between seismic surveys and subsequent fisheries catch rates could be found and if effects occurred, they could not be distinguished from inter-annual changes in stock size or availability to fishing gear resulting from other dynamics.
- Catch studies undertaken as part of a marine seismic survey in the Gippsland Basin found no clear evidence of adverse effects on scallops, fish or commercial catch rates (Przeslawski et al. 2016a; Bruce et al. 2018). Species covered here included John dory (*Zeus faber*), tiger flathead (*Neoplatycephalus richardsoni*), red gurnard (*Chelidonichthys kumu*), morwong (*Nemadactylus macropterus*), goatfish (*Upeneichthys* spp), sawshark (*Pristiophorus* spp), elephantfish (*Callorhinchus milii*), gummy shark (*Mustelus antarcticus*); Gould's squid (Nototodarus gouldi), Boarfish (Pentacerotidae); sawshark; swell shark (*Cephaloscyllium* spp); elephantfish; angel shark (*Squatina* spp); broadnose shark (*Notorynchus cepedianus*); school shark (*Galeorhinus galeus*) and snapper (*Pagrus auratus*).
- An investigation into the effect of a 2015 seismic survey in the Gippsland Basin on deepwater flathead catches did conclude that the significant drop in catch per unit effort was very likely influenced by the seismic survey (Haddon 2017). However, Haddon (2017) went on to add that the seismic survey did not appear to have had a lasting impact on deepwater flathead catch per unit effort, which returned to typical values in the first month following the seismic survey.
- Preliminary results from a FRDC funded BACI study to investigate the effects of a 3D marine seismic survey in eastern Bass Strait on Danish Seine catch rates (Knuckey 2020) indicated a negative impact of seismic acquisition on whiting catch rates up to ~100 days following the survey and on flathead rates up to ~200 days. Unfortunately, this study has not been peer-reviewed and nor has a final report ever been issued, despite the project finishing in 2021. Given outstanding questions remain around study design and implementation and a lack of serious review, we do not consider these results robust to interpretation, so they have not been a consideration for this assessment.

The predicted effect level to commercial fisheries catches from the Regia MSS is assessed as minor based on the lack of clear negative outcomes from multiple targeted studies.

The uncertainty level in the assessment of impacts to commercial fish catches from seismic sound is assessed as medium based on:

- There have been multiple studies supporting lack of significant changes to commercial fish catches from seismic surveys with, at worst, possible short term but recoverable effects.
- There is no evidence for mortality of fish (both immediate and delayed) exposed to seismic source emissions either under experimental or field conditions.

The predicted level of impact based on the effect (minor) and uncertainty (medium) is assessed as medium.

9.2 Measures Adopted to Manage Environmental Impacts

The following measures have been adopted to ensure that the impacts associated with underwater sound from the survey and support vessels on fish will be of an acceptable level.

These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

Table E3-2 Measures adopted to manage environmental impacts

Measure	Measure Type	Details and Justification
Ramp up of sound source to full power over 30 minutes.	Practice	Mobile marine fauna (including demersal and pelagic fish, octopus, squid, diving birds, penguins, and turtles) are expected to move away from the source before it is at full power, providing them a level of protection. However, once the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I04, I05, E08].
CGG Technical Operations Manager	Person	Reasonable, evidence-based claims are promptly assessed and paid as per the Otway Adjustment Protocol.
Quality Control and Reporting Representative	Person	Ensures that the contracted vessels follow the contract and deliver the survey as per the permitted activity by using the sail line plan.
Fisheries Liaison Officer (FLO)	Person	This person will conduct specific consultation with commercial fishers and support the processing of compensation claims.
Adjustment Protocol	Procedure	An adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area. This will extend to fishing cooperatives who can provide an evidence of commercial losses because of the survey.
Sail Line Plan	Resource	Ensures that the survey vessel will remain within the scope and boundaries of the EP and reflects the activity limitations.

10 Demonstration Impacts will be of an Acceptable Level

10.1 Principles of ESD

Temporary, Reversible, Small Scale and Natural variation

As described in the impact assessment, the Regia Marine Seismic Survey will generate impulsive underwater sound from a 2,820 in^3 airgun array over 60 days constrained within a 90-day period. Modelling predicts that sound exposure levels capable of causing for mortality/potential mortal injury and recoverable injury was reached between 86 m –2 km The distance to temporary threshold shift (TTS) is limited to 10.95 km Behavioural disturbance may occur up to 13.81 km from the sound source. As discussed in the impact assessment, Miller and Cripps (2013) found no significant impacts on site-attached fish species, with only short-term behavioural changes observed that resolved within 20 minutes and no long-term changes in fish diversity or abundance compared to pre-survey trends. Santulli et al. (1999) noted if fishes were to experience stress because of sound exposure, levels may return to normal within 72 hours, indicating any impacts will be temporary and reversible.

There has been no scientifically documented cases of mortality in free-swimming fish exposed to seismic source emissions under experimental or field conditions (DFO 2004; Boeger et al. 2006; Popper et al. 2014; Popper et al. 2016; Carroll et al. 2017; Popper and Hawkins 2019). Effects are most likely to be short-term behavioural responses, such as avoidance or startle, particularly in hearing-specialist fish.

Any physiological effects are expected to be minor and reversible, with no measurable impact on individual fitness or population viability. No critical spawning aggregations, fish nursery areas, or habitats of significance occur within area where thresholds are exceeded. Fish have high reproductive capacity and dispersal ability, and many species migrate through broad areas of habitat. The predicted sound footprint is narrow and transient, moving continuously with the vessel, resulting in limited and localised exposure. Overall, the potential environmental damage is temporary, reversible, and of low intensity.

Based on sufficient information

The assessment applied internationally recognised exposure thresholds for impulsive sound, including criteria recommended by Popper et al. (2014), to account for hearing sensitivity across fish groups. Site-specific acoustic modelling, literature on fish responses to seismic surveys, and expert judgment were used to define impact distances. While some uncertainty remains regarding variability in individual sensitivity and behavioural consequences, the assessment applied conservative thresholds and considered both physiological and behavioural endpoints. No potential for serious or irreversible harm was identified, and the precautionary principle was not triggered.

Activity not inconsistent with EPBC Act

The assessment considered all species listed under the EPBC Act and associated recovery or conservation plans. No protected fish species were found to have critical habitats within the Active Source Area. Activity design explicitly avoided areas like the West Tasmania Canyons Key Ecological Feature and Lady Julia Percy Island. No inconsistencies with management objectives or recovery plans were identified.

10.2 Biological and Ecological Categories

The modelled sound exposure areas are limited in scale, and most fish species are expected to respond to approaching vessels and sound sources by moving away. No mass mortality, spawning disruption, or physical injury is predicted (DFO 2004; Boeger et al. 2006; Popper et al. 2014; Popper et al. 2016; Carroll et al. 2017; Popper and Hawkins 2019, Miller and Cripps 2013). Populations are expected to remain dynamically stable within their natural ranges of variability without intervention. The assessment concluded that biological effects will be minor and unlikely to result in any population-level consequences.

Fish play important ecological roles as predators and prey, but the minor, localised and transient nature of the predicted impacts means that there will be no measurable effect on community structure or ecosystem processes. The sound footprint will not persist in any one area, and the short-

term displacement of individuals will not alter energy flows or trophic interactions. Ecosystem function and biodiversity will remain intact.

10.3 Economic, Cultural and Social Categories

Eels were identified through the cultural heritage review, consultation and desktop research as species with social, cultural and/or economic significance that may be impacted by underwater sound. The ecological impact of underwater sound on eel species has been assessed (see Appendix F3) and determined to be low intensity at a population level and within current accepted levels of impact as applied to the commercial fishing industry.

Several fish species were identified as valued to commercial and recreational fishing and, during consultation, a fishing tour operator. Assessed impacts to each fish species were all sub-lethal and mostly behavioural. There is no evidence of reduced fecundity nor developmental effects in any fish species, therefore long-term effects over multiple fishing seasons are not predicted.

As these values are closely tied to the physical presence and health of the species, the corresponding social, cultural and economic impacts are likewise considered acceptable. Ongoing assessment is conducted at the receptor level and via the corresponding measurement criteria and adopted mitigation measures. Therefore, industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational impacts; culturally significant species, places, and practices continue without disruption; and people and communities maintain ongoing access to the natural environment, recreational activities, and heritage values without long-term or irreversible effects.

10.4 Consistency with Company Processes

The impact assessment followed the methodology in Appendix B3 and applied peer-reviewed sources and defined thresholds where available, for physiological and behavioural effects based on fish hearing group classifications. The activity integrates all mitigation measures recommended through regulatory guidance and good industry practice, and the consequence ratings remain within CGG's established environmental limits. The conclusion of the assessment of seismic sound to fish is summarised below.

Table E3-3 Impact Assessment Effect Levels

Potential Impact	Predicted Level of Effect	Uncertainty	Predicted Level of Impact
Mortality and Potential Mortal Injury and Recoverable Injury	Minor	Low	Low
Temporary Threshold Shift	Minor	Medium	Medium
Change in Behaviour	Minor	Medium	Medium
Change in Commercial Catch	Minor	Medium	Medium

11 Environmental Performance Outcomes

Environmental Performance Outcomes (EPOs) are measurable and activity-specific outcomes that describe the environmental performance the titleholder must achieve to ensure impacts and risks are managed to acceptable levels. EPOs are critical to the structure of an Environment Plan because they form the clear link between the defined acceptable level of impact and the predicted level of environmental consequence. Each EPO must be measurable, achievable, and within the control of the titleholder to implement, providing a transparent and enforceable statement against which performance can be assessed.

Table E3-4 - Environmental Performance Outcomes and Justifications

Defined Acceptable Level (From Table E3-1)	Environmental Performance Outcome	Rationale
Fish and aquaculture stocks continue to be assessed as having the same stock status they held prior to commencement of the activity.	**No change in the assessed stock status of commercial and aquaculture species during and following the activity.**	The EPO can be supported through review of public fisheries stock reports and alignment with acoustic discharge levels remaining below modelled sound volume. No change in stock status indicates no unacceptable impact occurred.
No fish should be exposed to sound at or exceeding threshold levels for greater than 24 hrs for a TTS set at 186 dB SEL24hr.	**Fish will not be exposed to cumulative sound levels exceeding 186 dB SEL $_{cum24hr}$ for more than 24 hrs.**	This EPO is enforceable and verifiable through modelling of acoustic exposure fields and operational logs. It reflects a scientifically established threshold for temporary, recoverable effects and avoids threshold exceedance for both fish hearing sensitivity and pressure injury risk.
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	**Social, cultural, and economic features are protected, sustaining their value for people and communities.**	Predicted impacts to fish are low intensity damage at the population level and within currently accepted levels of impact to these species as applied by the commercial fishing industry. The Otway Adjustment Protocol will be implemented to ensure that affected fishers will not be worse off because of the activity.
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		The Budj Bim eel traps are protected under the World Heritage Area listing, the eels themselves are not. No impacts to the World Heritage Area are predicted. The predicted impacts to eels are low intensity at a population level and within current accepted levels of impact as applied to the commercial fishing industry. The Yarra Pygmy Perch occurs in lakes, ponds, and slow flowing rivers (Saddlier and Hammer 2010). Because of their freshwater affiliation no impact from underwater sound from offshore seismic is predicted.
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		Predicted impacts to fish are low intensity damage at the population level and within currently accepted levels of impact to these species as applied by the commercial fishing industry.

Defined Acceptable Level (From Table E3-1)	Environmental Performance Outcome	Rationale
Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	**The activity is conducted such that environmental impacts and risks remain within the range assessed as medium or lower, with mitigation measures in place and functioning as intended.**	This EPO enables ongoing assessment of effectiveness through internal reviews and operational audits. It provides a clear link between the impact and risk assessment process and implementation strategy, supporting regulatory compliance and continuous improvement without requiring environmental outcome monitoring.

12 Recommendations

For most species/taxa/groups of fish reviewed, this document provides the final assessment of impacts. However, despite an extensive review of the relevant literature on the effects of seismic on fish, there has been a high level of concern voiced throughout consultation with relevant persons, in relation to the importance of certain commercially targeted species and/or species of high cultural value. High levels of engagement on an aspect are a trigger for CGG to undertake additional assessment. In this case looking at the effects of the activity on the following species and/or behaviours. This additional assessment is detailed in Appendix F3 – Further Assessment of Key Values and Sensitivities under the following Sections

- 3.7 – Glass Eels
- 3.11 – Pink Snapper
- 3.12 – King George Whiting
- 3.14 – Spawning Patterns

It is important to note that the assessments detailed in Appendix F3 are as a response to further information requests and/or clarification and not a reflection of any prior assessment being insufficiently thorough. It is a recognition that more explanation and detail was sometimes necessary to better inform all groups involved in the consultation process, including the regulatory authority.

Hence, Appendix F3 does not provide further assessment on all aspects and values identified through the EP process only those that were identified as:

- Having some residual uncertainty about whether impacts or risks were of an acceptable level; and/or
- Contained environmental values and sensitivities (species) of key importance due to their protection status or commercial value; and/or
- Consultation with relevant persons revealed a particular value or sensitivity required further attention and material to support the consultation.

13 Document Control

Date	Revision	Update
6 August 2023	A	Draft prepared for initial comment
29 August 2023	B	Update based on comments and relevant person feedback
11 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
14 May 2024	2	Review and update following public comment
23 October 2024	3	Updated following NOPSEMA assessment
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
6 December 2025	5	Updated following NOPSEMA OMR 2 Letter

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table E3-5 shows how this feedback has been incorporated into the environmental assessments.

Table E3-5 - Public comment input.

Matter	Matter ID	Changes made arising from public comment
Matter: Flawed argument regarding animals moving away	I04	CGG has considered these claims and has updated the EP Impact Assessments (Appendices E, and F where relevant) to clarify that, while some displacement is expected from mobile taxa during the Regia MSS, the survey will not preclude animals from the Operational Area in its entirety. Instead, animals are expected to temporarily move away from the active acoustic source, but once the source passes, animals will be free to move back into the habitat that they departed from.
Matter: Additional information to support impact assessment for fish	F03	CGG has reassessed and referenced literature in Section 4, which clarifies that there is no evidence of significant spawning aggregations occurring within the proposed Regia MSS area for the following species: Blue Warehou, Orange Roughy, Gulper Shark, School Shark, Australian Sardine, Blue Grenadies, Blue-eye Trevalla, Elephant Fish, Gummy Shark, Pink Ling, and Tiger Flathead.
Matter: Impacts of underwater sound on elasmobranchs	F07	CGG has considered these claims and is satisfied that the concerns raised were adequately addressed but has include reference to activity limitation where the sound source will not be discharged within 17km of Deen Maar and it's mitigating effect against potential impacts to sharks and rays in EP Appendix E3.
Matter: Impacts of underwater sound on white sharks	F08	CGG has considered these claims and is satisfied that the concerns raised were adequately addressed but has include additional information on the White Shark BIA and activity limitation here the sound source will not be discharged within 17km of Deen Maar, and it's mitigating effect against potential impacts to White Sharks, in EP Appendix E3.
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and the following Activity limitation: the sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the safety criterion human health safety criterion for recreational divers, surfers and swimmers along the coastline CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F1 F3, G1 and G2). feedback
Matter: Geographic range and all species need to be defined and considered	I16	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table E3-6. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table E3-6 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4030	CGG's email on September 14 indicated that the project's timing has changed to two separate 3-month windows: April-June and September-November. AMCS is concerned that the December sound speed profile may not accurately reflect the physical conditions during these new survey periods. Since acoustic propagation modelling is critical for subsequent analyses and for setting thresholds for mitigation measures required for NOPSEMA approval, AMCS requests an explanation of how the December sound speed profile differs from those in April-June and September-November.	We acknowledge this concern and agree that acoustic propagation modelling is the foundation of subsequent analysis. We will complete another modelling report prior to submission to cover the changed timeframes of the proposed survey.	3384
4035	Comment about the impact of human activities on wildlife habitats and calls for a halt to such destruction for profit. It emphasises the negative consequences of competing interests in the area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2109
4036	Comment claims that seismic activity is known to cause significant harm to marine life, arguing that the proposed project will lead to further degradation of the coastal environment and should be abandoned as a result.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2098
4038	Commenter highlights that fish populations have been adversely affected by seismic testing over the past few years, leading to a decline in their numbers. This decline could also impact other marine species and have negative effects on whale populations.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. A fauna management plan is in place to manage whale interactions.	1432
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa	2940

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	mentioning the geologically sensitive Bonney upwelling.	within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4033	Claim that seismic testing is proven to damage and kill marine life.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1024
4035	Comment about the impact of human activities on wildlife habitats and calls for a halt to such destruction for profit. It emphasises the negative consequences of competing interests in the area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2109
4036	Comment claims that seismic activity is known to cause significant harm to marine life, arguing that the proposed project will lead to further degradation of the coastal environment and should be abandoned as a result.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2098
4038	Commenter highlights that fish populations have been adversely affected by seismic testing over the past few years, leading to a decline in their numbers. This decline could also impact other marine species and have negative effects on whale populations.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. A fauna management plan is in place to manage whale interactions.	1432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4050	Concern about the destruction of smaller sea life and the wounding of larger marine animals due to seismic blasting.	Regia EP has conducted thorough assessments of the literature for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	1669
4051	Concern about the detrimental impacts on marine animals.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1452
4053	Concern about the impact on marine creatures due to noise pollution from seismic surveys.	The titleholder acknowledged the feedback, noting that potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals, are assessed in the Environmental Plan (EP) and can be found in E2, E3, E4, E5, E6, and E7. Measures to minimise adverse impacts on biological receptors are outlined in the EP also and can be found in G2.	3237
4064	Concern raised by the stakeholder regarding the potential damage/kill of marine life due to seismic testing.	Titleholder responded to individual advising that CGG would not propose an activity that would lead to unacceptable impacts to marine life and advised that environmental impact assessments for each aspect of the proposed activity that has the potential to impact marine life were currently being prepared and that they would be based on scientific literature and published shortly for consultation and feedback.	1024
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation.	879

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	by other companies, particularly regarding the sale of seismic data.	Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	
4068	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4073	Concerns about impacts both reputational and physical to the region if the activity is allowed.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1244
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4076	Concerns about potential disturbance to the marine environment, including marine parks and areas of Biological Importance.	The titleholder acknowledged this concern and noted that potential impacts to the marine environment including marine parks and biologically important areas as a result of the Regia MSS is assessed in E1 to E9 and F3 of the EP. There will be no activities with Australian Marine Parks. All areas of biological importance have been identified and assessment in the respective impact and risk assessments.	2278
4077	Concerns about potential harm to zooplankton, whales, dolphins, sharks, seals, the Bonney Upwelling, rock lobster fishery and other local fishing industries.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation	722

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	
4078	Concerns about seismic testing and drilling rigs impacting marine life and fishing activities.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	917
4080	Concerns about the impact of seismic testing on various marine species.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	2179
4081	Concerns about the impact on whale habitat, endangered marine life, and commercial fisheries	Titleholder acknowledged this concern and noted that potential impacts to whales and relevant endangered marine species is assessed in the EP Chapters on underwater sound and light (E2-E7, and E9). Any interactions with seismic are mitigated and managed through spatial boundaries and a comprehensive fauna management plan. Advised that control measures to reduce impacts to commercial fishers as a result of displacement are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	4551
4083	Concerns about why more seismic needed and what time of the year was the survey going to be done to minimise impacts to fishing for sharks, lobsters, squid	Titleholder acknowledged this concern and each of the species within this claim has been subject to extensive assessment in E1, E3, E4 and F3 with various measure adopted to limit the sound exposure to the lowest level possible to meet geophysical objectives and to protect marine fauna (see G1).	740
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4088	Condemns seismic testing, asserting that it is deadly to marine life and unacceptable for ocean ecosystems. Call for a total ban, citing the large number of marine animals harmed by the practice. Argument that the destruction of marine ecosystems and the fishing industry is unjustifiable and express frustration, telling the parties responsible to stop.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	422
4093	Doubted the effectiveness of mitigation measures and believed the reports/information provided were absent of action /intention.	The mitigations applied by CGG are industry standard and comply with government policy. They have been proven to be as effective as reasonably practical for a number of years. The measures adopted to protect species from the aspects of the activity are found in the respective impact and risk assessments.	2830
4096	Environmental Risk: Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artificial light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological	2766

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		receptors in the region and relevant mitigation measures are outlined in the EP.	
4102	Expresses opposition due to proximity to local fishing industries. Emphasises concern about potential risks this testing poses.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Adjustment protocol in place for fishers to seek compensation if impacted by MSS.	428
4118	Impact on marine animals, which are the livelihood of the community.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4123	Insufficient information about potential damage from seismic testing.	The titleholder is confident that sufficient relevant and available information has been used to inform this this EP and to complete a comprehensive assessment of relevant aspects of the activity. Information used based around sound, peer reviewed scientific literature.	4190
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808
4133	Mass destruction of marine populations through the blasting process.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4136	Mention of considerable damage to marine life outweighing the benefits of mapping seafloors for gas drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to	1389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		reduce any impacts to as low as practicable.	
4145	Opposes seismic exploration claiming it is dangerous to all marine life. Cannot ensure zero risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	427
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high decibel blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making them unacceptable in a whale sanctuary area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	537
4153	Presents a historical account of their catch rates over 24 years, indicating that seismic surveys in the past led to a significant decrease in their catch from 10-15 tons per trip to just 5-6 tons per trip for over two years. They now report a catch rate of 10-14 tons per 7 days, suggesting lingering concerns about how current seismic activities may similarly affect their fishing operations.	Titleholder acknowledged this concern and noted that potential impacts to molluscs the Regia MSS is assessed in E1, E4 and F3 of the EP. Advised that control measures to reduce impacts to commercial fishers as a result of loss of catch are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	5190
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan	2088

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		(EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	
4155	Raised concerns about sound levels from the survey and associated effects on marine mammals and other species.	Acknowledged concerns and outlined the predicted effects of sound levels of different species of marine mammals including difference between high and low frequency cetaceans, sound propagation and modelling, and different effect level thresholds. Also outlined the whale management and mitigation measures in place for Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection technology trails, and citizen science program access. Also outlined the effects on zooplankton and the case for acceptability of these	3697
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4173	Seismic blasting has adverse effects on the marine environment, with critical gaps in understanding the effects on individual species and the marine environment.	The titleholder responded with an explanation of the information sources used to inform the Regia MSS impact and risk assessments, and explained how these information sources and resulting measures are specific to the potential impact. The titleholder also referred to documents relevant to this claim within the environment plan (Event ID 4092).	4091
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	2074

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4179	Seismic sounds have far-reaching effects on the marine environment, causing damage and suffering to species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3237
4180	Seismic testing and gas exploration/drilling pose undeniable risks to marine fauna, flora, ecosystems, local fishing, and tourism industries.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2118
4181	Seismic testing has also been found to have sub-lethal impacts on fisheries species	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1893
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and	2963

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1659

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and	1665

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4198	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1672
4199	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information	2586

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		gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments is covered below in response to concern 6.	2886
4202	Stakeholder objects to the proposed blasting activity due to its detrimental effects on marine ecosystems.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously	1049

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		defined acceptable levels and is presented in the Environment Plan.	
4217	Strong objection to the proposal for 3D seismic blast in the Otway Basin due to harm to oceans and unacceptable environmental impact or risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4218	Strong opposition to seismic testing in the ocean due to its effects on both wildlife and the fishing industry. Individual firmly disapproves of the practice.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	425
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4232	The feedback expresses frustration over repeated seismic blasts in the same area, emphasising the significant environmental impacts associated with these activities. It calls for accountability	The Regia MSS is targeting areas that have not been surveyed before though we acknowledge there may be some overlap with previous surveys. We have to show that the	2104

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	from NOPSEMA to prevent future occurrences, highlighting the ongoing threat to the environment.	environmental impacts are short-term, localised, or recoverable and that they are controllable with appropriate measures in place.	
4241	The fisher expressed concerns about the adverse effects of seismic activities on the stocks he relies on, indicating that the surveys have negatively impacted fish availability.	This claim was thoroughly assessed both in E3 and in F3. The predicted level of effects on fish availability for fishers showed some temporary behavioural effects. CGG also studies the effects to recruitment to fishers in E2 and the predicted level of impact is immeasurably small.	2026
4253	The possible effects to marine life and ecosystems are my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4260	The protection of wildlife in the Otway Basin is directly affected by drilling and seismic surveying.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1901

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064
4268	The stakeholder argues that it is impossible to ensure zero risk from seismic activities, emphasising that only zero risk is acceptable. This position reflects a strong concern regarding the potential negative impacts of seismic exploration on the marine environment.	The legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4270	The stakeholder asserts seismic surveying has been proven to be harmful and disruptive to marine life of many species.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	3343
4271	The stakeholder asserts that seismic blasts will have a direct negative impact on marine life, specifically mentioning that an “exclusion zone” will not effectively prevent the effects of the blasts from travelling through the ocean.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable. The titleholder is aware	2108

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how to protect and preserve the values of this site.	
4272	The stakeholder asserts that the survey will have a harmful effect on millions of sea creatures.	It would be unacceptable to have long-term or permanent/unrecoverable impacts, fortunately, impacts from marine seismic surveys are short-term, temporary, and recoverable. (Event ID: 3419)	3343
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publicly responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4278	The stakeholder expresses an active interest in the wellbeing of the coastline and its flora and fauna, indicating a general concern for environmental conservation.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	1325
4285	The stakeholder noted their concern as a resident of Port Fairy: noise (land and sea), impact on marine life, potential impacts on the environment and the future potential if gas is found.	We are also concerned about the welfare of marine fauna. We have undertaken an impact assessment process that includes whale, seals, pelagic and shorebirds. As part of this assessment, we must show that impacts to these species will be of an acceptable level. We have determined that it is acceptable to	1747

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		have temporary behavioural changes, such as moving away from the survey vessel, and no injury or long-term impacts. Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We are also publishing environmental impact, risk and mitigation documents as they are completed, in the document library. We are publishing the entire documents in order to remain transparent, but I have also attached a summary document.	
4287	The stakeholder objected to the activities due to sound levels/acoustic trauma experienced by sea creatures	The scientific literature supports that marine fauna may potentially be displaced due to a seismic survey but that these impacts are typically short term with no impact to ecosystem function. Large scale studies undertaken in Australia that you may be interested in are: Australian Institute of Marine Science. North West Shoals to Shore Marine Noise Monitoring and Impacts https://www.aims.gov.au/research-topics/monitoring-and-discovery/north-west-shoals-shore Behavioural Response of Australian Humpback whales to Seismic Surveys https://www.brahss.org.au/ Assessing the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries https://www.frdc.com.au/project/2012-008 Marine Seismic Survey Impacts on Fish and Invertebrates: Final Report for Gippsland Marine Environmental Monitoring Study https://ecat.ga.gov.au/geonetwork/srv/api/records/2292f4a7-ba2e-3533-e053-12a3070aaf2c Maxima 3D Marine Seismic Survey at Scott Reef https://www.sciencedirect.com/science/article/abs/pii/S0025326X13006528 https://www.sciencedirect.com/science/article/abs/pii/S0025326X18300687 Regarding Marine Fauna Observer's (MFOs), companies that contract MFOs such as Blue Planet Marine and RPS Group provide training for	2389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		MFOs. As part of contracting MFOs we will ensure that the persons provided meet the requirement of the Australian Government EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales, that requires MFOs to be trained and experienced in whale identification and behaviour, distance estimation, and be capable of making accurate identifications and observations of whales in Australian waters. The Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, details the competency requirements for MFOs and ongoing awareness (page 23 and 24). The Regia MSS Implementation Strategy is available on the Regia MSS Website Document Library see https://klarite.mysocialpinpoint.com.au/regiamss/document-library As detailed in the Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, CGG will only use appropriately experienced MFOs as determined by a review of their CVs (page 23). The Regia MSS Implementation Strategy also details how CGG will monitor the performance of the control measures during the activity (page 25). For example: Audits and Inspections Post acceptance of the EP, conformance will be monitored on an at least quarterly basis by the Client Site Representative, or delegate, via audits and inspections, as well as through the commitments under the Management of Risk, Management of Change, and Management of Knowledge parts of this Implementation Strategy. During the activity, conformance will be monitored on an at least fortnightly basis by the Client Site Representative, or delegate, via audits and inspections during the activity. Conformance auditing or inspection while the EP is in-force will be based on the Conformance Register and will target the following: • Conformance with regulatory requirements detailed in the accepted EP. • Management strategies and procedures to ensure EPOs and	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		EPSs are being implemented, monitored, measured, and evaluated. • Emissions and discharges are being monitored, measured, and documented As stated in the previous email, matters of national energy policy are not within the purview of CGG or the Regia MSS. We will however register claims related to the ongoing need for gas and provide those to NOPSEMA. Please find attached a brochure from NOPSEMA that describes this and may be of use to you.	
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747
4305	The stakeholder was concerned about interference with the Orange Roughy Research Program.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact any research being done on Orange Roughy. While this species is found throughout southern Australia, no spawning or feeding aggregations have been identified in the Operational area.	3350
4306	The stakeholder was concerned about potential negative impacts of gas exploration and development on Country,	The titleholder acknowledged the feedback, noting that all relevant impacts are assessed in the	3152

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	the marine and coastal environment, the local economy, Traditional Owners, and local communities.	Environmental Plan (EP) and can be found in E1-E9. Measures to minimise adverse impacts on functions, interests and activities on relevant receptors are also adopted and can be found in G1.	
4309	The stakeholder was concerned about the impact on marine life sensibilities and populations.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2273
4315	The statement suggests that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4323	There will be potential permanent damage to marine life due to sonic testing and drilling.	Titleholder responded and listed various information needs related to the activity, environmental assessment process, environmental aspects, predicted levels of environmental impact and risk, environmental management, consultation processes, and regulations or regulatory processes. Links to the project website and document library was provided.	1046
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian	1389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		waters and offered to provide individual with impact assessments when they became available.	
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4365	Concerns about the lack of definitive clarification on how seismic testing affects the marine environment and the clash between economic interests and environmental risks.	The titleholder acknowledged the feedback, noting that they have undertaken a thorough analysis and assessment of all relevant literature to inform the impact assessments conducted to assess potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals in the Environmental Plan (EP). These findings can be found in E2, E3, E4, E5, E6, and E7 under Section 8: Predicted Levels of Impact. Additional assessments of key receptors were also completed to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level (F3). Titleholder also conducted an assessment to investigate potential impacts to other marine users from physical presence resulting from the activity (E1).	2383
4357	The stakeholder raised an objection to seismic surveys as they negatively affect the fishing industry, local economy and environment.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of commercial fish species and sensitive species within the area of operation. The MSS will also not impact the local economy. Mitigation plans are in place to reduce any impacts to as low as practicable.	424
4433	Claims seismic impacts can linger longer than the few hours suggested, the	OMICC announces that the latest version of the OMICC Otway	6749

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	insistence on peer-reviewed work to prove this is opportunistic and suits OMICC's agenda.	Adjustment Protocol has been published, along with a video briefing for fishers, which can be accessed through a provided link. In the briefing, OMICC confirms that, following the relevant persons feedback, a "claim period" and a "lodgement period" have been incorporated into the definitions of the protocol. The claim period is set to 30 days after the end of any activity, while the lodgement period extends up to 6 months after the end date of any activity. OMICC further informs the relevant person that the OMICC Founders reviewed the request for claims up to 6 months after an activity. However, the decision was made to adopt a 30-day claim period, as this duration resulted in a positive compensation outcome for fishers affected by the Gippsland survey in 2019.	
4417	The relevant person was concerned that about the proposed seismic activity effecting the behaviours of certain species.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act.	6880
4452	Stakeholder claims that potential impacts on World Heritage Values of Budj Bim and the life-cycle of Kooyang have not been properly assessed or addressed.	Regia team responded by referencing the relevant impact assessments in the Environment Plan (EP) (EVT070), this information was also provided in Event ID 7363. Previously provided in Event ID 2521, 2356, 2357, 2358, 2359, 2360, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417.	7136
4453	Stakeholder claims that potential impacts on World Heritage Values of Budj Bim and the life-cycle of Kooyang have not been properly assessed or addressed	Regia team responded by referencing the relevant impact assessments in the Environment Plan (EP) (EVT070), this information was also provided in Event ID 7363. Previously provided in Event ID 2521, 2356, 2357, 2358, 2359, 2360, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417.	EVT070
4469	Objects to the negative effects of seismic testing on the short-finned eel.	CGG undertook scientific assessment for underwater sound impacts on Fish (Appendix E3 and F3), including short-finned eels. Short-finned Eels possess a swim bladder and were grouped with	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		other fish having swim bladders for acoustic impact analysis, following the guidance of Popper et al. (2014). For fish in general, and eels in particular, the key impact mechanisms considered were potential for hearing damage or physiological injury from intense sound close to the source, and behavioural disturbance (e.g. startle responses or avoidance movement) at various distances. The EP concluded that no fish, including eels, would be close enough to the seismic source to suffer mortality or physical injury, with measures in place such as soft-starts the free-swimming fish are able to move away from the sound source, and that they anticipate no direct fatalities or lasting injuries to adult eels in the water. The titleholder acknowledges that fish may exhibit behavioural reactions to seismic noise and they assumed a conservative scenario where fish might show avoidance responses at substantial distances. In the worst case, an eel migrating through the area might detect the seismic pulses at distance and alter its course or depth to avoid the highest sound levels. The EP considered such avoidance to be a temporary and localised effect and that any diversion would likely be on the scale of hundreds of meters to a few kilometres at most. Given that migrating eels travel thousands of kilometres to reach spawning grounds, a short detour or a brief pause is not expected to jeopardize their overall journey. The EP's finding was that behavioural changes would be temporary and would not have long-term impacts on individuals or the population. (Responded to in EVT346)	
4470	Objects to the insufficient consideration of the physical presence and migration interference caused by seismic activities in eel migratory pathways.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. The titleholder acknowledged that the Regia MSS Operational Area is offshore in the Otway Basin (south-west of Vic), which is adjacent to, with some limited overlap, to the potential migration corridor for these eels heading toward the western Tasman Sea. Appendix E3 identified "Eels (Anguilla spp.)" as a receptor in the environment that could be affected by underwater sound (section 4.1.6), precisely because	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Short-finned Eels are present in coastal catchments adjacent to the survey area and undertake marine migrations. (Responded to in EVT346)	
4471	Objects to the insufficient consideration of daily vertical migrations of the short-finned eel.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. CGG recognises that Short-finned Eels spend most of their life in freshwater/estuarine environments and undertake a once-in-a-lifetime spawning migration to the ocean. Specifically, the EP notes that mature adults (typically 8–20 years old, depending on sex) depart their rivers in late summer to autumn to migrate to oceanic spawning grounds. The EP also describes the return journey of the progeny: eggs hatch into larvae that drift southward on currents, metamorphose into “glass eels” and eventually enter coastal estuaries (with peak recruitment in winter–spring), which is consistent with established literature and references cited by the stakeholder (e.g. Gooley et al. 2002 , Jacoby et al. 2015). Appendix E3 incorporated the latest research on eel migration behaviour, notably Koster et al. (2021). The EP explicitly references Koster et al. and confirms the phenomenon of diel (daily) vertical migration in migrating eels: tagged eels from the Hopkins and Fitzroy Rivers exhibited a pattern of surfacing at night and diving deeper during the day while at sea. CGG acknowledges that this is a crucial behavioural detail that the EP does acknowledge. (Responded to in EVT346)	EVT178
4472	Objects to the insufficient consideration in Regia MSS Environment Plan's of the cultural value of the short-finned eel in South-West Victoria and South Australia beyond Budj Bim.	The Regia MSS EP was prepared and assessed under an objective based regulatory regime, which requires the titleholder to consider a broad definition of the environment which may be affected, including cultural heritage. The EP recognises the intangible cultural or spiritual connections to Sea Country and undertook research and assessment, including consultation with Traditional Owner groups, within the relevant Sea Country. While no significant impact is predicted, they remain committed to respectful ongoing engagement with Indigenous stakeholders regarding any spiritual or cultural concerns. Cultural heritage to the	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		eels is stated in Appendix E3 section 4.6.1, Appendix F3 section 3.7 and 3.16. Titleholder also explained that the EP contains a dedicated assessment of the Budj Bim Cultural Landscape (World Heritage Site) and its connection to Short-finned Eels and directed the stakeholder to Appendix F3 (Section 3.15). They stated that the conclusion of that assessment was that no threat or damage to Budj Bim's heritage values is expected from the proposed activity and that the cultural practices and eel stocks that underpin Budj Bim's value will not be materially affected. They stated that the EP goes further to acknowledge that beyond formally listed World Heritage values, there may be intangible cultural or spiritual connections to Sea Country that are difficult to quantify and that the Titleholder has regognised these and consulted Traditional Owner groups to better understand them.	
4478	Objects to the inadequate consideration of the habitat and lifecycle of the short-finned eel as their habitat includes all the areas essential to its lifecycle.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. The titleholder acknowledged that the Regia MSS Operational Area is offshore in the Otway Basin (south-west of Vic), which is adjacent to, with some limited overlap, to the potential migration corridor for these eels heading toward the western Tasman Sea. Appendix E3 identified "Eels (Anguilla spp.)" as a receptor in the environment that could be affected by underwater sound (section 4.1.6), precisely because Short-finned Eels are present in coastal catchments adjacent to the survey area and undertake marine migrations. The EP outlines the broad geographic distribution of Anguilla australi, extending from Queensland through Victoria, Tasmania, South Australia, and New Zealand, to demonstrate that eels from various regions may pass through or near the survey area. Accordingly, the EP did not overlook the potential for eels originating from rivers west of the survey area (such as the Glenelg River, Coorong, and Murray River) to travel along the continental slope. Instead, it treated the Short-finned Eel as a wide-ranging species and assessed it on that basis. The EP did not list each river individually because it considered the species at a regional	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		population level. The evidence and conclusions therefore apply to all Short-finned Eels in the area, irrespective of origin, as their marine behaviour and sensitivities are expected to be consistent across populations. The EP also includes detailed description of lifecycles, referencing the latest science, including the migrations in these lifecycles. (Responded to in EVT346)	
4474	Claims that seismic sounds can cause sublethal and lethal impacts on short-finned eels, such as disorientation, reduced energy budgets, stress or mortality.	Scientific assessment was completed for underwater sound impacts on Fish (Appendix E3) and how short-finned eels were accounted for in that assessment. As Short-finned Eels possess a swim bladder they were grouped with other fish having swim bladders for acoustic impact analysis, following the guidance of Popper et al. (2014). For fish in general, and eels in particular, the key impact mechanisms considered were potential for hearing damage or physiological injury from intense sound close to the source, and behavioural disturbance (e.g. startle responses or avoidance movement) at various distances. The assessment concluded that no fish, including eels, would be close enough to the seismic source to suffer mortality or physical injury, with measures in place such as soft-starts the free-swimming fish are able to move away from the sound source, and that they anticipate no direct fatalities or lasting injuries to adult eels in the water. The titleholder also acknowledged that fish may exhibit behavioural reactions to seismic noise and that they assumed a conservative scenario where fish might show avoidance responses at substantial distances. In the worst case, an eel migrating through the area might detect the seismic pulses at distance and alter its course or depth to avoid the highest sound levels. The EP considered such avoidance to be a temporary and localized effect and that any diversion would likely be on the scale of hundreds of meters to a few kilometres at most. Given that migrating eels travel thousands of kilometres to reach spawning grounds, a short detour or a brief pause is not expected to jeopardize their overall journey. The EP's finding was that behavioural changes would be temporary and would not have long-term impacts	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		on individuals or the population. (Responded to in EVT346)	
4475	Objects to the inconsistent consideration of short-finned glass eels arriving during April to October as they have been recorded to arrive throughout the year.	The EP describes the Short-finned Eel migration from Victoria largely occurring during late summer through autumn consistent with prevailing scientific theory. (Responded to in EVT346)	EVT178
4476	Objects to the lack of consideration of glass eel feeding, or the potential of having to 'swim out of the way' of seismic testing on energy budgets.	The Environment Plan (EP) fully considered potential effects of seismic activity on Short-finned Eels, particularly in relation to their ability to detect, avoid, and respond to underwater sound while migrating. The assessment followed internationally recognised scientific frameworks (e.g., Popper et al. 2014) and incorporated conservative sound-modelling to determine thresholds for injury and behavioural disturbance. The assessment concluded that no eels would be close enough to the seismic source to suffer injury or mortality, as eels are free-swimming and capable of moving away from noise. A soft-start procedure will also allow animals to detect and avoid the source gradually. Behavioural responses such as temporary avoidance or course adjustment were acknowledged and assessed as the most likely effect. Any such diversion would be localised and short-term, on the scale of hundreds of metres to a few kilometres, and would not meaningfully affect the eels' long-distance migration or energy reserves, given their natural capacity for endurance. The EP therefore determined that behavioural changes would be temporary, reversible, and of low intensity, with no population-level consequences. Supporting evidence from global studies shows no recorded cases of eel mortality or population decline linked to seismic surveys, including in the Otway Basin, where over 80 surveys have occurred in the past six decades. The assessment concludes that Short-finned Eels may move away from the survey area when exposed to sound, but will resume migration without harm or delay, and that predicted impacts are minor, transient, and not significant at individual or population scales. (Responded to in EVT346) Appendix E3 section 4.1.6 has been updated to include: It has been noted by Van Wichelen, et al (2022) that glass eels feeding during their migration is highly restricted, therefore when	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		discussing impacts to glass eels, this has been considered.	
4477	Objection about the lack of adequate recognition and consideration of non-lethal, cumulative, and long-term impact of seismic noise on short finned eel.	Short-finned Eels possess a swim bladder and were grouped with other fish having swim bladders for acoustic impact analysis, following the guidance of Popper et al. (2014). For fish in general, and eels in particular, the key impact mechanisms considered were potential for hearing damage or physiological injury from intense sound close to the source, and behavioural disturbance (e.g. startle responses or avoidance movement) at various distances. The assessment concluded that no fish, including eels, would be close enough to the seismic source to suffer mortality or physical injury, with measures in place such as soft-starts the free-swimming fish are able to move away from the sound source, and that they anticipate no direct fatalities or lasting injuries to adult eels in the water. The titleholder also acknowledged that fish may exhibit behavioural reactions to seismic noise and that they assumed a conservative scenario where fish might show avoidance responses at substantial distances. In the worst case, an eel migrating through the area might detect the seismic pulses at distance and alter its course or depth to avoid the highest sound levels. The EP considered such avoidance to be a temporary and localized effect and that any diversion would likely be on the scale of hundreds of meters to a few kilometres at most. Given that migrating eels travel thousands of kilometres to reach spawning grounds, a short detour or a brief pause is not expected to jeopardize their overall journey. The EP's finding was that behavioural changes would be temporary and would not have long-term impacts on individuals or the population. The Titleholder noted that the EP acknowledges the existing pressures on the Short-finned Eel population and was developed to demonstrate that the proposed seismic survey would not materially increase the cumulative impact on the species. The cumulative impact assessment concluded that, even when accounting for other regional activities, the incremental effect of the survey on overall conservation values would be neutral to	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		negligible. (Responded to in EVT346)	
4478	Objection to CGG's statements of 'no predicted mortality' on short finned eels is not supported.	This conclusion is supported by conservative modelling, peer-reviewed scientific research, and a precautionary evaluation of worst-case scenarios. No new scientific information was identified in the submission that had not already been considered in the Environment Plan. References such as Koster et al. (2021) were already incorporated into the EP, which includes the IUCN listing of near threatened. CGG notes that while Jacoby et al. (2015) raised conservation concerns for the species, the EP's findings are consistent with ensuring that the proposed activities do not exacerbate those concerns. (Responded to in EVT346)	EVT178
4479	Objection to CGG's statements about proposed mitigation measures in relation to the short finned eel.	The Environment Plan (EP) adopts an evidence-based, risk-weighted, and precautionary approach, consistent with both the letter and spirit of the precautionary principle in Australian law. The EP concludes that the impacts and risks to Short-finned Eels have been reduced to As Low As Reasonably Practicable (ALARP) and remain acceptable, meeting the requirements for EP acceptance under Regulation 34. While recognising that NOPSEMA's independent review will make the final determination on the EP's adequacy, CGG's view is that the document meets the regulatory acceptance tests, including demonstrating no unacceptable impacts on World Heritage values and consistency with the principles of Ecologically Sustainable Development (ESD). (Responded to in EVT346)	EVT178
4480	Objection to CGG's frequency range of 0-200Hz on migrating eels, stating the EP minimises how seismic testing may affect the eels.	Short-finned Eels possess a swim bladder, though it is not primarily used for hearing, and were therefore grouped with other fish possessing swim bladders for the purpose of acoustic impact assessment. The Environment Plan (EP) applied the internationally recognised framework of Popper et al. (2014) to establish scientifically validated thresholds for potential injury and behavioural disturbance. The assessment considered possible hearing damage, physiological effects from intense sound near the source, and behavioural responses, such as avoidance or startle reactions, at varying distances. As no specific audiograms exist for Short-	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		finned Eels, the EP adopted a conservative approach, assuming they would respond similarly to other fish with comparable anatomy. (Responded to in EVT346)	
4481	Claims that content provided in the Regia Environment Plan is inconsistent, incomplete, misleading and has multiple errors in logic and critical thinking and does not accurately represent the evidence about the life cycle of the short-finned eel.	The version of the EP referenced by the stakeholder (June 2024) had been substantively updated with multiple iterations during NOPSEMA's assessment and following public comment which addresses all scientific and policy related claims. Titleholder also explained that the Regia MSS EP was prepared and assessed under an objective based regulatory regime, which requires the titleholder to consider a broad definition of the environment, including cultural heritage and social values, not just the immediate onshore operational area.	EVT178
4482	Claims the inadequacy of the Regia MSS Environment Plan in applying the precautionary principle and using transparent, comprehensive evidence for impact assessment.	The claim that the process lacked transparency is not supported by record as the project ran an unusually open process where the EP and appendices were published on the Consultation Hub, and the public were provided with updates at every revision. The EP's approach is fully consistent with Australian regulatory requirements for EP's which demand evidence-based assessment and precaution in the face of uncertainty and that the Regia MSS EP applied conservative assumptions and safety margins wherever scientific uncertainty existed. CGG are confident that the EP's evidence-based, risk-weighted approach – supplemented by precautionary, worst-case scenarios – meets both the letter and spirit of the precautionary principle in Australian law. The EP applies precaution through conservative assumptions, rigorous modelling, and layered safeguards, while also ensuring that conclusions remain scientifically defensible and evidence based. CGG have taken precautionary measures without abandoning accuracy or overstating unverified threats.	EVT178
4483	Claims insufficient monitoring and need for application of conservation recommendations and the IUCN's ongoing monitoring advice.	The EP applies the precautionary principle and ESD, using a conservative risk assessment that predicts negligible impact and is consistent with avoiding any deterioration in the species' conservation status. The EP acknowledges the conservation concerns highlighted in scientific literature, noting that the Short-finned Eel is classified as Near	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Threatened on the IUCN Red List. However, this classification is attributed primarily to freshwater habitat issues, not marine threats. The EP did not propose species-specific monitoring for eels because the predicted impacts were deemed so low (minor, transient disturbances with no lasting harm to individuals or the population), however would be open to assisting researchers.	
4484	Claims that the Regia MSS assessment on mortality of eels shows a critical thinking error, confirmation bias, logical fallacy and exaggerated language.	CGG maintains that the EP contains no fundamental logical flaws and expresses confidence that NOPSEMA, as the independent regulator, would identify any such issues in fulfilling its statutory role. The EP applies a structured weight-of-evidence approach, drawing on multiple lines of scientific information rather than selectively minimising impacts; where uncertainty was identified, the EP adopts precautionary assumptions. CGG states that the EP meets all regulatory requirements by describing the activity and environment, identifying all credible impacts and risks, and demonstrating that they are reduced to ALARP and acceptable levels. Regarding eel mortality, CGG notes that the EP explicitly predicts no mortality or injury based on modelled sound levels. Acoustic modelling shows the distance at which injury could occur is limited (60–230 m), and because eels are mobile, combined with the soft-start procedure, the likelihood of harm is extremely low. In response to concerns about confirmation bias or minimising language, CGG explains that terms such as “low risk” and “no measurable impact” are technical descriptors supported by evidence, not value judgments. They state that contextual information—such as the species’ resilience and broader existing pressures—is provided to ensure accuracy rather than diminish concerns. CGG also acknowledges minor typographical errors in species names but clarifies that these do not affect the scientific assessment.	EVT178
4485	Claims the activity will exacerbate existing pressures on freshwater eel.	The EP directly acknowledges the conservation concerns identified in the scientific literature and states that its impact conclusions are designed to ensure the proposed	EVT200

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		activity does not exacerbate those threats. It contextualises the Short-finned Eel's resilience by noting that the species faces far greater long-term pressures, such as overfishing, river barriers, drought, and climate-driven changes to ocean currents, and that its Near Threatened status on the IUCN Red List is primarily due to freshwater habitat issues rather than marine impacts. Within this broader context, the EP concludes that the Regia MSS survey will not materially add to the cumulative pressures on the eel population. The cumulative impact assessment predicts the survey's incremental effect to be neutral to negligible, and that any impacts will be minor and temporary, with no risk of jeopardising migration success or the species' viability.	
4486	Claims that the overall ecological health of systems is impacted by stressors affecting the short finned eel.	The EP recognises the ecological significance of the Short-finned Eel within the wider system. It notes that the species plays an important dual role in aquatic food webs, as both predator and prey, and is an ecologically connected component of marine and freshwater ecosystems. The EP describes the species' resilience, highlighting that Short-finned Eels are broadly distributed, migratory, and have persisted through natural environmental fluctuations over millennia. The EP assesses whether any predicted impacts could translate into population-level or ecosystem-level consequences. It concludes that Short-finned Eels are expected to experience only minor and temporary behavioural disturbance from the seismic survey, with no lasting harm to individuals or the population. Because abundance and function are predicted to remain intact, the species' ecological roles are not expected to change. Consistent with defined acceptable impact criteria, the assessment finds that effects will be temporary, reversible, small-scale, and low intensity at the population level. On this basis, the EP concludes there will be no ripple effects on predators, prey, or ecosystem processes. The document further supports this conclusion by noting that more than 80 seismic surveys have taken place in the Otway Basin over six decades, with no recorded decline in Short-	EVT200

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		finned Eel populations attributable to seismic activity.	
4490	CGG has failed to adequately assess the impacts of its proposed activity on the Budj Bim World Heritage Cultural Landscape. GMTOAC further states that CGG did not sufficiently evaluate impacts on Kooyang, a culturally significant species whose lifecycle and migration underpin the world heritage values of the Budj Bim Cultural Landscape and extend well beyond its physical boundaries.	Culturally significant features, including the Budj Bim landscape, were included in both impact and cumulative risk assessments using a methodology that blends scientific evidence with cultural narratives. Regarding Kooyang (Eel), CGG maintains that this culturally important species, whose lifecycle is central to the world heritage values of Budj Bim, was addressed within the EP's impact and cumulative assessments. These assessments include both Kooyang's cultural significance and ecological role. CGG reiterates that its EP is consistent with statutory obligations, based on best-available science, and tailored to the cultural and ecological sensitivities identified. CGG maintains that the Budj Bim Cultural Landscape and Kooyang have been incorporated into the EP and that this inclusion meets regulatory standards for demonstrating ALARP and acceptable levels of impact.	EVT352
4491	Claims about the SRW and BW BIAs. States proposed activity will cause unacceptable impacts to all Karntubul species, including temporary & permanent hearing loss, displacement from BIAs, vessel strike, prey depletion during peak feeding/migration period, calving interruption, and impact to ecosystems and cultural landscapes as a result of the cumulative impact of these.	CGG has identified all Biologically Important Areas (BIAs) relevant to blue whales (BWs) and southern right whales (SRWs) and incorporated seasonal BIA use into the survey design through substantial temporal and spatial restrictions detailed in the EP. Predicted underwater-sound impacts on these Karntubul species, along with mitigation measures presented in Appendices E7 and F3, demonstrate impacts will remain acceptable and will avoid auditory impairment or displacement from BIAs or Habitats Critical to Survival (HCTS). CGG further notes that vessel-strike risk is already extremely low during seismic surveys and that additional controls in Appendix D2 ensure this risk is prevented and acceptable. It concludes that no changes to ecosystem structure, diversity, or function are expected from the one-off survey, with sound exposure too limited in extent and duration to affect prey, food webs, or predator–prey relationships. A cumulative impact assessment found residual cumulative effects to be low, reduced to ALARP, and acceptable, with no impacts predicted for regional marine parks. CGG also asserts consistency with the National Recovery Plan for Southern	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Right Whales and the Blue Whale Conservation Management Plan, stating that their objectives and recommended measures have been incorporated. Finally, CGG maintains that all marine mammal species likely to occur in the region have been adequately assessed using up-to-date EPBC Protected Matters data, and that mitigation measures ensure impacts to all listed species will remain acceptable and not inconsistent with EPBC Act protection provisions.	
4492	Claims that the eastern population of the Southern Right Whale, estimated at only 200–300 individuals, is at particularly high risk because its migration and reproduction Biologically Important Areas (BIAs) overlap directly with CGG's Operational Area and sound propagation footprint. According to the Southern Right Whale Recovery Plan, these whales use the affected region for reproduction between May and September and for migration between April and October. The Recovery Plan also notes that Southern Right Whales do not feed in coastal waters but are expected to feed, and possibly conceive, within the Australian Whale Sanctuary—an area entirely overlapped by the proposed Regia MSS activity. As a result, the seismic survey could occur within, or affect, conceiving, calving, and feeding grounds for this critically endangered sub-population. The species is particularly vulnerable to human impacts due to its low reproductive rate, long lifespan, and strong site fidelity to key habitats. The submission therefore emphasises the relevance of underwater noise, habitat degradation, and vessel-strike risks in the context of the proposed seismic activities.	The Recovery Plan explains that BIAs can be designated for key behaviours such as reproduction, foraging, migration, and resting. While Southern Right Whale BIAs in the Plan cover reproduction and migration, the Plan notes that foraging occurs across a much broader offshore latitudinal range (30°S–65°S) and is not linked to these BIAs. Because the Regia MSS is not located in Antarctic waters, it will not affect cetaceans that forage there. CGG states the survey will avoid peak SRW abundance in the mapped BIA and apply mitigation measures to ensure no SRWs are harmed, injured, or interfered with.	EVT352
4496	GMTOAC objects to CGG removing a previous control measure limiting seismic discharge in the Pygmy Blue Whale foraging BIA during periods of low whale presence, replacing it with a vague condition requiring CGG to determine whether whale presence is "compatible" with proceeding. GMTOAC argues this new measure lacks detail on how whale presence or "unacceptable disturbance" will be assessed, and that it fails to reference Recovery Plans which define unacceptable impacts. GMTOAC warns that the proposed survey timing (April–June 2026) coincides with peak Pygmy Blue Whale foraging season and Southern Right Whale migration and calving periods, meaning the seismic survey is likely to occur when both species are using their BIAs. Preventing whales from accessing these areas, or exposing	CGG has further reduced the likelihood of interactions with marine mammals by excluding the April–June period and commencing the survey only after 15 September. Because blue whales typically do not arrive from Western Australia until November, CGG argues that most of the survey will occur when blue whales are absent from the area. It adds that sighting data show very few blue whales in November and December, with peak abundance occurring later, from January to March during the Bonney Upwelling.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	them to injury while they remain, would constitute unacceptable impacts inconsistent with Recovery Plan objectives.		
4508	GMTOAC claims inadequate assessment of noise on culturally important Kooyang. GMTOAC notes that CGG's EP groups Kooyang with other fish possessing swim bladders, and acknowledges that fish with swim bladders may be more susceptible to physiological trauma from seismic noise. However, while the EP claims no studies have demonstrated direct mortality of adult fish from seismic emissions, GMTOAC highlights that it has repeatedly requested an independent study on Kooyang specifically, a request CGG has refused. Across multiple appendices, CGG's assessment appears inconsistent. Some sections state that eels fall within the category of fish whose hearing directly involves a swim bladder, while other parts of the EP fail to mention this heightened sensitivity or cross-reference relevant acoustic impact studies. GMTOAC argues these inconsistencies obscure the true risk profile and hinder meaningful evaluation of proposed controls. Finally, GMTOAC challenges CGG's conclusion that risks to adult Kooyang will be "extremely low" and indistinguishable from natural population variation. GMTOAC notes that this claim lacks scientific justification and appears to rely on the eel's behavioural avoidance or instinctual drive to migrate rather than on concrete control measures to prevent harm.	CGG recognises kooyang as a profoundly important Gunditjmara cultural value and not just an ecological species. The Environment Plan explicitly protects kooyang by applying culturally defined acceptability criteria, including ensuring no material reduction in kooyang abundance, recruitment, or sustainable harvesting that could impact Budj Bim practices or World Heritage values. This cultural framing underpins the entire assessment. CGG rejects claims that its underwater-noise assessment is inadequate, noting that it is detailed, conservative, peer-reviewed, and fully compliant with best-practice standards. Kooyang are assessed using the highest-sensitivity category under EPBC Policy 2.1, and predicted noise-effect zones are extremely small. The survey timing has been shifted to September–December, avoiding: peak adult silver-eel migration (Feb–May), most glass-eel recruitment (Oct–Feb), and juveniles that would already be inside river/estuary systems. This means minimal temporal or spatial overlap with key life stages. There is no credible pathway for population-level or culturally significant effects, and global evidence shows no seismic survey has ever been linked to effects on anguillid eel recruitment. Overall, the assessment is precautionary, culturally informed, and reduces risks to ALARP. CGG remains open to incorporating additional Gunditjmara knowledge or scientific evidence, but based on current information, no material impact on kooyang is credible.	EVT352
4509	GMTOAC claims that CGG's approach to assessing impacts on Kooyang is inconsistent with the precautionary principle under the EPBC Act, especially given Kooyang's cultural significance and its central role in the World Heritage–listed Budj Bim Cultural Landscape. GMTOAC states that CGG has repeatedly	CGG affirms the deep cultural importance of kooyang to the Gunditjmara People and agrees that any activity causing a population-level decline in kooyang that recruit into the Budj Bim wetland systems would be unacceptable. However, the claims in paragraphs 118–132 are	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	asserted, without scientific evidence, that juvenile eels will not be near the seismic activity, despite the absence of data tracking their migration from the Coral Sea to Gunditjmara Sea Country. They outline the well-established seasonal migration patterns of adult and juvenile Kooyang and state that these movements directly link the open ocean to the Budj Bim aquaculture systems. UNESCO inscribed Budj Bim as a World Heritage property because of Gunditjmara's long-standing eel aquaculture, which relies on the uninterrupted migration of Kooyang. GMTOAC highlights that published research, co-authored by Gunditjmara Elders and scientists, shows adult eels travel through areas that overlap with CGG's Operational Area and EMBA, meaning migrating Kooyang are likely to encounter the seismic survey if undertaken in April 2026. GMTOAC also raises concerns regarding CGG's framework for assessing impacts on World Heritage values. They argue that CGG wrongly limits its definition of "direct effects" to the physical boundaries of the property, failing to recognize that Kooyang moving through the marine environment outside the site are essential to the World Heritage values themselves. GMTOAC rejects CGG's categorisation of impacts to Kooyang and Gunditjmara cultural practices as merely "indirect," and notes the EP provides no explanation for its claim that such impacts are "immeasurable." Further, GMTOAC states that CGG has only referenced one of the required Budj Bim management plans and has not demonstrated engagement with the others. They contend that CGG has not shown how the proposed activities align with or avoid contravening the management goals, especially those aimed at restoring healthy Kooyang populations. GMTOAC concludes that CGG's failure to properly account for the cultural, ecological, and World Heritage significance of Kooyang is unacceptable to Gunditjmara, whose stewardship of Budj Bim spans millennia and underpinned the site's World Heritage listing.	based on legal and factual misunderstandings. The World Heritage property is strictly limited to the freshwater Budj Bim wetlands on the lava flow and does not include estuarine, coastal, or oceanic waters. Under UNESCO rules, World Heritage protection applies only within the fixed site boundaries and cannot extend to migratory species outside them. No World Heritage site has ever been interpreted the way GMTOAC suggests. CGG clarifies that the OUV attribute "ecology and life-cycle of kooyang" refers specifically to the parts of the life cycle occurring within the engineered aquaculture systems inside the property, not the entire oceanic migration. International precedents—such as the Monarch Butterfly Reserve, the Yellow Sea Migratory Bird Sanctuaries, and the Wadden Sea, show that impacts outside property boundaries are not considered direct impacts on World Heritage values. Scientifically, the EP uses best-practice criteria, with predicted noise effects on kooyang limited to very small distances (<300 m), and the survey timing (Sept–Dec) avoids overlap with major migration and recruitment periods. No tracking data show a kooyang migration corridor through the survey area, and the contribution of one 60-day survey to cumulative pressures is negligible. Appendix F3 confirms alignment with relevant management plans, which only consider impacts inside the property's boundaries. CGG states it remains open to further Gunditjmara knowledge and evidence, and has updated the EP to consider the provided management plans, but concludes that no credible pathway exists for material impact on kooyang abundance within the Budj Bim wetlands or on the property's Outstanding Universal Value. The EP is therefore lawful, scientifically robust, and compliant with Australia's World Heritage and EPBC Act obligations.	

Annex 3

Underwater Acoustic Sensitive Species

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Fish							
Australian Grayling	Species or species habitat likely to occur within area	Vulnerable				None identified	Conservation Advice *Prototroctes maraena* Australian Grayling (TSSC 2021)
Blue Warehou	Species or species habitat known to occur within area	Conservation Dependent				None identified	Commonwealth Listing Advice *Seriolella brama* Blue Warehou (TSSC 2015)
Orange Roughy, Deep-sea Perch, Red Roughy	Species or species habitat likely to occur within area	Conservation Dependent				None identified	None identified
Sygnathids							
Australian Smooth Pipefish, Smooth Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand	Species or species habitat may occur within area				Listed	None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Potbelly Seahorse							
Brushtail Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Common Seadragon, Weedy Seadragon	Species or species habitat may occur within area				Listed	None identified	None identified
Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Deepbody Pipefish, Deep-bodied Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Hairy Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Halfbanded Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Javelin Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Knifesnout Pipefish, Knife-snouted Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Leafy Seadragon	Species or species habitat may occur within area				Listed	None identified	None identified
Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Mother-of-pearl Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Port Phillip Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Pugnose Pipefish, Pug-nosed Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Red Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Rhino Pipefish, Macleay's Crested	Species or species habitat may occur within area				Listed	None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Pipefish, Ring-back Pipefish							
Ringback Pipefish, Ring-backed Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Robust Pipehorse, Robust Spiny Pipehorse	Species or species habitat may occur within area				Listed	None identified	None identified
Sawtooth Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Short-head Seahorse, Short-snouted Seahorse	Species or species habitat may occur within area				Listed	None identified	None identified
Spiny Pipehorse, Australian Spiny Pipehorse	Species or species habitat may occur within area				Listed	None identified	None identified
Spotted Pipefish, Gulf Pipefish, Peacock Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Tucker's Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Sharks							
Grey Nurse Shark	Species or species may occur within area	Critically Endangered	Migratory			None identified	Commonwealth Listing Advice on Carcharias taurus, Grey Nurse Shark (East Coast population) (TSSC 2001). Recovery Plan for the Grey Nurse Shark (Carcharias taurus) (DoE 2014).

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Little Gulper Shark	Species or species habitat likely to occur within area	Conservation Dependent				None identified	Commonwealth Listing Advice on *Centrophorus zeeha* (southern dogfish) (TSSC 2013)
Porbeagle, Mackerel Shark	Species or species habitat likely to occur within area		Migratory			None identified	None identified
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark	Species or species habitat may occur within area	Conservation Dependent				None identified	Commonwealth Listing Advice on *Galeorhinus galeus* (TSSC 2009a)
Shortfin Mako, Mako Shark	Species or species habitat likely to occur within area		Migratory			None identified	Listing Advice *Isurus oxyrinchus* shortfin mako shark (TSSC 2014).
White Shark, Great White Shark	Foraging, feeding, or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		Foraging	Recovery Plan for the White Shark (*Carcharodon carcharias*). (DSEWPaC 2013b)

REGIA
Marine Seismic Survey

Impact Assessment
Underwater Sound: Invertebrates

Appendix E4: REG-EP-023-E4

Rev 4

December 2025

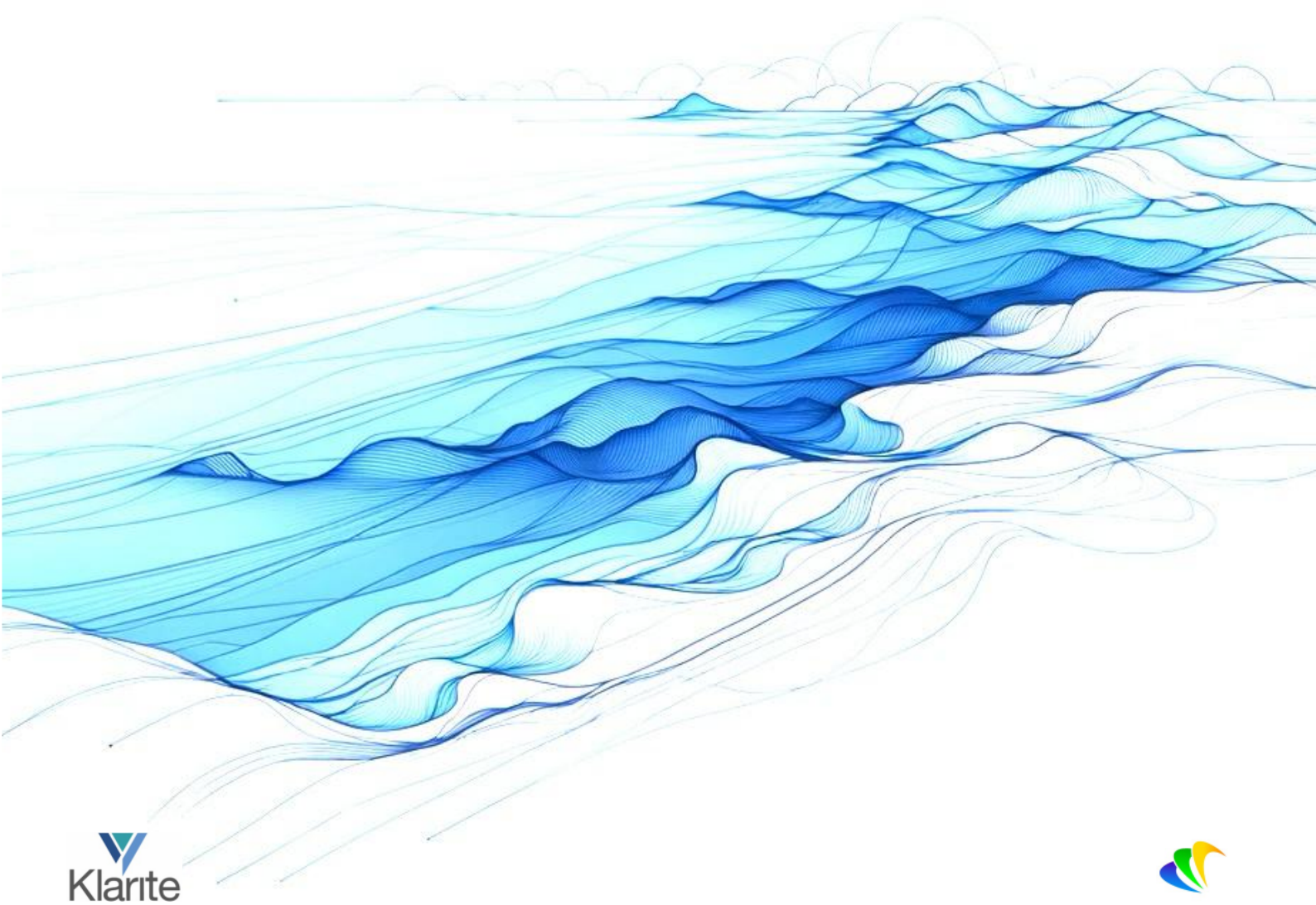

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Table of Contents

1 Introduction 4
1.1 Purpose and Scope 4
1.2 Consultation in Preparation of the EP 4
1.3 Modifications Arising from Further Assessment 4
2 Aspect – Underwater Sound 6
2.1 How the Aspect Occurs 6
2.2 Extent and Duration of the Aspect 6
3 Cause-Effect Pathway 7
3.1.1 Exempted Areas 7
4 Description of the Existing Environment that may be Affected by the Activity 8
4.1 Invertebrates - General 8
4.2 Invertebrates – Commercial Species 9
4.2.1 Crustaceans 10
4.2.2 Cephalopods 11
4.2.3 Molluscs 12
4.3 People and Communities 13
4.3.1 Social and economic features 13
4.3.2 Cultural features 13
5 Relevant Legislative Requirements 13
6 Defining Acceptable Levels of Impact 14
7 Consultation Input 17
7.1 Elimination 18
8 Minimisation of Impacts Through Activity Design 19
8.1 Substitution 19
9 Predicted Levels of Impact 20
9.1 Change in fauna behaviour, hearing capacity, and physical condition 20
9.1.1 Crustacean - Giant Crab 20
9.1.2 Crustacean - Southern Rock Lobster 21
9.1.3 Molluscs 23
9.1.4 Cephalopods - Octopus and Squid 24
9.2 Measures Adopted to Manage Environment Impacts 24
10 Demonstration impacts will be of an acceptable level 26
10.1 Principles of ESD 26
10.2 Biological and Ecological Categories 26
10.3 Economic, Cultural and Social Categories 27
10.4 Discussion on Consistency with Company Processes 27
11 Environmental Performance Outcomes 28
12 Recommendations 30

13 Document Control 31
14 References 32
Annex 1 35
Public Comment 35
Annex 2 36
Objections and Claims Raised from Consultation 36

1 Introduction

Underwater Sound was identified through the Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4) as an Aspect needing further assessment. Hence this document presents a detailed examination of Underwater **Sound**, as will typically be produced during the proposed Regia Marine Seismic Survey (**Regia MSS**), and its interaction with the environmental Receptor we are collectively calling **Invertebrates.**

This assessment is built on the information contained in the following four core studies, which should be read in the order they are listed:

1. PEIRA.
2. Seismic Sound Studies Report (Appendix B8).
3. Sound Emissions Modelling Reports (Appendix B7).

1.1 Purpose and Scope

The purpose of this document is to assess all acceptable sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document was initially published in draft form and uploaded to the Document Library of the Regia MSS Consultation Hub on 11 September 2023 as a stand-alone document, rather than as part of the much more substantial total EP document. This was done to maximise the ability of interested members of the public to read, interpret and respond within the mandated 30-day public comment period.

As such, public and Relevant persons were invited to comment on the document with an explicit request for feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

1.3 Modifications Arising from Further Assessment

To ensure this environmental assessment remains contemporary, accurate, and reflects feedback from the regulator and relevant persons, this document will be updated from time-to-time. In particular, the CGG environmental assessment process requires consideration of whether further assessment was needed to verify, or dive deeper into a topic, to further improve the predictive quality

of the assessment. When this has occurred, reference to such changes will be communicated in the Recommendation section and identified at relevant points in the assessment.

2 Aspect – Underwater Sound

2.1 How the Aspect Occurs

The primary sound source will be impulsive underwater acoustic emissions coming from the seismic source releasing compressed air (seismic pulse) and creating a sound wave directed downwards towards the seabed.

Secondary sound sources will include continuous underwater acoustic emissions generated by the survey and support vessels and helicopters. Sounds from vessels are generated by thrusters, engines, and propellers. Underwater acoustic emissions from helicopters are generated via the engine and rotors. Underwater acoustic emissions from Ultra-Short BaseLine positioning beacons are generated within the streamer spread.

2.2 Extent and Duration of the Aspect

Impulsive Sound

Duration: 60 days

Extent: Active Source Area + 90m – 2.74 km m based on the furthest distance to modelled sound effect criteria. [Updated in response to Matter: F17]

Active seismic acquisition will occur for up to 60 days within the Active Source Area.

Continuous Sound

Duration: 90 days

Extent: Operational Area

The survey and support vessels will be active in the Operational Area for the duration of the survey undertaking support activities and acquisition.

3 Cause-Effect Pathway

The PEIRA (Appendix B4) identified a cause-effect pathway for impulsive (seismic) underwater sound for the following environmental components and their social, cultural, and economic features:

- Invertebrates
- People and communities

In addition, indirect impacts were identified to the following via relevant person consultation:

- Commercial Fishers

Potential environmental impacts to invertebrates identified from the PEIRA are:

- Change in fauna behaviour.
- Change in hearing capacity.
- Change in physical condition.

3.1.1 Exempted Areas

Invertebrates were identified as a value within the West Tasmanian Canyons Key Ecological Feature (KEF) which the initial Activity Planning Area overlapped. Hence, an assessment of impacts to invertebrates within this KEF was included in the initial draft of this document first published to the Document Library of the Regia MSS Consultation Hub on 11 September 2023. However, since then the Active Source Area has been further refined and is now ~20 km from the West Tasmanian Canyons KEF (Appendix B12 MAP-REG-EPM-004). Given that the furthest distance to the modelled sound effect criteria for invertebrates is between –90 m – 2.74 km from the Active Source Area, impacts are not predicted.

Invertebrates were also identified as a value within the Twelve Apostles Marine National Park which was adjacent to the previous Activity Planning Area. Since then, the Operational and Active Source Areas have been refined and now include a 5 km buffer from the Operational Area to the Twelve Apostles Marine National Park (Appendix B12 MAP-REG-EPM-047). The Active Source Area is ~20 km from the seaward boundary of the Twelve Apostles Marine National Park (Appendix B12 MAP-REG-EPM-047). Given that the furthest distance to the modelled sound effect criteria for invertebrates is between 90 m – 2.74 km from the Active Source Area, impacts to invertebrates are not predicted within the park.

There is no scientific information on the potential for continuous underwater sound impacts to invertebrates and no cause-effect pathway has been established. Thus, the impact assessment focuses on impacts from impulsive (seismic) underwater sound to invertebrates.

4 Description of the Existing Environment that may be Affected by the Activity

For a description of the baseline soundscape in the region relevant to the Regia MSS, refer to Section 1.1 of Appendix B8.

Marine invertebrates include:

- Crustaceans such as crabs and rock lobsters.
- Molluscs such as bivalves (abalone, clams, mussels, and scallops), gastropods (sea snails/trochus, sea slugs and nudibranchs) and cephalopods (squid and octopus).
- Hard and soft corals.

Marine invertebrates not only represent the largest proportion of marine biomass, but many species also have important socio-economic values (Sole et al. 2023).

Species are grouped according to their sound modelling characteristics as outlined in Section 5: Acceptable Levels of Impact

4.1 Invertebrates - General

Studies by the Museum of Victoria found that invertebrate diversity was high in southern Australian waters although the distribution of species was patchy, with little evidence of any distinct biogeographic regions (Wilson and Poore 1987). This is supported by studies in the region.

Studies for the Beach Otway Gas Development that is in the eastern part of the Regia Operational Area identified the following:

- A video survey of the seabed at selected sites along proposed offshore pipeline routes for the Otway Gas Development was undertaken during 2003 (Beach Energy 2022) and found:
  - Substrate in water depths between 82 and 66 m was predominantly low-profile limestone with an incomplete sand veneer that supported a low to medium density, sponge dominated filter feeding community. Fish and other motile organisms were uncommon.
  - In shallower depths between 30 and 63m the video surveys showed a rippled, sand or sand/pebble substrate with minor sponge dominated benthic communities. The epibenthic organisms were generally attached to outcropping or sub-outcropping limestone pavements. Only in waters shallower than ~ 20 m, was significant, high-profile reef and associated high density macroalgae dominated epibenthos encountered.
- A drop camera survey at the seabed for the next phase of the Otway Gas Development was undertaken from November 2019 to January 2020 in water depths from 70 to 104 m (Beach Energy 2022) and found:
  - Percent cover of epifauna ranged from 0 to 80% for all samples, averaging no more than 37%. Of the individual epibenthic organisms, Gastropoda sp. 2 (a cone shell) and crinoids (featherstars) were the most abundant.
  - The general impression of the seafloor was of an unmodified marine environment that supports a patchy complex of branching epibiota (i.e., bryozoans, gorgonian cnidarians and sponges) providing microhabitat for a range of macrofauna such as amphipods, isopods, polychaete worms and molluscs.
  - There was a low abundance and diversity of infauna living within the sediment which reflects the coarse nature of the substrate. This type of substrate is highly

mobile making it difficult for filter feeders and soft bodies invertebrates to survive and establish significant populations.

- Epibiota on the seabed in the area surveyed was representative of what is expected at depths around 70-100 m. The infauna was of relatively low abundance and diversity as expected for coarse sand substrates. No species or ecological communities listed as threatened under the *Environmental Protection and Biodiversity Conservation Act* 1999 (the EPBC Act) were observed.

Studies for the proposed pipeline for the Cooper Energy Casino, Henry, Netherby Development (Cooper Energy 2017) located in the eastern part of the Regia Operational Area, found that.

- in water depths from 20 – 60 m much of the seabed was sand or fine gravel. No epifauna were observed in these large tracts of sand and the biological component was likely to be primarily in-faunal or pelagic.
- Beyond 60 m water depth, the seabed was characterised by concreted outcroppings with very low relief and structural complexity separated by gullies of sand or fine gravel. Survey footage indicated that this broad flat area has a sparse cover of filter-feeding epifauna dominated by sponges and probably hydrozoans, bryozoans and algae.

4.2 Invertebrates – Commercial Species

Based on the review of commercial fisheries within the Regia MSS Operational Area (Appendix B6), a number of fisheries have been identified as having catch-effort for invertebrate species within the Operational Area (Table E4-1).

Table E4-1 - Commercial Invertebrate Fisheries with Catch-Effort within the Regia MSS Operational Area.

Jurisdiction	Fishery	Species	Note
Commonwealth	Southern Squid Jig Fishery	Gould's squid (*Nototodarus gouldi*	The Operational Area overlaps the Southern Squid Jig Fishery and Southern and Eastern Scalefish and Shark Fishery Commonwealth Trawl Sector Squid maximum fished area and where there has been fishing intensity during 2010 – 2020.
Victoria	Giant Crab Fishery	*Pseudocarcinus gigas*	The Operational Area overlaps the area actively fished by the Giant Crab Fishery.
Victoria	Octopus Fishery	Pale octopus (*Octopus pallidus*) Maori octopus (*Octopus maorum*) Gloomy octopus (*Octopus tetricus*)	The Operational Area overlaps the area where there has been one vessel with a maximum fishing day of one since the fishery commence in 2020. Currently octopus fishing in the Western Zone, which overlaps the Operational Area is via exploratory, temporary permits.
Victoria	Southern Rock Lobster Fishery	*Jasus edwardsii*	The Operational Area overlaps the area actively fished by the Rock Lobster Fishery.
Victoria	Abalone Fishery	Blacklip *(Haliotis rubra)* *Greenlip (Haliotis laevigata)*	Based on water depths, the Activity Planning Area does not overlap the fishery, while the Environmental Planning Area overlaps the Western and Central zones of the fishery.

4.2.1 Crustaceans

4.2.1.1 Giant Crab

Giant Crab (*Pseudocarcinus gigas)* occurs in southern Australian waters between central New South Wales to southern Western Australia, including Tasmania. Giant crabs inhabit the continental slope at approximately 200 m depth and are most abundant along the narrow band of the shelf edge (VFA 2023b).

The stock of Giant Crabs distributed along the Victorian coast is part of a larger, genetically homogenous population that is endemic to southern Australia and maintained through widespread larval dispersion (VFA 2010). There has been little Giant Crab fishing in the Eastern Zone so the stocks in that zone are considered to be close to their natural state.

Giant Crabs are slow moving carnivores that feed primarily on sedentary benthic species such as starfish and on carrion. Growth of Giant Crabs is relatively slow; females and males taking approximately seven years and four to five years, respectively, to reach the legal minimum length of 150 mm (VFA 2010). The inter-moult period is one of the longest of the crab species and can be up to fifteen years for mature females (VFA 2010).

Female Giant Crabs are highly fecund and their ability to store sperm gives them the ability to fertilise their eggs over several successive breeding seasons. Eggs are released during autumn and incubated by the female until the following spring when they are released in the shallower depths of the shoulder of the continental slope (VFA 2010).

While there is little scientific data on the population, stock status records show the species to be sustainable throughout Western Australia, South Australia and Victoria but depleted in the Tasmania region (FRDC 2020).

Harvesting of the species has been undertaken for decades, though total allowable catch has been decreasing in Victoria significantly since 2011 from 25 tonnes to 10 tonnes by 2020 (VFA 2023b). Aspects of the species' biology (e.g., long-lived, slow-growing) and life-history characteristics make the species vulnerable to overfishing. The Victorian fishery stock status is listed as 'sustainable' while the Tasmania stock status is listed as 'depleted' based on percentage of egg production relative to unfished level.

Both the Victorian and Tasmanian fisheries recognise the importance of the breeding season with closures in effect from 1 June to 15 November for females while they are breeding and in berry. The Victorian fishery also closes between 15 September to 15 November to protect males during moult, while Tasmania remains open all year round for males.

4.2.1.2 Southern Rock Lobster

The Southern Rock Lobster (*Jasus edwardsii*) is found on coastal reefs from the south-west coast of Western Australia to the south coast of New South Wales, including Tasmania and the New Zealand coastline. Southern Rock Lobsters have extensive larval dispersal and can be found to depths of 150 metres, with most of the catch coming from inshore waters less than 100 metres deep (VFA 2017).

As the species is distributed continuously across southern Australia, the population is considered a single biological stock (VFA 2023, Bruce et al. 2007, Ovenden et al. 1992). Bruce (2007) detailed that, with the exception of southwest Western Australia, all regions receive more pueruli from outside their own boundaries than from self-recruitment.

In Victoria, the abundance of Southern Rock Lobster decreases from west to east reflecting a decreasing area of suitable rocky reef habitat (VFA 2017). Most adult Southern Rock Lobster remain within the same region (moving less than 1 km), though some tagged Southern Rock Lobster have moved more than 80 km between inshore and offshore reefs (SRL 2023). In the Otway Bioregion, Southern Rock Lobster habitat occurs as patchy, discontinuous low-profile reef running parallel to the coast.

The life cycle of the Southern Rock Lobster is complex. After mating in April to July (SRL 2023), fertilised eggs (from 100,000 up to 1,000,000 per female) are carried under the tail of the female for approximately 4-6 months before being released, typically between September and November (VFA

2017). Larval release occurs across the southern continental shelf, which is a high-current area, facilitating dispersal.

Once released, Southern Rock Lobster larvae (phyllosoma) live in the plankton and undergo 11 developmental stages over a period of between 12 and 24 months (Hartmann et al. 2013; SRL 2023). This stage is spent far out to sea beyond the continental shelf where ocean currents can carry phyllosoma hundreds or even thousands of kilometres from where they were released by the female lobster.

At the end of this developmental phase, phyllosoma larvae moult and metamorphose into a puerulus larvae (a transparent miniature version of the adult), still living in the water column but not feeding (SRL 2023). Successful metamorphosis from the final stage phyllosoma to puerulus stage occurs offshore but close to the continental shelf (Curtin University 2009). The puerulus swim inshore at night to settle onto reef habitat in depths from 50 m to the intertidal zone (Booth et al. 1991) where they moult into pigmented juvenile lobsters (SRL 2023).

This settlement of puerulus is very important and is monitored using specifically designed collectors placed in many locations around southern Australia. Only a very small number of the eggs released actually reach the stage of settling as puerulus, and very few of these puerulus survive to become adults (SRL 2023). From the millions of larvae annually produced by each adult lobster, only two on average survive to become adult lobsters (SRL 2023a). By measuring the annual settlement of puerulus, fisheries scientists gain an indicator of future stock levels.

Bruce et al. (2007) reported data for state-maintained puerulus collector sites, which indicates that most puerulus settlement in Portland occurs June through September, tapering off in October.

Southern Rock Lobster grow by moulting or shedding their exoskeleton. The frequency of the moulting cycle declines with age from five per year for newly settled juveniles to once per year for mature adults (VFA 2017). Males grow faster and larger than females, reaching 160 mm in carapace length after ten years. Females generally reach 120 mm in the same period. Growth rates also vary spatially, with growth faster in the east than in the west (VFA 2017). It can take between three and ten years for Southern Rock Lobsters to reach commercial fishing size (SRL 2023).

Adult Southern Rock Lobster are carnivorous and feed mostly at night on a variety of bottom dwelling invertebrates such as molluscs, crustaceans, and echinoderms. The main predators of Southern Rock Lobster are octopus, sharks, and reef fish such as wrasse and ling (SRL 2023).

The latest stock status determination for the Southern Rock Lobster across South Australia, Tasmania, Victoria, and Western Australia details that it is sustainable (FRDC 2021). The 2021/22 Victorian Rock Lobster Fishery Stock Assessment Report (VFA 2023) details the that the egg production for the Western Zone, which the Operational Area overlaps, has been relatively consistent at 23-24% in the last seven years, in 2021/22 egg production was lower at 22.0% but still above the 20% limit reference point. Overall, the stock indicators in the Western Zone continue to show improvement.

The Victorian and Tasmanian Southern Rock Lobster Fisheries close between 1 June and 15 November to protect females in berry (with eggs attached) during the spawning period and between 15 September and 15 November to protect males during the moulting period when soft shells increase their vulnerability (VFA 2023a).

4.2.2 Cephalopods

4.2.2.1 Gould's Squid

The following is from AFMA (2023):

Gould's squid (*Nototodarus gouldi*) is a commercially important species that inhabits temperate and subtropical waters of Australia and New Zealand. They can be found in estuaries and pelagic environments to depths of 825 m but are most abundant over the continental shelf at depths of 50-200 m. Larvae and juveniles are often found in shallow coastal waters. Gould's squid aggregate near the seabed during the day and move into the water column at night to feed.

Gould's squid reach reproductive maturity at an age of 6-9 months. They spawn throughout the year, with 2-3 peaks in spawning activity. Females mate before they are fully mature, with sperm bundles ('spermatophores') from the male being stored in buccal pouches around the mouth. It is not known how long spermatophores are retained before fertilisation occurs. Eggs are fertilised as they pass the buccal pouch and are released in a free-floating jelly-like mass. Each egg mass can contain several thousand eggs, although reproduction is highly variable depending on environmental conditions. Hatching occurs 1-2 months after fertilisation. Gould's squid die shortly after spawning.

Gould's squid feed on crustaceans, fish and cephalopods at night and are in turn prey for birds, large fish, sharks, and marine mammals (O'Sullivan and Cullen 1983).

The species is commercially fished using jigging by the Southern Squid Jig Fishery and is incidental catch for the Southern and Eastern Scalefish and Shark Fishery – Commonwealth Trawl Sector. Fishing mortality and biomass are classed as not overfished.

4.2.2.2 Octopus

The Pale Octopus is a benthic species with no pelagic stage in its development. It has a depth range of 7–275 m and is found from the Great Australian Bight around Tasmania to southern New South Wales (Leporati et al. 2008a, 2008b). It has a single reproductive episode where the females stay with their eggs until they hatch, shortly after which they die. Leporati et al. (2008a, 2008b) details that Pale Octopus have a maximum life span of ~18 months and that peak-spawning season is around late summer and early autumn.

The Gloomy Octopus is unlikely to be present in the Operational Area as it is found throughout Subtropical eastern Australia and northern New Zealand (Australian Museum 2023).

Maori Octopus is the largest octopod in Australasia and can exceed an arm span of 3 m and mass of 10 kg (Lalas 2008). They live in the benthic zone in soft-sediment and rubble habitats from depths of 0-549 m and will sometimes forage in nearby hard-reef habitats but are less common at the fringes between reefal and soft sediment habitats (Animalia 2023).

Currently, only exploratory fishing for octopus is occurring in the western zone that overlaps the Operational Area with Pale Octopus classified as an undefined stock (FRDC 2020a).

4.2.3 Molluscs

4.2.3.1 Abalone (Blacklip and Greenlip)

The Abalone Fishery is one of Victoria's most valuable commercial fisheries. Almost all of the catch is exported to international markets, predominately in Asia. Abalone are caught along the majority of the Victorian coastline and the fishery is primarily based on targeting blacklip abalone (*Haliotis rubra*) although Greenlip abalone are also targeted (*Haliotis laevegata*). Blacklip abalone stocks within the contemporary fishing grounds are fully fished while Greenlip abalone stocks have limited abundance in the Western and Central Zones. Historical catch of greenlip in WZ has been small, with 41.6 t reported landed from 1965-2005, including 37.6 t from 1969-1980 and only 850 kg from 1981-2005. In recent years, greenlip catch has remained low (i.e. <2.0t per year) compared to previous years, and 0 t was landed in the fishing period to December 2022 (Peeters et al 2023).

Blacklip Abalone stocks in Victoria are in relatively poor condition having suffered greatly from disease and overfishing. The pelagic larval duration of abalone is short at ~10 days, nevertheless genetics studies have found that abalone stocks along Victorias south coast are well connected, with high levels of gene flow within and between reef patches. Larval supply and recruitment success may therefore not depend predominantly on local reef sources. The marine physical environment of the south coast is highly variable, driven by converging ocean currents, strong environmental gradients, habitat discontinuities and varying degrees of exposure to wave energy (Miller et al 2016).

Regia MSS will be operating at depths greater than 50m. While almost all diver-harvested abalone will come from depths <30m the majority will come from depths <20m, hence there is approximately 15-20km distance between the 20m and 50m depth contours adjacent to where the proposed Regia MSS will approach the coast.

4.3 People and Communities

4.3.1 Social and economic features

During consultation, as presented in Annex 2, objections and claims were raised regarding concerns of impacts on the local economy and environment, including commercial species and marine life in general. Species that may be affected are described above in sections 4.1 and 4.2.

4.3.2 Cultural features

Several invertebrate species including torbos, pipis, abalone, limpets, mussels, elephant snails, crayfish/lobster, crabs and squid are identified as culturally significant to the Gunditjmara People as both a resource and in harvesting as a cultural practice (GMTOAC, 2023). Barnabeel (oyster), murrabal (mussel), bam bam (crayfish), abalone and pipi are also culturally important resources to the Wadawurrung People (WTOAC, 2020). Invertebrate species are an important traditional, social and economic resource for the Eastern Maar People. Abalone, cockles and crayfish are collected as tucker along the coast (EMAC, 2015). Invertebrate species may also hold totemic values and kinship. (Appendix F3, Section 3.16.1).

5 Relevant Legislative Requirements

CGG has considered all the relevant legislative requirements, conservation management and recovery plans for all invertebrate species that may be affected. No measures were identified from this process.

6 Defining Acceptable Levels of Impact

To define acceptable levels of impacts to invertebrates the species identified have been grouped according to similarity of impact pathways:

- Crustaceans - Southern Rock Lobster and Giant Crab
- Bivalves (Molluscs)
- Cephalopods
- Coral

Invertebrates do not sense sound pressure but rather particle motion, the other major component of sound waves. Particle motion is a more difficult component to measure, and this has meant most available research on seismic impacts to invertebrates characterises received sound levels in terms of the sound pressure only. Sound exposure levels can nevertheless be used as a reasonable proxy of particle motion at distances >250m from the source but at lesser distances there is too much signal saturation (McCauley et al. 2021).

The sound effect criteria adopted for the assessment of sound impacts to invertebrate groups are based on studies identified and cited in the Seismic Sound Studies Report and Sound Modelling Reports (Appendices B7 and B8 respectively). They have been used to define the acceptable levels of impact.

CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that assessment specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding assessment specific defined acceptable levels established for this assessment. This sets the foundation for relevant and targeted demonstration later in this assessment.[1]

Table E4-2 - Defined acceptable levels of impact from underwater sound effects to invertebrates

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	**Commercial Fishing** Fish and aquaculture stocks continue to be assessed as the same stock status they held prior to commencement of the activity. **Crustaceans** Exposure of individual invertebrates to sound levels exceeding 202 dB PK-PK may occur but is acceptable provided that the affected species or functional groups have sufficient abundance, distribution, or	**Commercial Fishing** Whilst this level is not related to a specific sound exposure level, this is a suitable proxy for effects on the commercial species under consideration. **Crustaceans** Payne et al (2008) and Day et al (2016a) Crustaceans are the most studied group in terms of the range of metrics investigated, including catch rates and physical, behavioural, and physiological effects (Carroll et al. 2017). Particle motion rather than sound pressure is the likely mechanism of impacts
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		

[1] Note: The acceptable levels related to demonstrating ALARP and the adoption of specific measures to ensure the effectiveness of control measures can be found in Appendix F2 and B3 respectively. As they are criteria integral to the acceptance of the Environment Plan, and they a documented elsewhere, these criteria are not discussed further in this assessment.

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.	reproductive capacity to maintain population viability and ecological function. .**Molluscs** Sound exposure to molluscs must be below PK-PK sound levels of 212 dB re 1 μ Pa a. **Cephalopods** Sound exposure to cephalopods must be below temporary threshold shifts at thresholds in exceedance of 162 dB SEL. **Corals** Sound exposure to corals and sponges are below 226 dB PK.	for invertebrates however this has not been rarely studied so PK-PK sound pressure is used here, based on work by Payne et al. (2008) who identified no effects on righting time in lobster at 202 dB re 1 μ Pa (PK-PK), and Day et al. (2016a) who found effects at 209 dB re 1 μ Pa (PK-PK). **Molluscs** Day et al (2017). A threshold of PK-PK 212 dB for molluscs is based on sub-lethal effects to scallops and oysters exposed at these levels from Day et al (2017). **Cephalopods** Fewtrell and McCauley (2012). A threshold of 162 dB SEL per-pulse for squid is used, based on the "inking and startle" response from Fewtrell and McCauley (2012). This is the most conservative measure available from the literature. **Corals** Heyward et al. (2018). A threshold of 226 dB PK received levels is used, based on no impacts to coral were identified at this level by (Heyward et al. 2018).
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	For species and sensitivities with social, cultural and/or economic values, if the potential ecological impact or risk is deemed acceptable, it is likely that the corresponding impact on social, cultural and/or economic values will also be considered acceptable, as the physical presence and health of these species are key for maintaining their social, economic and cultural roles. Therefore, ongoing assessment for social, cultural and economic values will be on a receptor level.
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	
	The views of public have been considered in the impact and risk assessment.		

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

7.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of underwater sound, elimination involves removing the source of underwater sound or preventing its generation in the first place. Four main options were considered and subsequently adopted:

No vessel movements within 5 km of the Twelve Apostles Marine Park

This activity limitation was adopted through the consultation process with Marine Parks Victoria. It is protective of cultural values of the marine park and Southern Rock Lobsters which are also a key value.

No vessel movements within 700 m of fishing blocks G12, G13, H13, and H14

During consultation concerns were raised by a fisher regarding the use of a smaller vessel which the fisher launches from a pier in Port Cambell. This restricts the fisher to access deeper waters and limits the fisher to fishing blocks G12, G13, H13 and H14 exclusively (see MAP -REG-EPM-037_A in Appendix 12).

To ensure this fisher was not worse off as a result of the activity, CGG implemented an activity limitation where the Regia MSS would not operate within 700m of Southern Rock Lobster Fishing Blocks G12, G13, H13, and H14. This activity limitation is based on the underwater sound modelling results where 700m is the no effect distance for invertebrates including Southern Rock Lobster, which is the target species fishers in these blocks.

No discharge of the sound source within the West Tasmania Canyons KEF

This measure eliminates potential noise impacts in a KEF characterised by complex bathymetry and high productivity, which may be important for key behaviours for invertebrates. It has been applied by CGG to protect the ecological integrity and invertebrate biodiversity associated with this KEF, which is recognised for its national environmental significance.

No seismic acquisition within 17 km of Deen Maar / Lady Percy Julia Island

This limitation reduced the overlap with most fishing effort in the region and is protective for mobile or short ranging fish species that are more likely to be present in water depth < 50 m. The shallow depths are also where most lobster will settle when ready to do so. This measure was adopted to avoid disturbance to coastal and nearshore invertebrate communities and to prevent elevated acoustic energy in shallow, sensitive environments. This was confirmed during consultation with commercial fishers who agreed that the data was correct and most fishing activities occurred in shallower waters close to ports (Event ID 4107, Feedback ID 1277).

8 Minimisation of Impacts Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of impact could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas

8.1 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the impact. One main option was considered and subsequently adopted:

Sound will not be emitted above the stated capacity

By selecting a sound source and operational settings that remain within a defined maximum acoustic output, the activity substitutes more harmful, higher energy alternatives for lower-intensity ones. This measure was adopted to ensure predicted effects on fish remain within modelled thresholds, avoiding excessive acoustic exposure that could disrupt behaviour or physiology.

9 Predicted Levels of Impact

To arrive at the predicted levels of impact of underwater sound on invertebrates at this stage in the process requires the reader to have assimilated all prior relevant information that has been assessed on invertebrates. The EP documentation is coded alphabetically to guide the reader through what is a natural process of temporal accumulation and review of evidence. The following documentation forms the evidence lineage for predictions on invertebrates as described here.

- B6 – Commercial Fisheries Review – all commercial fisheries and their targeted species, associated with the Commonwealth and/or the states of Victoria, Tasmania and South Australia were identified and mapped to indicate fishing effort relative to the proposed Regia MSS.
- B7 – Sound Modelling Reports –SLR) performed a numerical modelling study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic impacts on key regional receptors including benthic invertebrates, marine mammals, fish, turtles, plankton and recreational divers and swimmers. Acoustic thresholds derived from this document are used to guide assessments of impacts.
- B8 – Seismic Studies Report – This report provides a detailed assessment of the scientific literature related to sound (and specifically seismic) effects on invertebrates and other fauna. This literature is the key evidence base from which impact levels are derived.

Therefore, all species identified through B6 have been assessed through the framework provided by B7 and B8. Because of commonalities among species in their sensitivity to seismic it is not always necessary to describe effects to each species individually but rather as groups defined by their sensitivity to different frequency levels of sound and shared life-history behaviours.

9.1 Change in fauna behaviour, hearing capacity, and physical condition

As detailed from the underwater sound and studies relevant to seismic surveys, provided in the Seismic Sound Studies Report (Appendix B8), mortality and injury to invertebrates are not predicted based on the received sounds levels to these species.

No impacts to corals are predicted as the threshold in the underwater sound modelling was not reached.

9.1.1 Crustacean - Giant Crab

Giant Crab are likely to be present in the deeper waters (>200 m) of the Operational Area which overlaps areas where Giant Crab are caught by the Victorian Giant Crab Fishery. The Operational Area does not overlap the Tasmanian Giant Crab Fishery.

The extent of the area of impact is predicted to be 232m-397m.

The predicted effect level to this species is assessed as minor. While some level of impact is possible any potential effects are not considered significant or at a level to affect the population given the following:

- Available scientific literature has demonstrated no direct mortality of crabs from exposure to seismic sounds (Morris et al. 2017, Christian et al. 2003, Christian et al. 2004, DFO 2004).
- Sub-lethal effects, relating to impairment of reflexes, damage to the statocysts and reduction in numbers of haemocytes are documented in rock lobsters at received levels of 209 dB re 1 µPa (PK-PK) (Day et al. 2016a) and could also occur in Giant Crab. Based on the distances from the seismic source that these levels would be reached it is possible that some individual Giant Crabs will incur a reduction in fitness. However, there is no evidence to support large-scale fitness reductions or consequential changes to population health.
- A range of studies have exposed female crabs bearing eggs to seismic sound, with no reports of acute or chronic mortality in the adult lobsters and no mortality of embryos

(Christian et al. 2003, DFO 2004, Pearson et. al 1994). Day et al. (2016a, 2016b) also reported that exposures equivalent to approximately 205 dB re 1 µPa (PK) did not impact the condition or development of eggs carried by female lobsters, or the size or morphology of the larvae once hatched. Therefore, potential exposure of berried females to the seismic source is unlikely to result in any mortalities to adult females in addition to natural or fishing mortalities and, therefore, no reduction in the adult spawning biomass.

- No change to development rate in exposed fertilised crab eggs/embryos is predicted compared with unexposed eggs/embryos based on Payne et al. 2008, Christian et al 2003, DFO 2004 and Pearson et al. 1994. Therefore, impacts at a population level due to reduced recruitment would be unlikely as impacts to larvae and eggs were not observed.
- At received noise levels of 209 – 212 dB re 1 µPa (PK-PK) impacts to rock lobster embryonic development were not observed, with hatched larvae found to be unaffected in terms of egg development, the number of hatch larvae, larval dry mass and energy content and larval competency (Day et al. 2016a), thus recruitment should be unaffected. Though a different species, these results align with the outcomes of studies into the effects of seismic on fertilised crab eggs/embryos (Payne et al. (2008), Christian et al (2003), DFO (2004) and Pearson et al. (1994)).
- The stock of Giant Crabs distributed along the Victorian coast is part of a larger, genetically homogenous population that is endemic to southern Australia and maintained through widespread larval dispersion (VFA 2010).

The uncertainty level for impact to Giant Crab from seismic sound is assessed as medium based on:

- There are no published sound effect criteria for acoustic impacts from seismic exposure to crustaceans.
- In the absence of a published sound effect criteria for acoustic impacts from seismic exposure to crustaceans no effects on righting time in lobster at 202 dB re 1 µPa (PK-PK) from Payne et al. (2008) was applied in this assessment as a precautionary threshold to determine potential impacts.
- There are limited published studies on the effects of seismic on Giant Crab, none of which are specific to the species in the Otway region.
- An absence of long-term monitoring data of the effects of seismic exposure on Giant Crab in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (minor) and uncertainty (medium) is assessed as medium. For Giant Crab the predicted level of impact is clearly below the defined acceptable levels of impact as detailed in Section 10. The mitigation and management measures detailed in Section 9.2 provide sufficient confidence in the predicted effect levels.

9.1.2 Crustacean - Southern Rock Lobster

The Operational Area overlaps where Southern Rock Lobster are likely to be present in waters up to 150 m, and the nearshore waters where the majority of catch for the Victorian Rock Lobster Fishery occurs. The Operational Area does not overlap the Tasmanian Rock Lobster Fishery.

The extent of impact to Southern Rock Lobsters is predicted to be within 232m-397m from the seismic source.The extent of impact to larvae is predicted to be within 740 m from the seismic source (see Appendix E2 Underwater Sound – Plankton) for on how this distance has been determined.

The duration of the predicted physical and physiological impacts to individuals:

- May be permanent in some adults directly below the sound source.
- May be recoverable in puerulus and is permanent in juvenile life-stages.

The duration of the predicted impacts to the SRL population are uncertain due to potential increased vulnerability to predators and increased intermoult period arising from the possible impacts to individuals. However, given fishery recruitment is largely unimpeded by the Regia MSS, the duration of population level impact is expected to be limited to juveniles in the current cohort.

The predicted effect level to this species is assessed as minor as impacts are predicted to have some effect on Southern Rock Lobster, but the effect is not considered significant or at a level to affect the population given the following:

- Scientific literature has demonstrated no direct mortality of lobsters including eggs, puerulus, juvenile, and adults, proximate to a seismic source (Day et al. 2016a, Payne et al. 2008, Day et al. 2021). The Day et al (2016 and 2021) assessments are considered conservative given the water depths in the Operational Area and the protection afforded by typical habitat features such as holes, crevices, or rocky dens within structurally complex reef habitats in nearshore area where most Southern Rock Lobsters would be present. Scientific studies have detected impacts in shallower water depths, and as scientific literature identifies, behavioural and physiological responses in crustaceans are likely to be related to particle motion effects, located close to the operating array, rather than pressure effects (Carroll et al. 2017).
- Southern Rock Lobster population is sustainably fished meaning that the population is not vulnerable to mortal effects to large portions of the adult populations.
- A single seismic survey has a negligible impact on larval supply by comparisons with the size of the larval populations (McCauley et al. 2000) and recruitment into or out of the area is unlikely to be impaired.
- Pueruli are likely to use a range of orientation cues to locate suitable settlement areas (Hinojosa et al. 2016), reducing the potential impact of increased ambient sound on the ability to locate suitable settlement areas.
- The impact assessment has evaluated impacts from underwater sound on Southern Rock Lobster stocks, including at key life stages based on contemporary scientific literature.
- Conservative thresholds have been adopted and given the small spatial overlap with likely Southern Rock Lobster habitat, the potential for impact at the population level is negligible, localised, and recoverable.
- The Southern Rock Lobster population is highly recoverable shown by the overlaps with the Victorian Rock Lobster Fishing Area which have removed their full quota or close to their quota since quotas were introduced, which was a combined Total Allowable Commercial Catch (TACC) of 286 tonnes of the adult population in 2019/20.
- The Southern Rock Lobster population is resilient to mortal effects because the population is a connected, broadly distributed stock across the whole of southern Australia in water depths from 0 m to 400 m.
- The predicted physical and physiological effects to individuals are unlikely to affect the current population, or future populations, because of the high resilience of the species to more severe impacts.
- Despite the uncertainty in the duration of population level effects, the extent of impacts is ecologically insignificant in comparison to any of the analysed areas.
- This assessment is considered highly conservative given that:
  - Puerulus larvae settle onto reef habitat in shallow waters (50 m to the intertidal zone) not present within the operational area; and
  - Juveniles are normally found in isolated holes and crevices, with larger juveniles and sub-adults residing in large aggregations inside rocky dens within structurally complex reef habitats and are not typically exposed at the seafloor.

The uncertainty level for impact to Southern Rock Lobster from seismic sound is assessed as medium based on:

- There are no published sound effect criteria for acoustic impacts from seismic exposure to crustaceans.
- In the absence of a published sound effect criteria for acoustic impacts from seismic exposure to crustaceans no effects on righting time in lobster at 202 dB re 1 µPa (PK-PK) from Payne

et al. (2008) was applied in this assessment as a precautionary threshold to determine potential impacts.
- There are limited published studies on the effects of seismic on Southern Rock Lobster, none of which are specific to the species in the Otway region.
- An absence of long-term monitoring data of the effects of seismic exposure on Southern Rock Lobster in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (minor) and uncertainty (medium) is assessed as medium. For Southern Rock Lobster the predicted level of impact is clearly below the defined acceptable levels of impact as detailed in Section 10. The mitigation and management measures detailed in Section 9.2 provide sufficient confidence in the predicted effect levels.

9.1.3 Molluscs

Molluscs may be present within the Operational Area although no commercial fishing for molluscs such as scallops or abalone was identified within the Operational Area. However, based on consultation with Abalone Fishers a separate assessment on abalone has been added to Appendix F3. The predicted levels of impact as reported for Molluscs as a group are nevertheless the same for Abalone specifically.

As detailed in CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that assessment specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding assessment specific defined acceptable levels established for this assessment. This sets the foundation for relevant and targeted demonstration later in this assessment. The maximum modelled distance to sound effect criteria for molluscs is expected within 90m from the sound source at water depths of 67.4m.

The predicted effect level to this species is assessed as negligible as impacts to molluscs are predicted to have little or no effect on the environment or the affected species, populations, or ecosystems based on:

- The Abalone fishery usually operates in less than 50m water depth, therefore, CGG has implemented an operational constraint where the seismic source will not be operated in water depths less than 50 m, thus impacts to abalone and other molluscs in these water depths are not predicted.

The uncertainty level for impact to molluscs from seismic sound is assessed as medium based on:

- There are no published sound effect criteria for acoustic impacts from seismic exposure to molluscs.
- There are several published studies on the effects of seismic on molluscs, none of which are specific to the species in the Otway region.
- An absence of long-term monitoring data of the effects of seismic on molluscs in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (negligible) and uncertainty (medium) is assessed as medium. For molluscs the predicted level of impact is clearly below the defined acceptable levels of impact as detailed in Section 10. The mitigation and management measures detailed in Section 9.2 provide sufficient confidence in the predicted effect levels.

9.1.4 Cephalopods - Octopus and Squid

The extent of the area of impact is predicted to be a maximum of 2.74 km from the sound source during survey acquisition (CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that assessment specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding assessment specific defined acceptable levels established for this assessment. This sets the foundation for relevant and targeted demonstration later in this assessment.) which would result in a startle response.

The predicted effect level to this species is assessed as negligible as impacts to octopus and squid are predicted to have little or no effect on the environment or the affected species, their populations, or the broader ecosystem. The impact will be localised and temporary, and octopus and squid have the capacity to recover from the impact without significant harm based on:

- Verified impacts remain limited to behavioural startle responses and potentially inking (Fewtrell & McCauley (2102)
- Fewtrell and McCauley (2012) detailed that caged squid exposed to an air gun signal displayed a significant decrease in alarm responses in the second exposure to the air gun noise when compared with the first, supporting general habituation to the sound.
- Mortality and harm to adult octopus and/or hatchlings exposed to seismic was not detected during a targeted study by Day et al. (2023) to octopus.
- While individual octopus and squid may be injured if they are in very close proximity to a seismic source at full power, the use of soft starts will moderate this interaction. This is in addition to the lack of mortality found by Day et al. 2023 in caged individuals. [Paragraph updated in response to Matter I05].

The uncertainty level for impact to octopus and squid from seismic sound is assessed as medium based on:

- There are no published sound effect criteria for acoustic impacts from seismic exposure to octopus and squid.
- In the absence of a published sound effect criteria for acoustic impacts from seismic exposure to octopus and squid, the inking and startle response received level of 162 dB re 1 µPa from Fewtrell and McCauley (2012) was used which provides a conservative assessment as the study was undertaken on caged squid which could not move away from the air gun.
- There are no published sound effect criteria for acoustic impacts from seismic exposure to cephalopods.

The predicted level of impact based on the effect (negligible) and uncertainty (medium) is assessed as low thus good industry practice (including legislation and standards) has been applied and therefore these impacts are of an acceptable level without further reduction measures being required.

9.2 Measures Adopted to Manage Environment Impacts

The following measures have been adopted to ensure that the impacts associated with elevated levels of underwater sound from the survey and support vessels on invertebrates will be of an acceptable level.

These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

Measure	Measure Type	Details and Justification
Ramp up of sound source to full power over 30 minutes.	Practice	Mobile marine fauna (including demersal and pelagic fish, octopus, squid, diving birds, penguins, and turtles) are expected to move away from the source before it is at full power, providing them a level of protection. However, once the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I04, I05, E08].

10 Demonstration impacts will be of an acceptable level

10.1 Principles of ESD

Temporary, Reversible, Small Scale and Natural variation

Site-specific modelling predicts that impulsive sound levels capable of eliciting behavioural or physiological changes in marine invertebrates are confined to a limited spatial extent. Impacts to invertebrates will be predominantly behavioural or sub-lethal, including startle responses such as inking in cephalopods. Except for lobsters, these effects are short-lived and reversible and occur in populations that are naturally resilient to both environmental and fishing-related mortalities. For cephalopods, the predicted distance for behavioural startle response extends up to 2.74 km from the source. For molluscs, the effect distance is 90 m, and since the minimum water depth of the Regia MSS is 50 m, no impacts to molluscs are expected.

Predicted distances for recoverable injury to commercially and culturally significant species are 397 m for Southern Rock Lobster, and up to 397 m for Giant Crab depending on water depth. Modelled distances do not intersect any sensitive benthic habitats or invertebrate spawning areas. Importantly, the scientific literature has demonstrated no direct mortality of lobsters or crabs including eggs, puerulus, juvenile, and adults, proximate to a seismic source (Day et al. 2016a, Payne et al. 2008, Day et al. 2021). Therefore, any mortality or physiological stress that may occur is not expected to exceed natural or fishing-related mortality rates. Effects to invertebrates, where they occur, are considered minor, temporary, and immeasurably small at the population level (Payne et al. 2008, Christian et al 2003, DFO 2004 and Pearson et al. 1994). No impacts to corals are predicted, as the seismic sound thresholds for effect are not exceeded at water depths greater than 50 m. Overall, the predicted impact is low intensity, reversible, and spatially limited.

Based on sufficient information

The assessment utilised site-specific acoustic modelling, a review of peer-reviewed literature (including McCauley et al. 2017 and Day et al. 2016), and available guidance on invertebrate sensitivity to impulsive sound. While invertebrate hearing mechanisms differ from vertebrates and data is limited for some taxa, sufficient evidence exists to characterise likely exposure effects. The most sensitive group identified was cephalopods, and the assessment applied conservative thresholds derived from controlled laboratory studies. No evidence of permanent population-level harm was identified. As a result, the precautionary principle was not triggered.

Activity not inconsistent with EPBC Act

Invertebrates are not currently the subject of specific recovery plans under the EPBC Act. Nonetheless, the assessment reviewed relevant conservation advice for listed marine species and benthic environments, confirming no inconsistency between the activity and the objectives of the Act. No listed invertebrate species or key ecological communities occur within the modelled impact area. Mitigation and environmental management measures adopted for the activity, including soft-start procedures and adherence to spatial boundaries, align with best practice and maintain consistency with EPBC principles.

10.2 Biological and Ecological Categories

Marine invertebrates may display behavioural responses to impulsive sound, particularly within tens of metres of the source. However, the rapid dissipation of sound energy, limited duration of exposure, and lack of evidence of mortality or lasting physiological damage support the conclusion that any biological impacts will be minor. Species with low mobility are likely shielded by substrate, and more mobile taxa can avoid or quickly recover from exposure. No population-level effects are predicted.

The spatial and temporal scale of potential disturbance from seismic sound is too limited to disrupt ecological functions. The affected footprint, which has the potential to cause recoverable injury, but not mortality, moves continuously with the vessel and does not intersect with unique or sensitive habitats. Furthermore, the footprint of the survey area is extremely small in the context of a spatially

very large population that has a high level of connectivity (VFA 2010, VFA 2023, Bruce et al. 2007, Ovenden et al. 1992). Therefore, there is no anticipated cascade effect on trophic relationships, and ecosystem diversity and function will remain intact. Recovery is expected without intervention.

10.3 Economic, Cultural and Social Categories

Several invertebrate species including turbos, pipis, abalone, limpets, mussels, elephant snails, oyster, cockles, crayfish/lobster, crabs and squid were identified through the cultural heritage review, consultation and desktop research as species with social, cultural and/or economic significance that may be impacted by underwater sound. Concerns raised via consultation focused on possible sublethal effects, larval sensitivity, and cumulative exposure alongside fishing pressure. Stakeholders requested additional evidence that recoverable injury would not affect catch rates or access to culturally or economically significant species. In response, CGG integrated updated modelling that confirmed the distance to recoverable injury thresholds for southern rock lobster and giant crab are well within the spatial footprint of the survey and do not overlap with fishing grounds or culturally significant areas.

The assessment confirmed that no spawning areas, traditional harvest sites, or sensitive habitats would be affected, and that effects would be limited to temporary behavioural responses or minor, reversible physiological effects. As these values are closely tied to the physical presence and health of the species, the corresponding social, cultural and economic impacts are likewise considered acceptable. CGG also updated the impact characterisation to better reflect input from relevant persons and added further literature to address uncertainty about indirect ecological consequences. These actions demonstrate that the views of affected persons were seriously considered and incorporated into the environmental assessment. Therefore, industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational impacts; culturally significant species, places, and practices continue without disruption; and people and communities maintain ongoing access to the natural environment, recreational activities, and heritage values without long-term or irreversible effects and no person or group is expected to be materially worse off due to the activity.

10.4 Discussion on Consistency with Company Processes

The impact assessment used the ranking system outlined in Appendix B3. For invertebrates, the overall predicted level of effect was assessed as minor, with uncertainty rated as medium due to limited field validation studies. This reflects the application of conservative thresholds and recognition of remaining scientific uncertainty, while confirming that the impact remains within acceptable company limits. All mitigation measures are in place and effective in managing the impact pathway. The conclusion of the assessment of seismic sound to invertebrates is summarised below.

Invertebrates	Predicted Level of Effect	Uncertainty	Predicted Level of Impact
Giant Crab	Minor	Medium	Medium
Molluscs	Negligible	Medium	Medium
Southern Rock Lobster	Minor	Medium	Medium
Octopus and Squid	Negligible	Medium	Low

11 Environmental Performance Outcomes

Environmental Performance Outcomes (EPOs) are measurable and activity-specific outcomes that describe the environmental performance the titleholder must achieve to ensure impacts and risks are managed to acceptable levels. EPOs are critical to the structure of an Environment Plan because they form the clear link between the defined acceptable level of impact and the predicted level of environmental consequence. Each EPO must be measurable, achievable, and within the control of the titleholder to implement, providing a transparent and enforceable statement against which performance can be assessed.

Table E4-3 - Environmental Performance Outcomes and Justifications

Defined Acceptable Level (From Table E4-2)	Environmental Performance Outcome	Rationale
Fish and aquaculture stocks continue to be assessed as the same stock status they held prior to commencement of the activity.	No change in the assessed stock status of commercial and aquaculture species during and following the activity.	This EPO is supported through alignment with fisheries science reporting and stock assessments, allowing external verification of biomass trends. It provides a clear threshold for biological consequence and supports cumulative impact management.
Exposure of individual invertebrates to sound levels exceeding 202 dB PK-PK may occur, but is acceptable provided that the affected species or functional groups have sufficient abundance, distribution, or reproductive capacity to maintain population viability and ecological function.		
Sound exposure to molluscs must be below PK-PK sound levels of 212 dB re 1 μ Pa a.		
Sound exposure to cephalopods must be below temporary threshold shifts at thresholds in exceedance of 162 dB SEL.		
Sound exposure to corals and sponges are below 226 dB PK.		
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	**Social, cultural, and economic features are protected, sustaining their value for people and communities.**	
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		

Defined Acceptable Level (From Table E4-2)	Environmental Performance Outcome	Rationale
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		
Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	**The activity is conducted such that environmental impacts and risks remain within the range assessed as medium or lower, with mitigation measures in place and functioning as intended.**	This EPO enables ongoing assessment of effectiveness through internal reviews and operational audits. It provides a clear link between the risk assessment process and implementation strategy, supporting regulatory compliance and continuous improvement without requiring environmental outcome monitoring.

12 Recommendations

For most species/taxa/groups of invertebrates reviewed, this document provides the final assessment of impacts. However, despite an extensive review of the relevant literature around the effects of seismic on invertebrates, there has been a high level of concern voiced throughout consultation with relevant persons, around the importance of commercially targeted species. High levels of engagement on an aspect are a trigger for CGG to undertake additional assessment. In this case looking at the effects of the activity on certain commercial fish species. This additional assessment is detailed in Appendix F3 – Further Assessment of Key Values and Sensitivities under Section

- 3.5 Southern Rock Lobster
- 3.6 Giant Crab
- 3.8 Goulds Squid
- 3.9 Pale Octopus
- 3.10 Blacklip Abalone
- 3.14 Spawning Patterns

It is important to note that F3 is a response to further information requests and/or clarification and not a reflection of any prior assessment being insufficiently thorough. It is a recognition that more explanation and detail was sometimes necessary to better inform all groups involved in the consultation process, including the regulatory authority.

Hence F3 does not provide further assessment on all aspects and values identified through the EP process only those that were identified as

- Having some residual uncertainty about whether impacts or risks were of an acceptable level; and/or
- Contained environmental values and sensitivities (species) of key importance due to their protection status or commercial value; and/or
- Consultation with relevant persons revealed a particular value or sensitivity required further attention and material to support the consultation.

13 Document Control

Date	Revision	Update
20 July 2023	A	Draft prepared for initial comment
30 August 2023	B	Update based on comments and relevant person feedback
11 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
23 October 2024	2	Updated following NOPSEMA assessment
16 April 2025	3	Updated following NOPSEMA OMR 1 Letter
6 December 2025	4	Updated following NOPSEMA OMR 2 Letter

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table E4-4 shows how this feedback has been incorporated into the environmental assessments.

Table E4-4 - Public comment input

Matter	Matter ID	Changes made arising from public comment
Matter: Flawed argument regarding animals moving away	I04	CGG has considered these claims and has updated the EP Impact Assessments (Appendices E, and F where relevant) to clarify that, while some displacement is expected from mobile taxa during the Regia MSS, the survey will not preclude animals from the Operational Area in its entirety. Instead, animals are expected to temporarily move away from the active acoustic source, but once the source passes, animals will be free to move back into the habitat that they departed from.
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and the following Activity limitation: the sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the human health safety criterion for recreational divers, surfers and swimmers along the coastline. CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F1 F3, G1 and G2).

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table E4-5. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table E4-5 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4022	Attendees voiced concerns about how seismic activities could impact the sustainability and fish-ability of the immediate and nearby areas.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1529
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4357	The stakeholder raised an objection to seismic surveys as they negatively affect the fishing industry, local economy and environment.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of commercial fish species and sensitive species within the area of operation. The MSS will also not impact the local economy. Mitigation plans are in place to reduce any impacts to as low as practicable.	424
4030	CGG's email on September 14 indicated that the project's timing has changed to two separate 3-month windows: April-June and	We acknowledge this concern and agree that acoustic propagation modelling is the foundation of subsequent analysis. We will complete	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	September-November. AMCS is concerned that the December sound speed profile may not accurately reflect the physical conditions during these new survey periods. Since acoustic propagation modeling is critical for subsequent analyses and for setting thresholds for mitigation measures required for NOPSEMA approval, AMCS requests an explanation of how the December sound speed profile differs from those in April-June and September-November.	another modelling report prior to submission to cover the changed timeframes of the proposed survey.	
4033	Claim that seismic testing is proven to damage and kill marine life.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1024
4047	Concern about spawning activity of the Giant Crab, rather than the impact of the fishing overlap given exclusion of surveying at +200m water depths.	Titleholder acknowledged this concern and carried out an additional impact assessment for Giant crab and spawning species has been included in F3. There is expected to be no measurable effect on giant crab populations as a result of the survey.	4076
4050	Concern about the destruction of smaller sea life and the wounding of larger marine animals due to seismic blasting.	Regia EP has conducted thorough assessments of the literature for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	1669
4051	Concern about the detrimental impacts on marine animals.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1452

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4053	Concern about the impact on marine creatures due to noise pollution from seismic surveys.	The titleholder acknowledged the feedback, noting that potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals, are assessed in the Environmental Plan (EP) and can be found in E2, E3, E4, E5, E6, and E7. Measures to minimise adverse impacts on biological receptors are outlined in the EP also and can be found in G2.	3237
4054	Concern about the impact on marine species, specifically molluscs, due to the seismic survey.	Titleholder acknowledged this concern and noted that a thorough assessment of the potential impacts to marine invertebrates, including molluscs, from underwater sound is assessed in E4 of the EP.	2089
4059	Concern about the potential impact on the Abalone industry and the need for compensation if marine species are killed off.	Titleholder acknowledged this concern and noted that potential impacts to commercial fisheries from physical presence is assessed in E1 of the EP, and potential impacts to marine invertebrates from underwater sound is assessed in E4 of the EP. Advised that control measures to reduce impacts to commercial fishers as a result of loss of catch are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	2089
4062	Concern expressed regarding the timing of juvenile marine species' settlement, which is critical for their survival.	The titleholder noted the settlement is almost exclusively in inshore waters and the 50 m exclusion would protect querulous. Timing wise the likely settlement time is 9-12 months after spawning. As spawning occurs in Sept/Oct/Nov the settlement is likely in July/Augur/Sept.	3228
4064	Concern raised by the stakeholder regarding the potential damage/kill of marine life due to seismic testing.	Titleholder responded to individual advising that CGG would not propose an activity that would lead to unacceptable impacts to marine life and advised that environmental impact assessments for each aspect of the proposed activity that has the potential to impact marine life were currently being prepared and that they would be based on scientific literature and published shortly for consultation and feedback.	1024
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration by	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in	879

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	other companies, particularly regarding the sale of seismic data.	place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	
4068	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4073	Concerns about impacts both reputational and physical to the region if the activity is allowed.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1244
4074	Concerns about implications for the population of Rock Lobsters in the area going forward.	This claim has been thoroughly assessed in E1 and E5, and F3 for southern rock lobsters. The known effects to individual lobsters are not predicted to have any measurable effect on population levels or dynamics.	2773
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4076	Concerns about potential disturbance to the marine environment, including marine parks and areas of Biological Importance.	The titleholder acknowledged this concern and noted that potential impacts to the marine environment including marine parks and biologically important areas as a result of the Regia MSS is assessed in E1 to E9 and F3 of the EP. There will be no activities with Australian Marine Parks. All areas of biologic importance have been identified and assessment in the respective impact and risk assessments.	2278

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4077	Concerns about potential harm to zooplankton, whales, dolphins, sharks, seals, the Bonney Upwelling, rock lobster fishery and other local fishing industries.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	722
4078	Concerns about seismic testing and drilling rigs impacting marine life and fishing activities.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	917
4080	Concerns about the impact of seismic testing on various marine species.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	2179
4081	Concerns about the impact on whale habitat, endangered marine life, and commercial fisheries	Titleholder acknowledged this concern and noted that potential impacts to whales and relevant endangered marine species is assessed in the EP Chapters on underwater sound and light (E2-E7, and E9). Any interactions with seismic are mitigated and managed through spatial boundaries and a comprehensive fauna management plan. Advised that control measures to reduce impacts to commercial fishers as a result of displacement are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	4551
4083	Concerns about why more seismic needed and what time of the year was the survey going to be done to minimise impacts to fishing for sharks, lobsters, squid	Titleholder acknowledged this concern and each of the species within this claim has been subject to extensive assessment in E1, E3, E4 and F3 with various measure adopted to limit the sound exposure to the lowest level possible to meet geophysical objectives and to protect marine fauna (see G1).	740
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4088	Condemns seismic testing, asserting that it is deadly to marine life and unacceptable for ocean ecosystems. Call for a total ban, citing the large number of marine animals harmed by the practice. Argument that the destruction of marine ecosystems and the fishing industry is unjustifiable and express frustration, telling the parties responsible to stop.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	422
4093	Doubted the effectiveness of mitigation measures and believed the reports/information provided were absent of action /intention.	The mitigations applied by CGG are industry standard and comply with government policy. They have been proven to be as effective as reasonably practical for a number of years. The measures adopted to protect species from the aspects of the activity are found in the respective impact and risk assessments.	2830
4096	Environmental Risk: Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artificial light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and	2766

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		relevant mitigation measures are outlined in the EP.	
4102	Expresses opposition due to proximity to local fishing industries. Emphasises concern about potential risks this testing poses.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Adjustment protocol in place for fishers to seek compensation if impacted by MSS.	428
4118	Impact on marine animals, which are the livelihood of the community.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4123	Insufficient information about potential damage from seismic testing.	The titleholder is confident that sufficient relevant and available information has been used to inform this this EP and to complete a comprehensive assessment of relevant aspects of the activity. Information used based around sound, peer reviewed scientific literature.	4190
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808
4132	Lobsters - Stakeholder claimed that seismic air guns damage rock lobster mechanosensory organs and impair righting reflex - impacts of anthropogenic aquatic noise on marine invertebrates being poorly understood. Cited a study of the impact of seismic surveys on the righting reflex and statocyst morphology of the palinurid rock lobster, Jasus edwardsii, using field-based exposure to air gun signals which showed impaired righting and significant damage to the sensory hairs of the statocyst which persisted up to 365 days post-exposure and did not improve following moulting. These results indicate that exposure to air gun signals caused morphological damage to the statocyst of rock lobsters, which can in turn impair complex reflexes. Stakeholder also	Scientific literature has demonstrated no direct mortality of lobsters including eggs, puerulus, juvenile, and adults, proximate to the seismic source (Day et al. 2016a, Payne et al. 2008, Day et al. 2021). The Day et al (2016 and 2021) assessments are considered conservative given the water depths in the Activity Planning Area and the protection afforded by typical habitat features such as holes, crevices, or rocky dens within structurally complex reef habitats in nearshore area where the majority of Southern Rock Lobsters would be present. Scientific studies have detected impacts in shallower water depths, and as scientific literature identifies, behavioural and physiological responses in crustaceans are likely to be related to particle motion effects, located close to the operating array, rather than pressure effects (Carroll et al. 2017). Our full Southern Rock Lobster	2886

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	referenced study stating seismic surveys leave lobsters flat on their backs and unable to avoid predators, because of damaged statocysts, an organ similar to the human inner ear. It left the lobsters with an impaired ability to right themselves when flipped over.... "We didn't detect any sign of recovery, even one year after. LINK provided.	draft impact assessment is available here on page 13 and 14, for your review.	
4133	Mass destruction of marine populations through the blasting process.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4136	Mention of considerable damage to marine life outweighing the benefits of mapping seafloors for gas drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1389
4145	Opposes seismic exploration claiming it is dangerous to all marine life. Cannot ensure zero risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	427
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high decibel blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low	537

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	them unacceptable in a whale sanctuary area.	as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	
4153	Presents a historical account of their catch rates over 24 years, indicating that seismic surveys in the past led to a significant decrease in their catch from 10-15 tons per trip to just 5-6 tons per trip for over two years. They now report a catch rate of 10-14 tons per 7 days, suggesting lingering concerns about how current seismic activities may similarly affect their fishing operations.	Titleholder acknowledged this concern and noted that potential impacts to molluscs the Regia MSS is assessed in E1, E4 and F3 of the EP. Advised that control measures to reduce impacts to commercial fishers as a result of loss of catch are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	5190
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4155	Raised concerns about sound levels from the survey and associated effects on marine mammals and other species.	Acknowledged concerns and outlined the predicted effects of sound levels of different species of marine mammals including difference between high and low frequency cetaceans, sound propagation and modelling, and different effect level thresholds. Also outlined the whale management and mitigation measures in place for Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection technology trails, and citizen science program access. Also outlined the effects on zooplankton and the case for acceptability of these	3697
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4173	Seismic blasting has adverse effects on the marine environment, with critical gaps in understanding the effects on individual species and	The titleholder responded with an explanation of the information sources used to inform the Regia MSS impact and risk assessments, and explained how these information sources and	4091

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	the marine environment as a whole.	resulting measures are specific to the potential impact. The titleholder also made reference to documents relevant to this claim within the environment plan (Event ID 4092).	
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4179	Seismic sounds have far-reaching effects on the marine environment, causing damage and suffering to species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3237
4180	Seismic testing and gas exploration/drilling pose undeniable risks to marine fauna, flora, ecosystems, local fishing, and tourism industries.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2118
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies,	2963

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to	1659

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-	1665

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4198	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1672

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4199	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2586
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments is covered below in response to concern 6.	2886
4202	Stakeholder objects to the proposed blasting activity due to its detrimental effects on marine ecosystems.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are	1049

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	
4217	Strong objection to the proposal for 3D seismic blast in the Otway Basin due to harm to oceans and unacceptable environmental impact or risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4218	Strong opposition to seismic testing in the ocean due to its effects on both wildlife and the fishing industry. Individual firmly disapproves of the practice.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	425
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any	2080

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		evidence you can share so that we can consider it fully prior to our submission.	
4232	The feedback expresses frustration over repeated seismic blasts in the same area, emphasising the significant environmental impacts associated with these activities. It calls for accountability from NOPSEMA to prevent future occurrences, highlighting the ongoing threat to the environment.	The Regia MSS is targeting areas that have not been surveyed before though we acknowledge there may be some overlap with previous surveys. We have to show that the environmental impacts are short-term, localised, or recoverable and that they are controllable with appropriate measures in place.	2104
4235	The feedback questions if a strong environmental record includes the severe impacts of seismic activity on fishing industries, like the scallop industry near King Island, which has suffered losses reportedly without compensation.	Seismic survey effects on molluscs, including scallops are well understood and not mortal in our circumstance. There are many environmental pressures that cause fluctuations in fish populations, not just sound. We have a track record of successful co-existence with the fishing industry and of paying reasonable evidence-based claims for compensation - which we will do for the Regia survey.	2083
4239	The feedback raises concerns about the impact of seismic activities on the Abalone industry, suggesting that the industry may be negatively affected by the proposed exploration and seismic testing. This indicates a broader concern for the sustainability of marine life and the economic implications for local fisheries.	It would be unacceptable to have mortal effects on any marine species from our or any marine seismic survey. We do not predict mortal effects to molluscs (including scallops, abalone, oysters, clams, mussels, limpets, squids, octopus and cuttlefish etc.). Our full assessment of predict impacts on molluscs will be made publicly available as soon as it's completed.	2093
4246	The fishing industries in Port Fairy and King Island have reported significant impacts without financial compensation.	Through our extensive research we have not found any evidence of causation between seismic survey and mortal effects on molluscs. In fact, the evidence we have found (which we will publish in full) suggests seismic and fishing can happily co-exist. Please provide references, evidence, or testimonials for your claims so that we can take them into consideration in the proper process (Event ID 2084).	2084
4253	The possible effects to marine life and ecosystems are my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4260	The protection of wildlife in the Otway Basin is directly affected by drilling and seismic surveying.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1901
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4268	The stakeholder argues that it is impossible to ensure zero risk from seismic activities, emphasising that only zero risk is acceptable. This position reflects a strong concern regarding the potential negative impacts of seismic exploration on the marine environment.	The legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4270	The stakeholder asserts seismic surveying has been proven to be harmful and disruptive to marine life of many species.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	3343
4271	The stakeholder asserts that seismic blasts will have a direct negative impact on marine life, specifically mentioning that an “exclusion zone” will not effectively prevent the effects of the blasts from travelling through the ocean.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable. The titleholder is aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how to protect and preserve the values of this site.	2108
4272	The stakeholder asserts that the survey will have a harmful effect on millions of sea creatures.	It would be unacceptable to have long-term or permanent/unrecoverable impacts, fortunately, impacts from marine seismic surveys are short-term, temporary, and recoverable. (Event ID: 3419)	3343
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publicly responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are	2255

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4278	The stakeholder expresses an active interest in the wellbeing of the coastline and its flora and fauna, indicating a general concern for environmental conservation.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	1325
4285	The stakeholder noted their concern as a resident of Port Fairy: noise (land and sea), impact on marine life, potential impacts on the environment and the future potential if gas is found.	We are also concerned about the welfare of marine fauna. We have undertaken an impact assessment process that includes whale, seals, pelagic and shorebirds. As part of this assessment, we must show that impacts to these species will be of an acceptable level. We have determined that it is acceptable to have temporary behavioural changes, such as moving away from the survey vessel, and no injury or long-term impacts. Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We are also publishing environmental impact, risk and mitigation documents as they are completed, in the document library. We are publishing the entire documents in order to remain transparent, but I have also attached a summary document.	1747
4287	The stakeholder objected to the activities due to sound levels/acoustic trauma experienced by sea creatures	The scientific literature supports that marine fauna may potentially be displaced due to a seismic survey but that these impacts are typically short term with no impact to ecosystem function. Large scale studies undertaken in Australia that you may be interested in are: Australian Institute of Marine Science. North West Shoals to Shore Marine Noise Monitoring and Impacts https://www.aims.gov.au/research-topics/monitoring-and-discovery/north-west-shoals-shore Behavioural Response of Australian Humpback whales to Seismic Surveys https://www.brahss.org.au/ Assessing the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries https://www.frdc.com.au/project/2012-	2389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		008 Marine Seismic Survey Impacts on Fish and Invertebrates: Final Report for Gippsland Marine Environmental Monitoring Study https://ecat.ga.gov.au/geonetwork/srv/api/records/2292f4a7-ba2e-3533-e053-12a3070aaf2c Maxima 3D Marine Seismic Survey at Scott Reef https://www.sciencedirect.com/science/article/abs/pii/S0025326X13006528 https://www.sciencedirect.com/science/article/abs/pii/S0025326X18300687 Regarding Marine Fauna Observer's (MFOs), companies that contract MFOs such as Blue Planet Marine and RPS Group provide training for MFOs. As part of contracting MFOs we will ensure that the persons provided meet the requirement of the Australian Government EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales, that requires MFOs to be trained and experienced in whale identification and behaviour, distance estimation, and be capable of making accurate identifications and observations of whales in Australian waters. The Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, details the competency requirements for MFOs and ongoing awareness (page 23 and 24). The Regia MSS Implementation Strategy is available on the Regia MSS Website Document Library see https://klarite.mysocialpinpoint.com.au/regiamss/document-library As detailed in the Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, CGG will only use appropriately experienced MFOs as determined by a review of their CVs (page 23). The Regia MSS Implementation Strategy also details how CGG will monitor the performance of the control measures during the activity (page 25). For example: Audits and Inspections Post acceptance of the EP, conformance will be monitored on an at least quarterly basis by the Client Site Representative, or delegate, via audits and inspections, as well as through the	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		commitments under the Management of Risk, Management of Change, and Management of Knowledge parts of this Implementation Strategy. During the activity, conformance will be monitored on an at least fortnightly basis by the Client Site Representative, or delegate, via audits and inspections during the activity. Conformance auditing or inspection while the EP is in-force will be based on the Conformance Register and will target the following: • Conformance with regulatory requirements detailed in the accepted EP. • Management strategies and procedures to ensure EPOs and EPSs are being implemented, monitored, measured, and evaluated. • Emissions and discharges are being monitored, measured, and documented As stated in the previous email, matters of national energy policy are not within the purview of CGG or the Regia MSS. We will however register claims related to the ongoing need for gas and provide those to NOPSEMA. Please find attached a brochure from NOPSEMA that describes this and may be of use to you.	
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4292	The stakeholder raised concern about the sound level from the survey and its effect on marine mammals and other species.	Outlined the predicted effects of sound levels of different species of marine mammals including difference between high and low frequency cetaceans, sound propagation and modelling, and different effect level thresholds. Outlined the whale management and mitigation measures in place for Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection	3697

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		technology trails, and citizen science program access. Outlined the effects on zooplankton and the case for acceptability of these impacts noting the movement of the survey timing to avoid the upwelling period. (event ID 3697)	
4293	The stakeholder raised concerns about the lack of evidence of the effects of seismic on abalone.	Noted the distances for effects are likely from particle motion, which is very short range from the sound source.	948
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747
4306	The stakeholder was concerned about potential negative impacts of gas exploration and development on Country, the marine and coastal environment, the local economy, Traditional Owners, and local communities.	The titleholder acknowledged the feedback, noting that all relevant impacts are assessed in the Environmental Plan (EP) and can be found in E1-E9. Measures to minimise adverse impacts on functions, interests and activities on relevant receptors are also adopted and can be found in G1.	3152
4309	The stakeholder was concerned about the impact on marine life sensibilities and populations.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2273
4313	The statement challenges that seismic blasting will harm shellfish like scallops, citing research by Ryan Day et al. (2017) that demonstrates physiological harm and altered behaviour in scallops due to exposure to seismic air gun signals.	We understand that there are impacts of seismic surveys. The findings of the paper have been used to define the distance at which some effects may occur. Our current understanding is that the effects are initially sub-lethal, that increased mortality was observed post exposure, and that increased mortality was within natural variation. Our draft assessments will be published soon (Event ID 2078).	2078
4315	The statement suggests that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual	2076

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	
4319	There are concerns regarding the potential impacts of seismic surveys on penguins, diving birds, and other marine fauna. Stakeholders are particularly worried about how the noise and disturbance from these surveys could affect the breeding and foraging behaviours of these species.	This effects of sound on birds were initially assessed in E4 and further assessments for penguins can be found in F3. Birds can also be affected by artificial light, which has been assessed in E9. The conclusion is that the measures adopted to protect foraging birds will mean that impacts are of an acceptable level.	2006
4322	There is measurable damage done to one species which will be an example of potential damage to others in the vicinity of King Island and surrounds	While the claim was noted the REGIA EP has conducted an extensive assessment of the literature and found no evidence of measurable damage to populations of invertebrates or fish in the vicinity of King Island and surrounds. The seismic acquisition area is also located ~100km from nearest King Island landfall.	2773
4323	There will be potential permanent damage to marine life due to sonic testing and drilling.	Titleholder responded and listed various information needs related to the activity, environmental assessment process, environmental aspects, predicted levels of environmental impact and risk, environmental management, consultation processes, and regulations or regulatory processes. Links to the project website and document library was provided.	1046
4329	This feedback highlights the uncertainty regarding the long-term impacts of seismic blasting on abalone populations, particularly emphasising that the effects may not be immediately observable and could depend on the juvenile stages at the time of blasting.	We have recently installed an exclusion zone down to the 40m bathymetry contour primarily as a result of discussions with abalone fishers who dive down to 30m. This will help protect early life-cycle stages of abalone. Further, seismic surveys have occurred in this region for many years and the two industries (fishing and petroleum) have successfully coexisted over time (Event ID 2095).	2095
4343	Questions possibility of compensation for the abalone industry if their stocks are depleted as a result of seismic testing, drawing a parallel to the scallop industry near King Island that was adversely affected. It highlights concerns regarding accountability and the financial implications for local fisheries in the event of ecological harm.	The titleholder acknowledged this concern and noted that potential impacts to the abalone industry. It would be unacceptable to have mortal effects on any marine species from our or any marine seismic survey. We do not predict mortal effects to molluscs (including scallops, abalone, oysters, clams, mussels, limpets, squids, octopus and cuttlefish etc.). Our full assessment of predict impacts on molluscs can be found in E1 Section 8, E4 Section 8 and F3 Section 4.	2093

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4365	Concerns about the lack of definitive clarification on how seismic testing affects the marine environment and the clash between economic interests and environmental risks.	The titleholder acknowledged the feedback, noting that they have undertaken a thorough analysis and assessment of all relevant literature to inform the impact assessments conducted to assess potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals in the Environmental Plan (EP). These findings can be found in E2, E3, E4, E5, E6, and E7 under Section 8: Predicted Levels of Impact. Additional assessments of key receptors were also completed to demonstrate that environmental impacts and risks	2383

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		arising from the activity will be of an acceptable level (F3). Titleholder also conducted an assessment to investigate potential impacts to other marine users from physical presence resulting from the activity (E1).	
4419	Concern about the potential impacts of seismic surveys on the planktonic phyllosoma stage of Southern Rock Lobster.	Event ID 6820 - The Regia team responded that the information already provided on Southern Rock Lobster shows the scales of connectivity and dispersal that are intrinsic to the stock of Southern Rock Lobster. They show how any impacts to individual rock lobster larvae within the intended area of seismic will be immeasurably small relative to the mortality that is operating across the regional distribution of this species. Such a well-connected, genetically homogenous stock is, by definition, highly resilient to localised disturbances. Evidence of impacts to individual larval lobsters is not evidence of impacts to the stock of southern rock lobsters. This conclusion is based on published papers presented in the previous document and an understanding of life-history dynamics in marine invertebrates.	6411
4420	Research indicating potential impacts of seismic activity to “pruning” of egg clutches by female Pale Octopus.	Event ID 6820 - The Regia team responded that the point raised repeats some of the key findings from Day et al 2023. They stated that they had discussed this in the information previously provided, along with the other implications which indicated that there was no evidence for significant long-term damaging effects or impairment. The Regia team said that it was conflating an effect at the individual level with population-level effects.	6411
4421	Reports on the impacts of a commercial seismic survey off the coast of Victoria on the Pale Octopus indicating a sub-lethal neurotoxic effect capable of altering behaviour and locomotor abilities.	Event ID 6820 - The Regia team responded that the point raised repeats some of the key findings from Day et al 2023. They stated that they had discussed this in the information previously provided, along with the other implications which indicated that there was no evidence for significant long-term damaging effects or impairment. The Regia team said that it was conflating an effect at the individual level with population-level effects. The study showed there were effects to individual octopus, however it also showed great variation in the scale of effects and a lack of evidence to support significant harm. Scale of effects is crucial to understanding outcomes. There are many disturbances acting on marine invertebrates and they span a scale from insignificant to very impactful. Climate changes and commercial	6411

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		fishing are at the very impactful level with potentially large changes to populations. Current science indicates that population changes are not going to result from a stand-alone seismic survey, irrespective of whether individual octopi are affected.	
4422	Uncertainty about whether Giant Crab are sensitive to seismic air gun exposure and if so, to what degree. The relevant person was also concerned about the lack of data on safe threshold distances for exposure.	Event ID 6820 - The Regia team responded that Appendix F3, Section 3.6 (provided a link), provides a specific assessment of the sensitivities of Giant Crab stocks and likely impacts from the proposed Regia MSS. This assessment addresses the questions posed here using all the available science. They recommended this section be read or re-read however they provided relevant excerpts to illustrate the assessment that has been done. Multiple studies have looked at seismic effects on crustacean larvae amongst other taxa, and results have been mixed, with any mortality limited to very close proximity to the source. Adult crab species that have been tested have shown very little response to seismic pulses (Appendix E4 and references therein). They stated that there was no evidence to support an expectation of significant and measurable cumulative impacts to P. gigas because of the MSS. Large scale environmental drivers driven by a changing climate, and fishing effort, will continue to be the major influences on the population health of giant crab. The Regia team reiterated that fishing effort is the major anthropogenic driver of changes to crab populations, and it is this driver interacting with a changing climate that will drive population changes in the future.	6411
4433	Seismic impacts can linger longer than the few hours suggested, the insistence on peer-reviewed work to prove this is opportunistic and suits OMICC's agenda.	Event 6724 - OMICC announces that the latest version of the OMICC Otway Adjustment Protocol has been published, along with a video briefing for fishers, which can be accessed through a provided link. In the briefing, OMICC confirms that, following the relevant persons feedback, a "claim period" and a "lodgement period" have been incorporated into the definitions of the protocol. The claim period is set to 30 days after the end of any activity, while the lodgement period extends up to 6 months after the end date of any activity. OMICC further informs the relevant person that the OMICC Founders reviewed the request for claims up to 6	6749

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		months after an activity. However, the decision was made to adopt a 30-day claim period, as this duration resulted in a positive compensation outcome for fishers affected by the Gippsland survey in 2019.	
4436	The relevant person stated that it was evident what had impacted rock lobsters in the early 2000s.	Event ID 6595 - Titleholder responded to relevant person outlining approach to assessment of fisheries and SRL, including assessment of mitigation in place.	6594
4437	Relevant person was concerned about impacts of seismic to rock lobsters.	Event ID 6595 - The titleholder responded that they had undertaken a thorough assessment of potential impacts on SRL, including a further assessment on the effectiveness of the mitigations in place.	6592
4438	Relevant person was concerned about the impacts of seismic surveys on lobster populations.	Event ID 6875 - The Regia team responded in-meeting and explained that there is an impact of the seismic activity on lobster associated with their righting reflex. Discussed that they needed to look at what the resource tolerates. Discussed research boat in Tasmania and directed relevant person to recent research paper "Boom, Shake the Room."	6875
4439	Concerned about impacts to squid, octopus and scallops.	Event ID 6875 - The Regia team responded in-meeting with a discussion about the assessment work undertaken on impacts to squid, octopus and scallops.	6875
4441	Concerned about the impacts of seismic activities on crab populations.	Event ID 6876 - The Regia team responded in-meeting that seismic can cause a physiological reaction in crab - delayed righting. Discussed that they will only go to 200m.	6876
4443	Concerned that the Regia team said there will be zero effect and that every historical seismic activity has had a worse effect.	Event ID 6876 - The Regia team responded in-meeting that they did not say there would be zero effect. Offered to analyse fishing data provided by commercial fishers and reproduce long-term catchability analysis. An analysis is also included in Appendix F3, section 3.5.3	6876
4444	Concerned that there are no studies about the effect of seismic after adult malting.	Event ID 6786 - The Regia team responded in-meeting and discussed UTAS study which looked into effects of seismic during different stages of juvenile development. Explained that the sample size was very small. Study showed that there is a repairing period. Asked relevant person about malting seasons.	6876
4447	Asserted that non-productive catch areas are a result of seismic activity.	Event ID 6876 - The Regia team responded in-meeting that they could re-run their long-term catchability analysis with data provided by commercial fishers. Stated that they	6876

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		could reduce block size and make it granular.	
4448	Concerned that seismic was hurting the industry and catch rates would be higher but for seismic testing.	Event ID 6876 - The Regia team responded in-meeting and went through their box plot analysis. Explained that the data used was landed catch data each month from 2016 - 2023. Also went through CPUE data set and stated that the analysis showed although landed catch was lower, CPUE was still in range in 2020. Explained the Regia team are looking at recruitment of the fishery. Explained that the fishers take 30% of the fishery. Stated there was evidence there was no stock level effect.	6876
4417	The relevant person was concerned that about the proposed seismic activity effecting the behaviours of certain species.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act.	6880
4450	Claimed that the Regia team should avoid September activity window due to female crays carrying eggs.	The effects on berried female Southern Rock Lobsters (SRL) and subsequent recruitment are considered minimal due to the species' high fecundity, variable recruitment patterns, and likely larval input from distant sources. These minor effects are outweighed by the benefits of avoiding impacts to more sensitive species, like blue whales, and avoiding surveys during summer when biodiversity peaks. Additionally, because SRL settle continuously from June to September, there is a high degree of certainty that major stock damage from a September start will not occur.	6876

REGIA
Marine Seismic Survey

Impact Assessment
Underwater Sound: Birds

Appendix E5: REG-EP-024-E5

Rev 5

December 2025

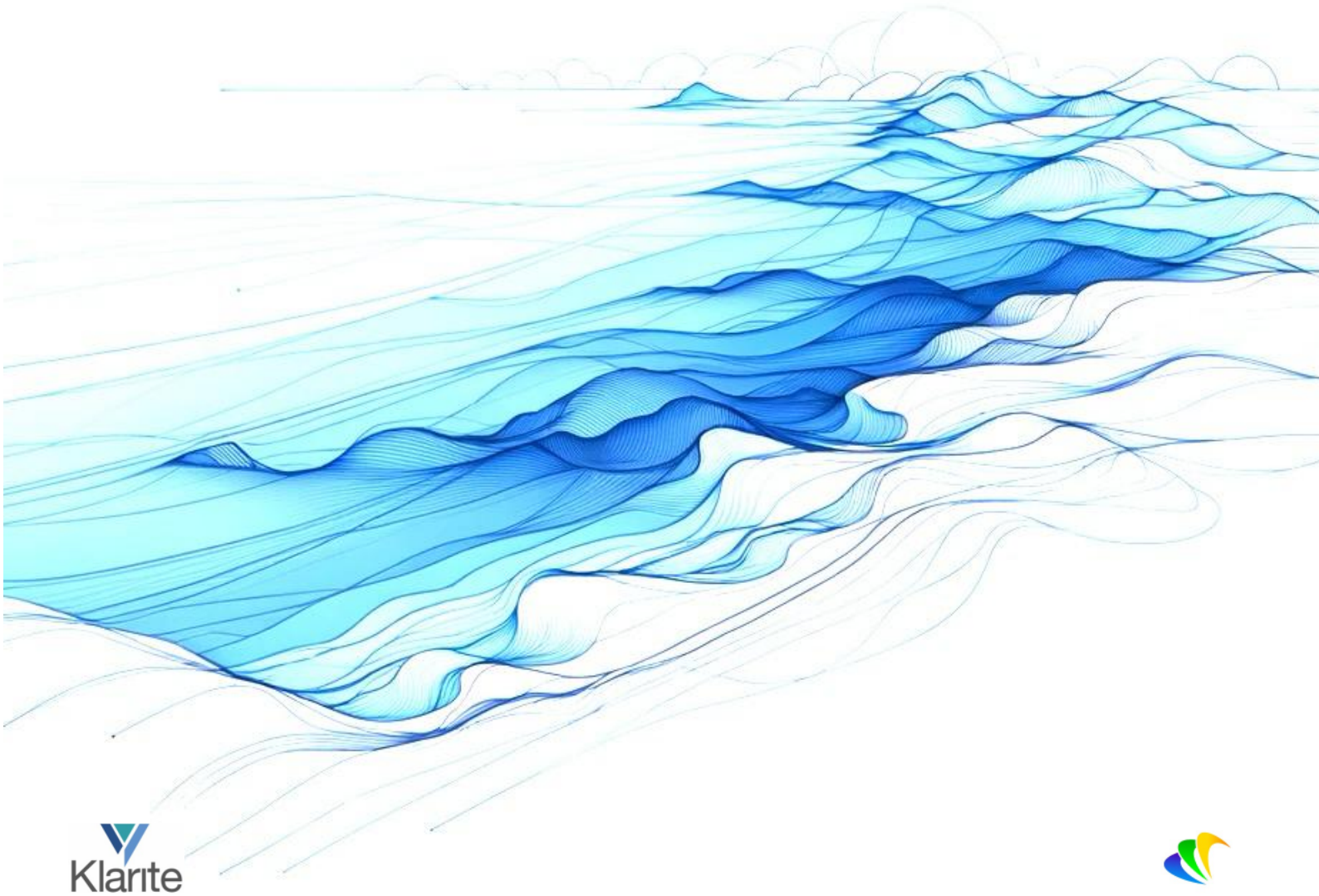

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Table of Contents

1 Introduction 4
1.1 Purpose and Scope 4
1.2 Consultation in Preparation of the EP 4
1.3 Modifications Arising from Further Assessment 4
2 Aspect – Underwater Sound 6
2.1 How the Aspect Occurs 6
2.2 Extent and Duration of the Aspect 6
3 Cause-Effect Pathway 7
4 Description of the Existing Environment that may be Affected by the Activity 8
4.1 Albatrosses and Petrels 8
4.2 Black-faced Cormorant (*Phalacrocorax fuscescens*) 9
4.3 Crested Tern (*Thalasseus bergii*) 9
4.4 Gannets (*Morus serrator* and *M. capensis*) 9
4.5 Little Penguin (*Eudyptula minor*) 9
4.6 Little Tern (*Sternula albifrons*) 10
4.7 Shearwaters (*Ardenna tenuirostris* and *A. pacifica*) 10
4.8 Silver Gull (*Chroicocephalus novaehollandiae*) 11
4.9 People and Communities 11
4.9.1 Social and economic features 11
4.9.2 Cultural features 11
5 Relevant Legislative Requirements 12
6 Defining Acceptable Levels of Impact 13
7 Consultation Input 17
8 Minimisation of Impacts Through Activity Design 18
8.1 Elimination 18
8.2 Substitution 18
9 Predicted Levels of Impact 19
9.1 Change in fauna behaviour, hearing capacity, and physical condition 19
9.2 Measures Adopted to Manage Environmental Impacts 21
10 Demonstration Impacts Will Be of an Acceptable Level 22
10.1 Principles of ESD, Biological and Ecological Categories 22
10.2 Economic, Cultural and Social Categories 23
10.3 Discussion on Consistency with Company Processes 23
11 Environmental Performance Outcomes 25
12 Recommendations 27

13 Document Control **28**
14 References **29**
Annex 1 ..... **31**
Public Comment 31
Annex 2 ..... **32**
Objections and Claims Raised from Consultation 32
Annex 3 ..... **63**
Underwater Acoustic Sensitive Species 63

1 Introduction

Underwater Sound was identified through the Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4) as an aspect needing further assessment. Hence this document presents a detailed examination of **Underwater Sound**, as will typically be produced during the proposed Regia Marine Seismic Survey (**Regia MSS**), and its interaction with the environmental receptor we are collectively calling **Birds.**

This assessment is built on the information contained in the following four core studies, which should be read in the order they are listed:

1. PEIRA
2. Seismic Sound Studies Report (Appendix B8)
3. Sound Emissions Modelling Reports (Appendix B7)

1.1 Purpose and Scope

The purpose of this document is to assess all acceptable sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document was initially published in draft form and uploaded to the Document Library of the Regia MSS Consultation Hub on 11 September 2023 as a stand-alone document, rather than as part of the much more substantial total EP document. This was done to maximise the ability of interested members of the public to read, interpret and respond within the mandated 30-day public comment period.

As such, the public and relevant persons were invited to comment on the document with an explicit request for readers to provide feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

1.3 Modifications Arising from Further Assessment

To ensure this environmental assessment remains contemporary, accurate, and reflects feedback from the regulator and relevant persons, this document will be updated from time-to-time. In

particular, the CGG environmental assessment process requires consideration of whether further assessment was needed to verify, or dive deeper into a topic, to further improve the predictive quality of the assessment. When this has occurred, reference to such changes will be communicated in Section 0 -

Recommendations and identified at relevant points in the assessment.

2 Aspect – Underwater Sound

2.1 How the Aspect Occurs

The primary sound source will be impulsive underwater acoustic emissions coming from the seismic source releasing compressed air (seismic pulse) and creating a sound wave directed downwards towards the seabed.

Secondary sound sources will include continuous underwater acoustic emissions generated by the survey and support vessels and helicopters. Sounds from vessels are generated by thrusters, engines, and propellers. Underwater acoustic emissions from helicopters are generated via the engine and rotors. Underwater acoustic emissions from Ultra-Short BaseLine positioning beacons are generated within the streamer spread.

2.2 Extent and Duration of the Aspect

Impulsive Sound

Duration: 60 days

Extent: Active Source Area + 55 m6 to 10.62 km. based on the furthest distance to modelled sound effect criteria. [Updated in response to Matter: F17]

Seismic acquisition where the seismic source will be active will occur for up to 60 days within the Active Source area.

3 Cause-Effect Pathway

The PEIRA (Appendix B4) identified a cause-effect pathway for underwater sound for the following environmental components and their social, cultural, and economic features:

- Diving birds and penguins.
- People and communities

Potential environmental impacts to bird identified from the PEIRA are:

- Change in fauna behaviour.
- Change in hearing capacity.
- Change in physical condition.

These were initially assessed as not requiring further assessment. However, during consultation with relevant persons it was determined that a detail assessment should be completed.

4 Description of the Existing Environment that may be Affected by the Activity

For a description of the baseline soundscape in the region relevant to the Regia MSS, refer to Section 1.1 of Appendix B8.

To identify diving birds and penguins that may be present within the area affected by underwater sound a PMST search was undertaken using the Active Source Area with a 50 km buffer. Note: the furthest distance to a sound effect criteria was updated to Active Source Area +.10.4 to 77 km for the Little Penguin. [Updated in response to Matter: F17]). The PMST report is available in Appendix B5. The updated furthest distances of 5.6 to 10.62 km have been derived from the most recent modelling study (Appendix B7c), and supersede previously defined predicted effect distances for this receptor group.

To ensure all diving bird species with biologically important behaviours were identified, a further review was undertaken of the Department of Climate Change, Energy, the Environment and Water National Conservation Values Atlas (NCVA) (now AMSIS).

A summary of all bird species identified from the PMST report and review of the NCVA/AMSIS is provided in Annex 3 of this document along with any relevant conservation advice or management plans.

The area above the sound effect criteria for diving birds overlaps the following marine protected areas that identified foraging birds as a value:

- Apollo Australian Marine Park for which one of the values are important foraging area for Black-browed and Shy albatross, Australasian Gannet, Short-tailed Shearwater, and Crested Tern.
- Zeehan Australian Marine Park for which one of the values are important foraging areas for Black-browed, Wandering and Shy albatrosses, and Great-winged and Cape Petrels.

PMST searches were run again prior to resubmission to ensure any changes to species or listings were identified to control for passage of time. A Breeding BIA for the Short-tailed Shearwater was added to the area potentially affected by underwater sound. As of 5th March 2025 the Little Tern has been assigned a threatened category (Vulnerable) under the EPBC Act. The Breeding BIA for the Wedge-tailed shearwater has been removed from area potentially impacted by underwater sound [Section added in response to Matters: I16 and I17].

These species are described below.

4.1 Albatrosses and Petrels

Twelve albatross and six petrel species are identified as having foraging, feeding or related behaviour and/or BIAs within the area potentially affected by underwater sound (Annex 3). These BIAs cover either most or all the South-east Marine Region (CoA 2015a). In addition, the Common Diving-petrel breeds on Lady Julia Percy Island which is within the area potentially affected by underwater sound.

Albatrosses and petrels are among the most oceanic of all seabirds and seldom come to land unless breeding (CoA 2022). Albatross and petrel species exhibit a broad range of diets and foraging behaviours, and hence at-sea distributions are diverse. Combined with their ability to cover vast oceanic distances, all waters within Australian jurisdiction can be considered foraging habitat, however the most critical foraging habitat is those waters south of 25° where many species spend much of their foraging time (CoA 2022).

Albatrosses have a widespread distribution throughout the southern hemisphere. They feed mainly on cephalopods, fish and crustaceans, using surface feeding or plunge diving to seize their prey (ACAP 2020). Albatrosses are colonial, usually nesting on isolated islands and foraging across oceans in the winter months with most observations along the edge of the continental shelf (CoA 2022).

Petrels are oceanic and have a widespread distribution throughout the southern hemisphere. They are colonial and breed on sub-Antarctic and Antarctic islands in a circumpolar band generally between 40°S and 60°S. Petrel species feed on small fish, cephalopods (octopus, squid and cuttlefish) and crustaceans along the edge of the continental shelf and open waters (CoA 2022).

4.2 Black-faced Cormorant (*Phalacrocorax fuscescens*)

The Black-faced Cormorant was identified as breeding known to occur within the area potentially affected by underwater sound (Annex 3). This species is found along the coast of Tasmania and Victoria with two independent populations one on the coast of southern Western Australia, the other on the coasts of South Australia (del Hoyo et al. 1992). Breeding usually occurs on rocky islands, but also on stacks, slopes, and sea cliffs in colonies of up to 2,500 individuals (del Hoyo et al. 1992). It feeds in coastal waters, sometimes in sheltered places such as bays and islets and can be found entering rivers along the coast (CoA 2020a) and thus is unlikely to feed within the area potentially affected by underwater sound.

4.3 Crested Tern (*Thalasseus bergii*)

The Greater-crested Tern was identified as breeding known to occur within the area potentially affected by underwater sound. Crested Terns are medium sized, slender terns that are widely distributed. They are commonly found in near-coastal environments and estuaries, but also inhabit lakes and rivers inland (GSA 2023). They dive from heights of five to eight metres when foraging but only penetrate a few centimetres below the surface of the water (GSA 2023). Their diet includes small fish such as Sardines, Australian Anchovies and Leatherjackets (GSA 2023).

4.4 Gannets (*Morus serrator* and *M. capensis*)

The Australasian Gannet was identified as breeding known to occur and both a foraging BIA and an aggregation BIA within the area potentially affected by underwater sound (Annex 3). The BIA is a 40 km buffer around Portland (Point Danger) where the Australasian Gannet breeds between July and March.

The Australasian Gannet generally feeds over the continental shelf or inshore waters. Their diet is comprised mainly of pelagic fish, but also squid and garfish. Prey is caught mainly by plunge-diving, but it is also seen regularly attending trawlers (CoA 2015a).

The Cape Gannet was identified as breeding known to occur within the area potentially affected by underwater sound (Annex 3). There is limited information on where this breeding location but it is likely that it is also at Point Danger (Portland) based on Pizzey (2007) that details that several birds have occasionally been found breeding on offshore Australian islands, together with Australasian Gannets, although the Cape species is never represented by more than a few pairs.

4.5 Little Penguin (*Eudyptula minor*)

The Little Penguin was identified as breeding within the area potentially affected by underwater sound (Annex 3). Initial investigations identified that breeding occurs on Lady Julia Percy (Deen Mar) Island and Middle Island. Consultation then identified an additional six breeding colonies of variable and unreliable size on the mainland between Portland to the West and Apollo Bay to the East: Gibson Steps, Lawrence Rocks, Griffith Island, London Bridge, the Twelve Apostles and Portland Harbour.

The Little Penguin is the smallest penguin species and endemic to Australia and New Zealand. In Australia, the species occurs from Western Australia (Carnac Island) to New South Wales (Broughton Island) and Tasmania. Their distribution is not continuous, with sections of the southern coast of Australia without occurrence of breeding colonies (CoA 2020a).

The Little Penguin breeds during the austral autumn to summer months and is the only truly nocturnal penguin species on land; adults always arrive after dusk and leave before dawn (CoA 2020a). Females typically lay 2 eggs in a season with most egg-laying occurring between September

and November, with chicks fledging some three months later (Dann et al. 2000), although egg-laying has been observed to start as early as July at Middle Island (Overeem and Wallis 2003).

This species is a generalist feeder, with large variability in diet amongst colonies and even between years at the same colony. They feed mainly on clupeids, such as anchovy and sardines, when feeding chicks, but they may also feed on krill and several species of cephalopods at all stages of breeding (CoA 2020a).

Using electronic tags Hoskins et al. (2008) examined the foraging range and diving behaviour of the Little Penguin from three breeding colonies (Rabbit Island, Kanowna Island and Phillip Island) in central northern Bass Strait, during the chick-guard stage. Although there were large overall differences between individuals, the mean maximum foraging range (16.9 to 19.8 km) and mean total distance travelled (41.8 to 48.0 km) were similar between the 3 colonies, despite different bathymetric environments. Individuals from all three colonies selected foraging habitats within a narrow sea surface temperature (SST) range (16.0 to 16.4°C). While there were significant differences in mean dive depths (5.4 to 10.9 m) and mean durations (13.2 to 28.6 s) between the different colonies, the mean diving effort (vertical distance travelled: 936.3 to 964.3 m h–1) was similar. These findings suggest little penguins from the three colonies employ relatively similar foraging efforts yet are flexible in their foraging behaviours.

McCutcheon et al. (2011) used satellite telemetry to determine the at-sea movements and foraging range of 47 Little Penguins from Phillip Island, south-eastern Australia, during the winter non-breeding period. Individuals conducting single-day trips (72% of individuals) typically foraged 8–14 km from the colony, whereas individuals conducting longer trips (28%; 2–49 days) foraged either within Port Phillip Bay or in the coastal waters of western Bass Strait at maximum distances of 62–147 km from the colony. McCutcheon et al. (2011) noted that the results of this study indicate that Little Penguins remain within continental shelf waters no more than several hundred kilometres from the breeding colony during the non-breeding period, suggesting food availability is adequate within this region throughout the year.

4.6 Little Tern (*Sternula albifrons*)

The Little Tern (vulnerable) was identified as breeding known to occur within the area potentially affected by underwater sound (Annex 3). Little Terns forage in shallow waters of estuaries, coastal lagoons, and lakes, frequently over channels next to spits and banks or entrances, and often close to breeding colonies (DCCEEW 2023). They also forage along open coasts, especially around bars off the entrances to rivers and lagoons, less often at sea, and usually within 50 m of shore (DCCEEW 2023). Little Terns are primarily diurnal, and feed by plunging in shallow water of channels and estuaries, or in surf on beaches, typically from 3–10 m above the surface though up to 13 m above water (DCCEEW 2023).

4.7 Shearwaters (*Ardenna tenuirostris* and *A. pacifica*)

The Short-tailed Shearwater was identified as breeding known to occur (Lady Julia Percy Island) and both a breeding BIA and a foraging BIA to be present within the area potentially affected by underwater sound (Annex 3). The Short-tailed Shearwater migrates to the Northern hemisphere for the austral winter and generally only present in Australian waters from September to May. They are common in the South-east Marine Region and largely found on numerous islands off Victoria and Tasmania during breeding (Baker and Hamilton 2013, Skira et al. 1996). During breeding they conduct a bimodal feeding strategy, alternating short foraging trips to local waters with long foraging trips (up to 17 days) to the Polar Frontal Zone. Short trips allow greater chick provisioning at the sacrifice of body condition, which is then recovered in richer subantarctic waters. Diet includes fish particularly mycotphids, crustaceans and squid (Weimerskirch and Cherel 1998). During consultation breeding colonies were also identified on Middle Island and Griffiths Island [Event ID 2023], and they are of significant value to local communities. These are not identified as BIAs, likely due to a lower number of breeding pairs in comparison to other offshore islands. [Paragraph updated in response to Matter: B07 and B08].

The Wedge-tailed Shearwater was identified as having a foraging BIA within the area potentially affected by underwater sound (Annex 3). The foraging BIA is associated with Muttonbird Island, however, a review of the DCCEEW Species Profile and Threats Database (SPRAT), Atlas of Living Australia and South-east Marine Region Profile did not provide any information on the Victorian Muttonbird Island Wedge-tailed Shearwater colony. The DCCEEW SPRAT profile does not show any locations for the Wedge-tailed Shearwater in Victoria, and Beaver (2018) details Montague Island in NSW was the southernmost known colony, however, in 2017 breeding individuals of Wedge-tail Shearwaters were discovered a couple of hundred kilometres further south on Gabo Island Lighthouse Reserve, Victoria near the NSW border.

Movement patterns of the Wedge-tailed Shearwater are poorly known but populations at the northern and southern extremities of the known range are migratory, departing nests in early April to early May and spending the nonbreeding season in the tropics (DCCEEW 2023a). In Australia, Wedge-tailed Shearwaters have been observed feeding along the junction between inshore and offshore water masses. There is no detailed analysis of the diet of Australian adult Wedge-tailed Shearwater's, however tropical residing Wedge-tailed Shearwater birds are known to mostly consume fish, some cephalopods, insects, jellyfish and prawns (DCCEEW 2023a). Food is taken by contact-dipping, dipping, surface-seizing and, rarely, deep-plunging up to 2 m deep (DCCEEW 2023a).

4.8 Silver Gull (*Chroicocephalus novaehollandiae*)

The Silver Gull was identified as breeding known to occur within the area potentially affected by underwater sound (Annex 3). The breeding area is between Port Fairy and Warrnambool (DCEEW 2023b). Sliver Gulls natural diet consists of insects, worms, fish, and crustaceans. They are not known to plunge dive and thus are unlikely to be affected by underwater sound.

4.9 People and Communities

4.9.1 Social and economic features

During consultation, as presented in Annex 2, objections and claims were raised regarding concerns of impacts on the local economy and environment, including tourism and local enjoyment of the area with recreational activities such as bird watching. Species that may be affected are described above in sections 4.1 to 4.8.

4.9.2 Cultural features

Short-tailed shearwaters (mutton birds), described above (section 4.7) are identified as being culturally significant to the Gunditjmara People and are used in traditional harvesting practice (GMTOAC, 2023). Shearwaters are also identified as culturally significant species to the Eastern Maar people, along with gannets (section 4.4) and Little Penguins (section 4.5) (Appendix F3, Section 3.16.1).

5 Relevant Legislative Requirements

CGG has considered all the relevant legislative requirements, conservation management and recovery plans for all bird species that may be affected (see Appendix B2). No measures were identified from this process.

6 Defining Acceptable Levels of Impact

There are no regulatory thresholds for understanding underwater sound effects on bird species. Thus, for assessing potential sound–induced impact of impulsive seismic source signals on diving birds, the least sensitive marine mammal hearing group, Other Carnivores in Water (OCW), from Southall et al. (2019), is used as a proxy. This hearing group has been selected due to similar hearing sensitivity in the frequency band of underwater hearing for diving birds and otariid pinnipeds, which are included in the group. This provides a conservative approach, as otariids are considered more sensitive to underwater sound at higher frequencies than diving birds. A very recent study has modelled sound thresholds for Little Penguins (*Eudyptyla minor*) from head scans of deceased birds (Wei & Erbe 2024). Their results indicate a potential disturbance threshold at 50-100 dB above the minimum hearing threshold of ~110 dB re.1 µPa at 200Hz (see Fig. 7 in Wei & Erbe 2024) which supports the use of the modelled thresholds used in CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that assessment specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, Table E5-1 shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding assessment specific defined acceptable levels established for this assessment. This sets the foundation for relevant and targeted demonstration later in this assessment.

There are also no regulatory thresholds or criteria established to assess potential behavioural responses by diving birds to underwater sound. To allow for assessing the potential for such impacts, an onset criterion for behavioural responses of 120 dB re 1 µPa (SPL) for impulsive sources was used based on information from Sørensen et al. (2020). They exposed gentoo penguins (*Pygoscelis papua*) in a controlled exposure experiment to underwater noise bursts (impulsive signals) and demonstrated that the animals show a graded reaction depending on received sound levels.

Further information on studies in relation to seismic acoustic emission impacts to diving birds is provided in the Seismic Sound Studies Report (Appendix B8).

Table E5-1 - Defined acceptable levels of impact from underwater sound effects to birds

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	Diving birds including little penguins are not exposed to sound levels that cause permanent auditory injury or mortality at any life stage. Any temporary hearing effects to diving birds including little penguins remain brief, recoverable, and do not impair essential functions such as foraging, navigation, chick provisioning, or juvenile development. Any behavioural responses to diving birds including little penguins are minor, short-lived, and do not reduce survival, reproductive success, access to nesting sites, or overall population viability.	Diving birds rely on intact hearing, precise underwater orientation, and highly efficient foraging to meet demanding daily energy budgets. Because permanent auditory injury could compromise prey detection, navigation, or predator avoidance for any diving species, a no-auditory injury threshold is the only defensible injury criterion. Allowing any degree of irreversible hearing loss would create a direct pathway to reduced survival or breeding performance. A separate TTS threshold is appropriate as temporary auditory fatigue occurs naturally across marine vertebrates and does not lead to population-level effects when it is brief and fully recoverable. The scientific evidence consistently shows that short-duration TTS does not impair essential functions for diving birds, provided it resolves quickly. Limiting TTS to this benign, recoverable range provides meaningful protection without imposing unnecessary or scientifically unsupported constraints.
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		A behavioural threshold is also essential because the ecological Risk for diving birds arises not only from injury but from disruptions that increase energetic costs or reduce access to foraging or breeding habitats. By restricting behavioural responses to minor, short-lived events, the threshold prevents sustained displacement or reduced provisioning success—outcomes that could otherwise affect reproductive performance across species. Together, these three thresholds—no Auditory injury, tightly bounded TTS, and only minor, transient behavioural responses—cover all biologically credible pathways through which underwater sound could affect diving birds at the population level. They provide comprehensive, proportionate protection while acknowledging that brief, recoverable sensory or behavioural responses are both natural and tolerable for all diving bird species, including Little Penguins.
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	For species and sensitivities with social, cultural and/or economic values, if the potential ecological impact or risk is deemed acceptable, it is likely that the corresponding impact on social, cultural and/or economic values will also be considered acceptable, as the physical presence and health of these species are key for maintaining their social, economic and cultural roles. Therefore, predicted levels of impact for social, cultural and economic values for species will be assessed on a receptor level. Native Title will be assessed separately.
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	
	The views of public have been considered in the impact and risk assessment.		

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Impacts Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of impact could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of underwater sound, elimination involves removing the source of underwater sound or preventing its generation in the first place. One main option was considered and subsequently adopted:

No seismic acquisition within 17 km of Deen Maar/Lady Julia Percy Island

This island is known for its ecological significance, including bird habitats and potentially sensitive species that rely on the surrounding waters. The buffer zone was applied to provide spatial protection for species utilising this ecologically and culturally important area, thereby reducing potential impacts. For derivation of the 17km buffer please refer to Table 6 in the EP document.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the impact. No substitution-based limitations were required in this case, as the elimination measures applied were sufficient (when applied with other measure types) to reduce the identified impact to an acceptable level.

9 Predicted Levels of Impact

To arrive at the predicted levels of impact of underwater sound on birds at this stage in the process requires the reader to have assimilated all prior relevant information that has been assessed on birds. The EP documentation is coded alphabetically to guide the reader through what is a natural process of temporal accumulation and review of evidence. The following documentation forms the evidence lineage for predictions on birds as described here.

- B5 – PMST Reports – The Protected Matter Search Tool was used to search for environmental values and sensitivities potentially located within the proposed Regia MSS planning area, with eight specific searches undertaken of which one was for Birds within the region defined by the Regia MSS Active Source Area with an included buffer area out to 50 km.
- B7 – Sound Modelling Reports - SLR performed a numerical modelling study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic impacts on key regional receptors including birds, marine mammals, fish, turtles, benthic invertebrates, plankton and recreational divers and swimmers. Acoustic thresholds derived from this document are used to guide assessments of impacts.
- B8 – Seismic Studies Report – This report provides a detailed assessment of the scientific literature related to sound (and specifically seismic) effects on birds and other fauna. This literature is the key evidence base from which impact levels are derived.

Therefore, all species identified through B5 have been assessed through the framework provided by B7 and B8. Because of commonalities among species/taxa/groups in their sensitivity to seismic it is not always necessary to describe effects to each species individually but rather as groups defined by their sensitivity to different frequency levels of sound and shared life-history behaviours.

9.1 Change in fauna behaviour, hearing capacity, and physical condition

There is very little known about the effects of intense underwater sound (i.e. seismic surveys) on marine birds. It is generally thought that noise produced from activities associated with seismic surveys may impact those species of birds that spend large quantities of time underwater, either swimming or plunge diving while foraging for food.

The acoustic modelling predicted that the criteria for temporary threshold shift (TTS) was reached for the per pulse criteria out to 68 m, and AUD INJ was reached out to 55 m from the sound source. The criteria for TTS was reached for the SEL 24hr criteria out to 1.02 km. The modelled distance to sound effect criteria for behavioural impacts ranged from 5.66 km to 10.62 km.

The predicted effect level to these species is assessed as minor as impacts are predicted to have some effect on birds, but the effect is not considered significant or at a level to affect the population given the following:

- Mortality and injury impacts are not predicted for birds. Though the TTS SEL 24hr criteria was reached within 1.02 km of the source it would be highly unlikely for a diving bird or penguin to be within that distance of the source for 24 hours. As the seismic source will be slowly ramped up to full power over 30 minutes this further reduces the risk of a diving bird or penguin being close to the seismic source at full power.
- Impacts to diving birds and penguins would be limited to behavioural impacts which could range from startle response to moving away from the seismic survey to forage in other areas.
- Seabirds feed on multiple prey species and have widespread foraging areas. Indirect impacts including displacement of prey species such as fish will be limited to the proximity of the sound source. While displacement of some prey species may result in the displacement of these birds, this impact is localised, temporary and recoverable in any one location after the survey vessel moves past. Given their widespread foraging areas (ACAP 2020) and the small area possibly affected by prey displacement, seabirds are not expected to be impacted by

reduced net foraging opportunities. [Paragraph has been added in response to Matters B09, B12, B13 and B14].

- Pichegru et al. (2017) who investigated the behavioural response of endangered African penguins and found that penguins foraging within 100 km of the active seismic operations showed a change of foraging direction during seismic periods, increasing their distance between their feeding area and the location of the seismic vessel from 77 km, compared to ca 65 km on average in the absence of seismic activity. The avoidance behaviour by penguins observed in this study may be explained by either a direct disturbance from the noise generated by the operation or a change in fish distribution during that period (possibly because of seismic activities). Small-scale acoustic fish surveys assessing distribution and MSS.
- The African penguins quickly reverted to normal foraging behaviour after cessation of seismic activities during this study, which suggest a relatively short-term influence of seismic activity on these birds' behaviour and/or that of their prey.
- Increasing energy expenditure at sea to locate food can negatively affect penguins' reproductive output. However, Little Penguins have been shown to travel large distances during chick-guard stage with mean total distance travelled of 41.8 to 48.0 km (Hoskins et al. 2008) and during non-breeding periods at maximum distances of 62–147 km from the colony. Suggesting that changes in areas and distances is dependent on food source and that a temporary increase in foraging distances associated with a seismic survey is unlikely to have a significant impact on individual penguins or the population.
- Little penguins prey mainly on Clupeiformes, including anchovy, pilchard, and sprat during the chick guard phase (Camprasse et al 2017) but they may also feed on krill and several species of cephalopods at all stages of breeding (CoA 2020a), Impacts to little penguin prey is discussed in EP Appendix E3 (Underwater Sound Fish) and E2 (Underwater Sound Plankton). Population impacts to fish and plankton are not expected. Sardines are a key food source in the Otway region hence evidence of significant changes in behaviour of this species and other clupeids in response to a seismic MSS could have flow-on effects to their predators. However, research does not support significant changes in the behaviour of clupeids in the presence of MSS. A key reference that is cited to support seismic effects on penguins (Pichegru et al 2017) found there were no significant changes in distribution and/or abundance of small pelagic fish in the region compared to a few months prior to or after the seismic operations (Pichegru et al 2017). An even more targeted study that exposed herring schools to a full-scale 3D seismic survey off Northern Norway found no changes in the behaviour of herring schools from a transmitting seismic vessel as it approached from a distance of 27 km to as close as 2 km (Pena et al 2013). The schooling behaviour of sardines is complex and varies within and among locations, days, months and years at both spatial and temporal scales (Ward et al 2011). This variability is clearly intrinsic to their behaviour and would influence feeding strategies and adaptability of those species that target them as a food source.
- If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Therefore, the predicted level of impact on the cultural features of the short-tailed shearwater is assessed as minor, as per the points above.

The uncertainty level for impact to birds from seismic sound is assessed as medium based on:

- There are no sound effect criteria for underwater sound for bird species.
- There are limited published studies on the effects of seismic on diving birds, with only one study relevant to penguins.
- An absence of long-term monitoring data of the effects of seismic on birds in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (minor) and uncertainty (medium) is assessed as medium. For birds the predicted level of impact is clearly below the defined acceptable levels of impact as detailed in Section 10. The mitigation and management measures detailed in the Section 9.2 provide sufficient confidence in the predicted effect levels.

9.2 Measures Adopted to Manage Environmental Impacts

The following measures have been adopted to ensure that the impacts associated with elevated levels of underwater sound from the survey and support vessels on birds will be of an acceptable level.

These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

Measure	Measure Type	Details and Justification
The seismic source will shut down if flocks of foraging birds are observed within 500 m of the source.	Practice	Full power can commence when the seismic source is > 500 m from flocks of foraging birds. This will ensure no Diving Bird specifically little penguin is exposed to sound which would result in mortal injury.
Ramp up of sound source to full power over 30 minutes.	Practice	Mobile marine fauna (including demersal and pelagic fish, octopus, squid, diving birds, penguins, and turtles) are expected to move away from the source before it is at full power, providing them a level of protection. However, once the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I04, I05, E08].

10 Demonstration Impacts Will Be of an Acceptable Level

10.1 Principles of ESD, Biological and Ecological Categories

Temporary, Reversible, Small Scale and Natural variation

The Regia Marine Seismic Survey will generate underwater acoustic emissions primarily from seismic pulses and vessel operations, which are expected to result in short-term and reversible behavioural effects on marine birds. For species such as the Little Penguin and Short-tailed Shearwater, behavioural disturbance may occur within 5.66 km to 10.62 km of the source, with temporary threshold shifts (TTS) possible within 1.02 km and PTS possible within 55m.. These effects are limited to short-term foraging displacement or temporary avoidance, which are not anticipated to disrupt critical life stages or affect population viability. Seabirds in the area are wide-ranging and behaviourally flexible, allowing them to adjust their foraging patterns as needed. The survey area does not intersect with core breeding sites, Biologically Important Areas (BIAs), or key marine protected zones. Ecosystem-level effects, such as prey displacement, are considered negligible and localised, with no disruption to biodiversity, species interactions, or ecological processes. Overall, the impact is temporary, reversible, spatially limited, and of low ecological consequence.

Little Penguins

Temporary and Reversible

Potential impacts of sound exposure on little penguins during the Regia MSS are expected to be temporary, reversible, and of small spatial and population scale. Across all life stages, little penguins are known for their behavioural flexibility, which allows them to maintain essential activities even in the presence of short-term disturbances.

As described in the impact assessment, Pichegru et al. (2017) found penguins altered foraging direction within 100km of a seismic source but reverted back to normal behaviour after seismic ceased, foraging adults little penguins may exhibit temporary avoidance or minor changes in foraging effort in response to sound, but these responses are brief and do not affect survival or breeding output. Even older individuals (senescent penguins) are able to sustain essential behaviours such as resting and feeding without experiencing undue energy expenditure or elevated predation.

As described in the impact assessment, Hoskins et al. (2008) noted little penguions have the ability to increase their foraging ranges, therefore during the chick-rearing period (September to December), adult little penguins can continue to provision their young successfully, and juvenile development proceeds without hearing impairment. While temporary behavioural changes may occur, such as altered foraging patterns, these do not affect chick survival or population viability.

As described in the impact assessment, changes in abundance or distrubution to little penguin prey (i.e Clupeiformes, including anchovy, pilchard, and spratand krill) are not expected, as described by Pichegru et al. (2017). Impacts to little penguin prey is discussed in EP Appendix E3 (Underwater Sound Fish) and E2 (Underwater Sound Plankton). Population impacts to fish and plankton are not expected. Knock on effects to little penguins are not expected.

Reproductive behaviours such as courtship and pair bonding occur on land and are therefore not expected to be affected by the Regia MSS. Similarly, egg formation, incubation, and nest attendance take place within terrestrial nesting sites, where penguins remain protected from underwater acoustic exposure. As such, these critical life stages are not predicted to experience disturbance or injury from the activity.

Overall, the available evidence supports the conclusion that any behavioural responses by little penguins to sound generated during the Regia MSS will be short-lived, non-injurious, and will not result in biologically significant impacts to the species.

Natural variation

The activity will be managed to prevent injury to birds including little penguins and so that areas and periods important to biologically important to foraging and reproduction are avoided or prevented.

Therefore, it is not possible for impacts to important foraging locations to be greater than natural variations of these ecological processes. The Regia MSS does not overlap with any little penguins BIAs.

There may be temporary behaviour impacts to little penguins during the chick rearing. Given little penguins have the ability to increase their foraging distances based on prey availability (Hoskins et al. (2008) and prey distribution is not expected to be impacted by the MSS (Pichegru et al. 2017), any foraging displacement as a result of a behavourial disturbance would not result in little penguins increasing their foraging distances outside of their natural abilities.

Based on sufficient information

The assessment drew upon SLR acoustic modelling, species presence data (PMST and NCVA), and peer-reviewed literature including studies on underwater hearing in birds (Wei & Erbe 2024) and behavioural thresholds (Sørensen et al. 2020). While specific data on seismic sound effects on birds is limited, particularly for penguins, appropriate proxies were used to adopt a precautionary approach. Behavioural thresholds were conservatively set, and modelling results indicated that predicted exposure levels remained below thresholds for serious harm. Consequently, while some uncertainty remains, the assessment was based on a sufficient body of evidence and did not necessitate invoking the precautionary principle.

Activity not inconsistent with EPBC Act

CGG reviewed relevant conservation advice, management, and recovery plans for all identified species. There are no regulatory thresholds for underwater sound impacts on birds, but the assessment incorporated acceptable levels of impact based on the best available science. The approach is consistent with EPBC conservation advice for species such as the Little Tern and Short-tailed Shearwater. Mitigation and performance measures address concerns raised through consultation and are aligned with legislative requirements, ensuring consistency with the EPBC Act and associated planning instruments.

10.2 Economic, Cultural and Social Categories

The cultural heritage review, desktop research and consultation with relevant persons, cultural representatives, and the public identified concerns regarding potential impacts to seabird populations, birdwatching activities, tourism, and culturally significant species such as the Little Penguin and Short-tailed Shearwater.

These concerns were addressed by refining species presence data, incorporating literature on behavioural responses and foraging flexibility, and improving the clarity of exposure thresholds. Although some short-term behavioural responses are predicted, no injury, mortality, or disruption to breeding or foraging success is expected. Mitigation measures adopted in response to feedback include the potential reduction of source power if foraging birds are observed within 500 m of the vessel. As these values are closely tied to the physical presence and health of the species, the corresponding social, cultural and economic impacts are likewise considered acceptable.

Public submissions prompted further clarification of species listings, foraging ranges, and criteria used in the risk assessment. These inputs were reviewed, assessed for merit, and integrated where appropriate, demonstrating a transparent and responsive approach to relevant person engagement. Therefore, industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational impacts; culturally significant species, places, and practices continue without disruption; and people and communities maintain ongoing access to the natural environment, recreational activities, and heritage values without long-term or irreversible effects and no person or group is expected to be materially worse off due to the activity.

10.3 Discussion on Consistency with Company Processes

The impact assessment followed the methodology outlined in Appendix B3 and applied defined thresholds for both physiological and behavioural effects. For birds, the effect level was assessed as minor, with an uncertainty rating of medium, resulting in a final predicted impact level of medium. The predicted sound footprint was compared against the distribution and foraging ranges of identified bird species, including the Little Penguin and Short-tailed Shearwater. All mitigation measures required by regulation and good industry practice, such as ramp-up protocols and source

power reduction in proximity to foraging birds, were incorporated. No exceedance of injury thresholds or high consequence outcomes was identified, and the final consequence rating remains within company limits.

This impact assessment has demonstrated that the effect of underwater sound to birds has a:

- **Predicted level of effect of minor (2).**
- **An uncertainty of medium (3).**
- **Predicted level of impact of medium (6).**

11 Environmental Performance Outcomes

Environmental Performance Outcomes (EPOs) are measurable and activity-specific outcomes that describe the environmental performance the titleholder must achieve to ensure impacts and risks are managed to acceptable levels. EPOs are critical to the structure of an Environment Plan because they form the clear link between the defined acceptable level of impact and the predicted level of environmental consequence. Each EPO must be measurable, achievable, and within the control of the titleholder to implement, providing a transparent and enforceable statement against which performance can be assessed.

Table E5-2 - Environmental Performance Outcomes and Justifications

Defined Acceptable Level (From Table E5-1)	Environmental Performance Outcome	Rationale
Diving birds including little penguins are not exposed to sound levels that cause permanent auditory injury or mortality at any life stage.	**No death or injury to fauna, including listed threatened or migratory species, from the activity.**	This EPO can be demonstrated through pre-activity acoustic modelling, exclusion zone design, and shutdown protocols when birds are observed in zones where threshold exceedance is predicted.
Any temporary hearing effects to diving birds including little penguins remain brief, recoverable, and do not impair essential functions such as foraging, navigation, chick provisioning, or juvenile development.		
Any behavioural responses to diving birds including little penguins are minor, short-lived, and do not reduce survival, reproductive success, access to nesting sites, or overall population viability.		
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	**Social, cultural, and economic features are protected, sustaining their value for people and communities.**	This EPO ensures that the activity is managed in a way that prevents unacceptable impacts to social, cultural, and economic values associated with marine mammals.
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		

Defined Acceptable Level (From Table E5-1)	Environmental Performance Outcome	Rationale
Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	**The activity is conducted such that environmental impacts and risks remain within the range assessed as medium or lower, with mitigation measures in place and functioning as intended.**	This EPO enables ongoing assessment of effectiveness through internal reviews and operational audits. It provides a clear link between the risk assessment process and implementation strategy, supporting regulatory compliance and continuous improvement without requiring environmental outcome monitoring.

12 Recommendations

For most species/taxa/groups of birds reviewed, this document provides the final assessment of impacts. However, despite an extensive review of the relevant literature around the effects of seismic on birds, there has been a high level of concern voiced throughout consultation with relevant persons, around the prevalence of Little Penguin colonies in the region and the potential impact of seismic on their activities. High levels of engagement on an aspect are a trigger for CGG to undertake additional assessment. In this case looking at the effects of the activity on interfering with the ability of Little Penguins to undertake their normal behaviours. This additional assessment is detailed in Appendix F3 – Further Assessment of Key Values and Sensitivities under Section

- 3.4 Little Penguins

It is important to note that F3 is a response to further information requests and/or clarification and not a reflection of any prior assessment being insufficiently thorough. It is a recognition that more explanation and detail was sometimes necessary to better inform all groups involved in the consultation process, including the regulatory authority.

Hence F3 does not provide further assessment on all aspects and values identified through the EP process only those that were identified as

- Having some residual uncertainty about whether impacts or risks were of an acceptable level; and/or
- Contained environmental values and sensitivities (species) of key importance due to their protection status or commercial value; and/or
- Consultation with relevant persons revealed a particular value or sensitivity required further attention and material to support the consultation.

13 Document Control

Date	Revision	Update
6 August 2023	A	Draft prepared for initial comment
28 August 2023	B	Update based on comments and relevant person feedback
12 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
14 May 2024	2	Updated after public comment and rerun of the PMST searches.
23 October 2024	3	Updated following NOPSEMA assessment.
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
6 December 2025	5	Updated following NOPSEMA OMR 2 Letter

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table E5-3 shows how this feedback has been incorporated into the environmental assessments.

Table E5-3 - Public comment input.

Matter	Matter ID	Changes made arising from public comment
Matter: Flawed argument regarding animals moving away	I04	CGG has considered these claims and has updated the EP Impact Assessments (Appendices E, and F where relevant) to clarify that, while some displacement is expected from mobile taxa during the Regia MSS, the survey will not preclude animals from the Operational Area in its entirety. Instead, animals are expected to temporarily move away from the active acoustic source, but once the source passes, animals will be free to move back into the habitat that they departed from.
Matter: Acknowledgement of breeding colonies	B07	EP Appendix E5 has been updated to include specific mention of the Short-tailed Shearwater.
Matter: Underwater sound impacts on shearwaters	B08	Information has been added to EP Appendix E5 regarding the shearwater colony on Griffiths Island, Victoria.
Matter: Impacts on prey species	B09	Information has been added to EP Appendix E5.
Matter: Impacts to diving birds and their prey	B12	Information has been added to EP Appendix E5.
Matter: Consideration of olfactory foraging in seabirds	B13	Information has been added to EP Appendix E5.
Matter: Community level and cumulative impacts	B14	Information has been added to EP Appendix E5.
Matter: Mitigating sound exposure impacts to seabirds	B15	Clarification has been provided in EP Appendix E5 (Impact Assessment – Underwater Sound: Birds) that the acoustic source will be reduced to the low power setting if flocks of foraging birds are observed by the Marine Fauna Observer within 500 m of the source. Full power can commence when the seismic source is > 500 m from any flocks of foraging birds.
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and the following Activity limitation: the sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the safety criterion human health safety criterion for recreational divers, surfers and swimmers along the coastline CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F3, G1 and G2).
Matter: Geographic range and all species need to be defined and considered	I16	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection

		status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table E5-4. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table E5-4 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4023	Behavioural Response Threshold & Seismic Sound Avoidance: If CGG conducts seismic blasting within 82.8 km of any Fairy Penguin colony during the breeding season, the penguins may experience discomfort and hearing interference, leading them to alter their behaviour to avoid the seismic source. This distance combines the maximum foraging range for a single day trip and the modelled distance for behavioural response thresholds.	CGG has included the study by Pichegru et al. (2017) on penguins in the EP and has referred to this study multiple times across multiple documents See specific examples below: B8 Seismic Study Report, Section 7, Birds: E5 Underwater Sound- Birds Section 6 F3 Section 4.4.1, 4.4.3 and 4.4.4.	5117
4226	The email expresses concerns about the adverse effects of blasting the southern ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4024	Birds and the little Penguin Colony having to travel further away for food and shelter during seismic testing times, causing stress and fatigue.	The titleholder acknowledged the feedback, noting that impacts and risks to penguins are assessed in the Environmental Plan (EP) and can be found in E5 and F3. F3 focuses on foraging capabilities in the area and the potential overlap with the Regia MSS. There is an overlap between the foraging range of little penguins at Deen Maar and the Regia MSS. This overlap is ~5.3 hours spread over 3.5 weeks; therefore, we do not believe little penguins will be displaced from foraging areas.	1784
4357	The stakeholder raised an objection to seismic surveys as they negatively affect the fishing industry, local economy and environment.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of commercial fish species and sensitive species within the area of operation. The MSS will also not impact the local economy. Mitigation plans are in place to reduce any impacts to as low as practicable.	424
4030	CGG's email on September 14 indicated that the project's timing has changed to two separate 3-month windows: April-June and September-November. AMCS is concerned that the December sound speed profile may not accurately reflect the physical conditions during these new survey periods. Since acoustic propagation modelling is critical for subsequent analyses and for setting thresholds for mitigation measures required for NOPSEMA approval, AMCS requests an explanation of how the December sound speed profile differs from those in April-June and September-November.	We acknowledge this concern and agree that acoustic propagation modelling is the foundation of subsequent analysis. We will complete another modelling report prior to submission to cover the changed timeframes of the proposed survey.	3384
4033	Claim that seismic testing is proven to damage and kill marine life.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1024
4050	Concern about the destruction of smaller sea life and the wounding of larger marine animals due to seismic blasting.	Regia EP has conducted thorough assessments of the literature for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information	1669

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	
4051	Concern about the detrimental impacts on marine animals.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1452
4053	Concern about the impact on marine creatures due to noise pollution from seismic surveys.	The titleholder acknowledged the feedback, noting that potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals, are assessed in the Environmental Plan (EP) and can be found in E2, E3, E4, E5, E6, and E7. Measures to minimise adverse impacts on biological receptors are outlined in the EP also and can be found in G2.	3237
4055	Concern about the impact on shearwater birds and their breeding ground at Griffith Island.	Titleholder has conducted a thorough assessment of the literature, with potential impacts to birds assessed in the Environmental Plan (EP) (E5). Measures to minimise potential adverse impacts birds are also outlined in the EP (G2).	2908
4056	Concern about the impact on the Penguin colony at Middle Island.	This effects of sound on penguins were initially assessed in E4 and was later subject to further assessment in F3. The conclusion is that the measures adopted to protect foraging penguins will mean that impacts are of an acceptable level (See G 1 for a list of measures adopted).	2908
4061	Concern about the welfare of whales, seals, and birds due to the activity.	The titleholder acknowledged concerns outlined in email regarding welfare of whales, seals and birds due to the activity. Outlined approach to assessment that included demonstrating that impacts to these species will be of an acceptable level and advised that it had been determined that is acceptable to have a temporary behavioural change such as moving away from the survey vessel and that injury or long-term impacts were not acceptable.	835

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4063	Concern for various birds and little penguins and the effects of sound and light.	Impacts from underwater sound and artificial light on birds, including little penguins, are assessed in the Environmental Plan (EP) and can be found in E5 and E9. Further assessment of little penguins was also undertaken by CGG to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level. Measures to minimise adverse impacts on birds in the region are also outlined in the EP.	1783
4064	Concern raised by the stakeholder regarding the potential damage/kill of marine life due to seismic testing.	Titleholder responded to individual advising that CGG would not propose an activity that would lead to unacceptable impacts to marine life and advised that environmental impact assessments for each aspect of the proposed activity that has the potential to impact marine life were currently being prepared and that they would be based on scientific literature and published shortly for consultation and feedback.	1024
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration by other companies, particularly regarding the sale of seismic data.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	879
4068	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4073	Concerns about impacts both reputational and physical to the region if the activity is allowed.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1244
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4076	Concerns about potential disturbance to the marine environment, including marine parks and areas of Biological Importance.	The titleholder acknowledged this concern and noted that potential impacts to the marine environment including marine parks and biologically important areas as a result of the Regia MSS is assessed in E1 to E9 and F3 of the EP. There will be no activities with Australian Marine Parks. All areas of biologic importance have been identified and assessment in the respective impact and risk assessments.	2278
4077	Concerns about potential harm to zooplankton, whales, dolphins, sharks, seals, the Bonney Upwelling, rock lobster fishery and other local fishing industries.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	722
4078	Concerns about seismic testing and drilling rigs impacting marine life and fishing activities.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	917
4080	Concerns about the impact of seismic testing on various marine species.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	2179
4081	Concerns about the impact on whale habitat, endangered marine life, and commercial fisheries	Titleholder acknowledged this concern and noted that potential impacts to whales and relevant endangered marine species is assessed in the EP Chapters on underwater sound and light (E2-E7, and E9). Any interactions	4551

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		with seismic are mitigated and managed through spatial boundaries and a comprehensive fauna management plan. Advised that control measures to reduce impacts to commercial fishers as a result of displacement are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825
4088	Condemns seismic testing, asserting that it is deadly to marine life and unacceptable for ocean ecosystems. Call for a total ban, citing the large number of marine animals harmed by the practice. Argument that the destruction of marine ecosystems and the fishing industry is unjustifiable and express frustration, telling the parties responsible to stop.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	422
4093	Doubted the effectiveness of mitigation measures and believed the reports/information provided were absent of action /intention.	The mitigations applied by CGG are industry standard and comply with government policy. They have been proven to be as effective as reasonably practical for a number of years. The measures adopted to protect species from the aspects of the activity are found in the respective impact and risk assessments.	2830
4094	Effects of seismic testing on birds and the little Penguin Colony and their ability to return to chick, leading to a decimation in colony numbers.	The titleholder responded with some information relating to the large distances normally travelled by some seabird species to search for food sources for their chicks (Event ID 2910).	1784

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4096	Environmental Risk: Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artificial light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	2766
4118	Impact on marine animals, which are the livelihood of the community.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4119	Implications For Hearing Interference: This persistent loud noise from the proposed activity poses stress to the Fairy Penguin colonies in Western Victoria, potentially interfering with their hearing. Such interference may hinder prey detection and foraging success, affect predator detection and avoidance, disrupt environmental assessment while swimming, and impair essential communication between individuals. Penguins rely on vocalizations to communicate with mates and for parents to locate their young. Ongoing stress and hearing interference could harm individuals, populations, and reproductive success within the colonies.	The following statements can be found in Section 5: Sound Effect Criteria of the document titled Impact Assessment for Underwater Sound: Birds (E5): “There are no regulatory thresholds for underwater sound for bird species. Thus, for assessing potential sound–induced impact of impulsive seismic source signals on diving birds, the least sensitive marine mammal hearing group, other carnivores in water (OCW), from Southall et al. (2019), is used as a proxy. This hearing group has been selected due to similar hearing sensitivity in the frequency band of underwater hearing for diving birds and otariid pinnipeds, which are included in the group. This provides a conservative approach, as otariids are considered more sensitive to underwater sound at higher frequencies than diving birds.” “There are also no regulatory thresholds or criteria established to assess	5117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		potential behavioural responses by diving birds to underwater sound. To allow for assessing the potential for such impacts, an onset criterion for behavioural responses of 120 dB re 1 µPa (SPL) for impulsive sources was used based on information from Sørensen et al. (2020). They exposed gentoo penguins (Pygoscelis papua) in a controlled exposure experiment to underwater noise bursts (impulsive signals) and demonstrated that the animals show a graded reaction depending on received sound levels." These statements relate to the complexity surrounding the assessments of impacts of sound on bird species due to gaps in scientific literature and research available to date. These statements also present how best efforts have been made to understand how birds, including the Little Penguin, may be impacted by the seismic survey, given the limited information currently available. The above-mentioned impact assessment has stated our prediction that impacts from the seismic activity are expected to have some effect on birds, but that this effect is predicted as minor and is not considered significant or at a level to affect any bird population. CGG are therefore in agreement with you that some ecological and biological-related impacts to Little Penguin individuals may occur. CGG does not believe however, that potential impacts to this species would be at a significant or population level if they were to occur. The reasons for this assessment are stated and explained in this above-mentioned document and so CGG encourages you to read this for a fully comprehensive explanation. Some of the explanations that CGG believe relate to your concerns can be found in Section 6: Predicted Levels of Impact where explanations are made as to why mortality and injury are not predicted in relation to survey design and soft-start implementation, why impacts to birds are predicted to be behavioural only, and why this behaviour-related displacement is not expected to impact foraging opportunities. Some references to findings from relevant studies on penguins and seismic activity have also been discussed here to aid in the assessment of predicted levels of impacts on penguins from the seismic survey. To summarise, CGG believe the concerns you have raised on this matter have been addressed both in this response and in the referenced section of the document.	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4123	Insufficient information about potential damage from seismic testing.	The titleholder is confident that sufficient relevant and available information has been used to inform this this EP and to complete a comprehensive assessment of relevant aspects of the activity. Information used based around sound, peer reviewed scientific literature.	4190
4127	Lack of Acknowledgement of the Fairy Penguin Breeding Colonies in Western Victoria in CGG's Environment Plan, as well as No Acknowledgement of their Biologically Important Foraging Areas.	We believe there is some confusion here on what Biologically Important Areas are. Biologically Important Areas are regions where aggregations of individuals of a particular species are known or likely to display important behaviours such as breeding, foraging, nesting or migration. They have been identified from the literature and using expert scientific knowledge about species' distribution, abundance and behaviour (Australian Marine Parks, 2024). Biologically Important Areas were established to guide decision-making under the Environmental Protection and Biodiversity Conservation Act of 1999. These areas have been designated for a specific group of protected species, selected based on their conservation status and the availability of dependable spatial and scientific data. There are two sources we would use to identify Biologically Important Areas, the Protected Matters Search Tool and the National Conservation Values Atlas website. The closest Fairy Penguin BIA is around Christmas Island (off the northeast coast of King Island), and it is a designated foraging BIA. Nonetheless, just because the colonies are not BIA's doesn't mean they don't deserve consideration in our Environmental Plan. Little Penguins are discussed in detail in E56 Section 4.5, here we have acknowledged the breeding colonies on both Middle Island and Lady Julia Percy Island. See excerpt from E5 below: "The Little Penguin was identified as breeding known to occur within the area potentially affected by underwater sound (Annex 3). Within this area, breeding occurs on Lady Julia Percy Island and Middle Island." CGG will amend the Environmental Plan to include references to fairy penguins located at London Bridge, Gibson Steps and Lawrence Rocks.	5117
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise	4808

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		adverse impacts on marine life are outlined in the EP in G1.	
4133	Mass destruction of marine populations through the blasting process.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4136	Mention of considerable damage to marine life outweighing the benefits of mapping seafloors for gas drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1389
4142	Non-specific Sound Modelling & Hearing Damage: Current sound modelling for Fairy Penguins is based on their hearing sensitivity but relies on comparisons to the least sensitive marine mammal group, "Other Carnivores In Water," which includes much larger species like the Australian Fur Seal. This comparison is questionable, as these seals can weigh up to 360 kg—360 times the size of a Fairy Penguin—and have distinct ear structures that allow them to close their ear openings underwater. Thus, using such morphologically different species to assess safe sound levels for Fairy Penguins raises significant concerns about the appropriateness of the assumptions being made regarding potential impact risks.	The following statement can be found in Section 5: Sound Effect Criteria of the document titled Impact Assessment for Underwater Sound: Birds (E5) of the Regia MSS EP in reference to choosing the least sensitive marine mammal hearing group, Other Carnivores in Water, as a proxy for diving birds in assessing potential sound-induced impact of impulsive seismic source signals on diving birds: “This hearing group has been selected due to similar hearing sensitivity in the frequency band of underwater hearing for diving birds and otariid pinnipeds, which are included in the group. This provides a conservative approach, as otariids are considered more sensitive to underwater sound at higher frequencies than diving birds.” CGG acknowledges that sound modelling information in relation to diving birds was a proxy, due to insufficient information and regulatory thresholds currently available to accurately conduct this modelling using diving bird data. CGG does however believe that a well-justified and conservative approach has been taken to assess the relevant impact. As highlighted in this concern, CGG does not believe that the association of the Little Penguin with the “least sensitive marine mammal hearing group” is a problem as it has been made evident that the use of this proxy is a conservative approach as this group of marine mammals are more sensitive to underwater sound at higher frequencies than diving birds. CGG agrees that otariid pinnipeds are morphologically physiologically distinct	5117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		from Little Penguins, but as explained above, despite these differences these marine mammals are considered more sensitive to underwater sound at higher frequencies than Little Penguins. This is evidence that morphological and physiological differences does not necessarily dictate sensitivity and susceptibility to underwater noise.	
4145	Opposes seismic exploration claiming it is dangerous to all marine life. Cannot ensure zero risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	427
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high decibel blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making them unacceptable in a whale sanctuary area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	537
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4155	Raised concerns about sound levels from the survey and associated effects on marine mammals and other species.	Acknowledged concerns and outlined the predicted effects of sound levels of different species of marine mammals including difference between high and	3697

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		low frequency cetaceans, sound propagation and modelling, and different effect level thresholds. Also outlined the whale management and mitigation measures in place for Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection technology trails, and citizen science program access. Also outlined the effects on zooplankton and the case for acceptability of these	
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4161	Related to the effects of seismic testing on various birds, in particular the Little Penguin colony at Middle and Griffith Islands.	The titleholder provided information regarding the update of the environment plan to reflect the inclusion of various seabirds, including the Little Penguin, at the location of concern, not previously accounted for in the environment plan. The titleholder responded with some summarised information from the paper the stakeholder provided about foraging penguins and its relevance to the Regia MSS (Event ID 2910).	2908
4162	Related to the effects of seismic testing on various birds, particularly the Little Penguin colony.	The titleholder responded with a provision of a document link to the titleholder's preliminary impact and risk assessment relevant to shorebirds, some information regarding light being a likely cause of effect on nesting seabirds, and the titleholder has explained the process by which they conducted the relevant impact assessment in line with government guidelines (Event ID 1792). The titleholder provided information regarding the update of the environment plan to reflect the acknowledgement of various seabirds, including the Little Penguin, not previously accounted for in the environment plan (Event ID 2910).	1783
4173	Seismic blasting has adverse effects on the marine environment, with critical gaps in understanding the effects on individual species and the marine environment.	The titleholder responded with an explanation of the information sources used to inform the Regia MSS impact and risk assessments, and explained how these information sources and resulting measures are specific to the potential impact. The titleholder also referred to documents relevant to this claim within the environment plan (Event ID 4092).	4091

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4179	Seismic sounds have far-reaching effects on the marine environment, causing damage and suffering to species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3237
4180	Seismic testing and gas exploration/drilling pose undeniable risks to marine fauna, flora, ecosystems, local fishing, and tourism industries.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2118
4182	Seismic testing's impact on migratory seabirds and their flight path movements.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any birds within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1247
4186	Stakeholder expressed concern about the destruction and	Petroleum activities do not operate to a no-impact standard. Instead, the Regia	2963

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	depletion of the ocean due to the activity.	MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels.	1659

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1665
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4198	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to	1672

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4199	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2586
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments are covered below in response to concern 6.	2886
4202	Stakeholder objects to the proposed blasting activity due to its detrimental effects on marine ecosystems.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049
4217	Strong objection to the proposal for 3D seismic blast in the Otway Basin due to harm to oceans and unacceptable environmental impact or risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4218	Strong opposition to seismic testing in the ocean due to its effects on both wildlife and the fishing industry. Individual firmly disapproves of the practice.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	425
4226	The email expresses concerns about the adverse effects of blasting the southern ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4228	The EP uses inaccurate and misrepresented data and subsequent assumptions regarding	We appreciate the effort you have undertaken to understand the EP however, page 195 of the	5117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	the assessment of Fairy Penguins and their behaviours.	Environmental Plan which you have referenced is part of the PEIRA (Preliminary Environmental Impact and Risk Assessment). For context, the PEIRA was written in March 2023 and is only the first step when preparing an Environmental Plan. The purpose of the PEIRA is to a priori, identify key environmental sensitivities and provide an initial evaluation of the environmental impacts and risks associated with the Regia MSS. This is a 'first pass' to support the consultation efforts, it is not the full impact assessment. The full assessment reflects all the feedback from consultation and contains extra assessment as identified. The Fairy Penguin exemplifies the importance of public consultation in the Environmental Plan process. The PEIRA was drafted before public consultation began, and since the colonies along the western Victorian coastline were not designated as BIA's, they were not identified in the PEIRA. However, the Middle Island population of Fairy Penguins was identified through public consultation and subsequently discussed in the Impact Assessment (E5 - Underwater Sound - Birds). It is crucial to read the Environmental Plan in its entirety to fully understand the impact assessment and mitigation measures. Little Penguins are discussed in detail in E56 Section 4.5, here we have acknowledged the breeding colonies on both Middle Island and Lady Julia Percy Island. See excerpt from E5 below: "The Little Penguin was identified as breeding known to occur within the area potentially affected by underwater sound (Annex 3). Within this area breeding occurs on Lady Julia Percy Island and Middle Island." CGG will amend this section of the EP to include the other breeding colonies mentioned above. Regarding the information on the Australian Wildlife website, the table you produced is accurate. However, it's important to note that CGG has not misrepresented the science here. Context is crucial: while it is stated that during the non-breeding season, penguins may forage up to 700 km, the majority remain within 20 km. 700 km foraging trips are not undertaken by most animals and represent the extreme range of travel for this species. Therefore, we consider the average foraging distance to be 20 km. We would recommend you read E5 of the Environmental Plan, we have discussed in detail the fairy penguin and	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		information regarding foraging, see excerpt below: "Hoskins et al. (2008) examined the foraging range and diving behaviour of the Little Penguin from three breeding colonies (Rabbit Island, Kanowna Island and Phillip Island) in central northern Bass Strait, during the chick-guard stage using electronic tags. Although there were large overall differences between individuals, the mean maximum foraging range (16.9 to 19.8 km) and mean total distance travelled (41.8 to 48.0 km) were similar between the 3 colonies, despite different bathymetric environments. Individuals from all three colonies selected foraging habitats within a narrow sea surface temperature (SST) range (16.0 to 16.4°C). While there were significant differences in mean dive depths (5.4 to 10.9 m) and mean durations (13.2 to 28.6 s) between the different colonies, the mean diving effort (vertical distance travelled: 936.3 to 964.3 m h–1) was similar. These findings suggest little penguins from the three colonies employ relatively similar foraging efforts yet are flexible in their foraging behaviours. McCutcheon et al. (2011) used satellite telemetry to determine the at-sea movements and foraging range of 47 Little Penguins from Phillip Island, south-eastern Australia, during the winter non-breeding period. Individuals conducting single-day trips (72% of individuals) typically foraged 8–14 km from the colony, whereas individuals conducting longer trips (28%; 2–49 days) foraged either within Port Phillip Bay or in the coastal waters of western Bass Strait at maximum distances of 62–147 km from the colony. McCutcheon et al. (2011) noted that the results of this study indicate that Little Penguins remain within continental shelf waters no more than several hundred kilometres from the breeding colony during the non-breeding period, suggesting food availability is adequate within this region throughout the year." Multiple studies across spatially distant locations all found that average foraging distances for birds during nesting season were within 20km with a few km of variance around this. There is still extended foraging by individual birds on occasion, but this is not the norm. Feeding ranges are ultimately constrained by availability of food and we have reported the health and abundance of sardines and squid in the region adjacent to the Regia MSS. It has also been noted by Norman et al (2017) that the presence of upwelling in the nearby region equates to greater	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		productivity and hence why penguins in this area do not have to travel as far to obtain food. We recognize the (Berlincourt & Arnould, 2015) is more up to date than the references use in E7, and as a result CGG undertook a literature review to ensure the most up to date information is used in the EP.	
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4232	The feedback expresses frustration over repeated seismic blasts in the same area, emphasising the significant environmental impacts associated with these activities. It calls for accountability from NOPSEMA to prevent future occurrences, highlighting the ongoing threat to the environment.	The Regia MSS is targeting areas that have not been surveyed before though we acknowledge there may be some overlap with previous surveys. We have to show that the environmental impacts are short-term, localised, or recoverable and that they are controllable with appropriate measures in place.	2104
4237	The feedback questions whether the potential impact of seismic blasting on the local food supply, including fish and zooplankton essential to the marine ecosystem, has been considered, expressing concern over the ability of penguins and other marine life to feed if these populations are diminished.	The titleholder is studying the little penguins and will put in place protections for them. The titleholder ensures detail of the impact assessment of the effects of elevated levels of sound will be published shortly. The titleholder ensures they will consider all life-cycle stages of the penguin and the ecosystem effects, including those pressures on the food chain.	2079
4238	The feedback raises concern about the foraging distance penguins travel at night to feed themselves and their young, urging consideration of this range in seismic planning.	We are studying the little penguins and will put in place protections for them. The detail of our impact assessment of the effects of elevated levels of sound will be published shortly. We will consider all life-cycle stages of the penguin and the ecosystem effects, including those pressures on the food chain (Event ID 2079).	2079
4253	The possible effects to marine life and ecosystems is my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact	2117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4260	The protection of wildlife in the Otway Basin is directly affected by drilling and seismic surveying.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1901
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not	2064

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	
4268	The stakeholder argues that it is impossible to ensure zero risk from seismic activities, emphasising that only zero risk is acceptable. This position reflects a strong concern regarding the potential negative impacts of seismic exploration on the marine environment.	The legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4270	The stakeholder asserts seismic surveying has been proven to be harmful and disruptive to marine life of many species.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	3343
4271	The stakeholder asserts that seismic blasts will have a direct negative impact on marine life, specifically mentioning that an “exclusion zone” will not effectively prevent the effects of the blasts from travelling through the ocean.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable. The titleholder is aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how to protect and preserve the values of this site.	2108
4272	The stakeholder asserts that the survey will have a harmful effect on millions of sea creatures.	It would be unacceptable to have long-term or permanent/unrecoverable impacts, fortunately, impacts from marine seismic surveys are short-term, temporary, and recoverable. (Event ID: 3419)	3343
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publicly responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4276	The stakeholder does not accept the blasting activity as beneficial or	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the	2255

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	more important than existing marine life and structures.	acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4278	The stakeholder expresses an active interest in the wellbeing of the coastline and its flora and fauna, indicating a general concern for environmental conservation.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	1325
4285	The stakeholder noted their concern as a resident of Port Fairy: noise (land and sea), impact on marine life, potential impacts on the environment and the future potential if gas is found.	We are also concerned about the welfare of marine fauna. We have undertaken an impact assessment process that includes whale, seals, pelagic and shorebirds. As part of this assessment, we must show that impacts to these species will be of an acceptable level. We have determined that it is acceptable to have temporary behavioural changes, such as moving away from the survey vessel, and no injury or long-term impacts. Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We are also publishing environmental impact, risk and mitigation documents as they are completed, in the document library. We are publishing the entire documents in order to remain transparent, but I have also attached a summary document.	1747
4287	The stakeholder objected to the activities due to sound levels/acoustic trauma experienced by sea creatures	The scientific literature supports that marine fauna may potentially be displaced due to a seismic survey but that these impacts are typically short term with no impact to ecosystem function. Large scale studies undertaken in Australia that you may be interested in are: Australian Institute of Marine Science. North West Shoals to Shore Marine Noise Monitoring and Impacts https://www.aims.gov.au/research-topics/monitoring-and-discovery/north-west-shoals-shore Behavioural Response of Australian Humpback whales to Seismic Surveys	2389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		https://www.brahss.org.au/ Assessing the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries https://www.frdc.com.au/project/2012-008 Marine Seismic Survey Impacts on Fish and Invertebrates: Final Report for Gippsland Marine Environmental Monitoring Study https://ecat.ga.gov.au/geonetwork/srv/api/records/2292f4a7-ba2e-3533-e053-12a3070aaf2c Maxima 3D Marine Seismic Survey at Scott Reef https://www.sciencedirect.com/science/article/abs/pii/S0025326X13006528 https://www.sciencedirect.com/science/article/abs/pii/S0025326X18300687 Regarding Marine Fauna Observer's (MFOs), companies that contract MFOs such as Blue Planet Marine and RPS Group provide training for MFOs. As part of contracting MFOs we will ensure that the persons provided meet the requirement of the Australian Government EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales, that requires MFOs to be trained and experienced in whale identification and behaviour, distance estimation, and be capable of making accurate identifications and observations of whales in Australian waters. The Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, details the competency requirements for MFOs and ongoing awareness (page 23 and 24). The Regia MSS Implementation Strategy is available on the Regia MSS Website Document Library see https://klarite.mysocialpinpoint.com.au/regiamss/document-library As detailed in the Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, CGG will only use appropriately experienced MFOs as determined by a review of their CVs (page 23). The Regia MSS Implementation Strategy also details how CGG will monitor the performance of the control measures during the activity (page 25). For example: Audits and Inspections	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Post acceptance of the EP, conformance will be monitored on an at least quarterly basis by the Client Site Representative, or delegate, via audits and inspections, as well as through the commitments under the Management of Risk, Management of Change, and Management of Knowledge parts of this Implementation Strategy. During the activity, conformance will be monitored on an at least fortnightly basis by the Client Site Representative, or delegate, via audits and inspections during the activity. Conformance auditing or inspection while the EP is in-force will be based on the Conformance Register and will target the following: • Conformance with regulatory requirements detailed in the accepted EP. • Management strategies and procedures to ensure EPOs and EPSs are being implemented, monitored, measured, and evaluated. • Emissions and discharges are being monitored, measured, and documented As stated in the previous email, matters of national energy policy are not within the purview of CGG or the Regia MSS. We will however register claims related to the ongoing need for gas and provide those to NOPSEMA. Please find attached a brochure from NOPSEMA that describes this and may be of use to you.	
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-	1747

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4306	The stakeholder was concerned about potential negative impacts of gas exploration and development on Country, the marine and coastal environment, the local economy, Traditional Owners, and local communities.	The titleholder acknowledged the feedback, noting that all relevant impacts are assessed in the Environmental Plan (EP) and can be found in E1-E9. Measures to minimise adverse impacts on functions, interests and activities on relevant receptors are also adopted and can be found in G1.	3152
4309	The stakeholder was concerned about the impact on marine life sensibilities and populations.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2273
4315	The statement suggest that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4323	There will be potential permanent damage to marine life due to sonic testing and drilling.	Titleholder responded and listed various information needs related to the activity, environmental assessment process, environmental aspects, predicted levels of environmental impact and risk, environmental management, consultation processes, and regulations or regulatory processes. Links to the project website and document library was provided.	1046
4331	This feedback raises concerns about the negative impact of seismic blasting on local commercial rock lobster and scallop fishing industries.	This claim has been thoroughly assessed in E1, E5, and F3 for southern rock lobsters. There is no commercial scallop industry in the region. The known effects to individual lobsters are not predicted to have any measurable effect on population levels or dynamics.	2097

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4345	The stakeholder asked how we can be sure that seismic blasting will not harm penguins when conducted 60 meters away, expressing concern that this distance might be insufficient for safety.	The titleholder has acknowledged this feedback relating to underwater sound and penguins. The results from the underwater sound modelling (see E5 Section 6) show the TTS criteria was reached within 60 m of the source. This is a 24-hour cumulative result, meaning the penguin would have to remain within 60m of the sound source to experience TTS. It would be highly unlikely for a diving bird or penguin to be within that distance of the source for 24 hours. As the seismic source will be slowly ramped up to full power over 30 minutes this further reduces the risk of a diving bird or penguin being close to the seismic source at full power.	2079
4346	Requested details on the proximity of seismic blasting to Middle Island, with a specific concern for the range penguins travel offshore to forage at night.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions relating to penguins. The MSS will not impact the foraging abilities of fairy penguins within the area of operation, and CGG has acknowledged breeding colonies of Fairy Penguin along the coast of Victoria (EP E7 Section 4 and 8). CGG undertook an additional assessment of Fairy Penguins in EP F3 and outlined the overlap of foraging colonies along the coast with the Regia MSS. The foraging range of the Middle Island colony does not overlap with the Regia MSS. There is a small overlap with one of the breeding colonies and the Regia MSS, the overlap equates to only ~5.3 hours spread over 3.5 weeks. Mitigation plans are in place to reduce any impacts to as low as practicable.	2079
4347	Enquired about whether the potential impacts on the Fairy Penguin colony have been evaluated, specifically regarding how far they travel to forage and the depths to which they dive. Raises concerns about the effects of seismic activity on this important wildlife species.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions relating to penguins. The MSS will not impact the foraging abilities of fairy penguins within the area of operation, and CGG has acknowledged breeding colonies of Fairy Penguin along the coast of Victoria (EP E7 Section 4 and 8). CGG undertook an additional assessment of Fairy Penguins in EP F3 and outlined the overlap of foraging colonies along the coast with the Regia MSS. There is a small overlap with one of the breeding colonies and the Regia MSS, the overlap equates to only ~5.3 hours spread over 3.5 weeks. Mitigation plans are in place to reduce any impacts to as low as practicable.	2077
4348	Asks if the seismic blasting will occur during the breeding season of the Fairy Penguin colony, emphasising that the penguins forage after dusk, making them	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions relating to penguins. The MSS will not impact the foraging abilities of fairy	2077

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	less visible at night. It highlights the need to consider the timing of the project to avoid disrupting this vulnerable wildlife population.	penguins within the area of operation. The Regia MSS is scheduled to take place outside of the Fairy Penguin breeding season. CGG undertook an additional assessment of Fairy Penguins in EP F3 and outlined the overlap of foraging colonies along the coast with the Regia MSS. There is a small overlap with one of the breeding colonies and the Regia MSS, the overlap equates to only ~5.3 hours spread over 3.5 weeks. Mitigation plans are in place to reduce any impacts to as low as practicable.	
4349	Raises a concern about whether the sound levels from seismic blasting could be harmful or uncomfortable for Fairy Penguins during their foraging activities.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the foraging abilities of fairy penguins within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2077
4352	Asked if low-power zones or shut-down zones could be applied to penguins and seabirds.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of penguins or seabirds within the area of operation (see E5). Although there were no mitigation measures through the impact assessment, to address concerns to penguins as a result of consultation CGG has agreed to implement the following measure: The seismic source will be reduced to the low power setting if flocks of foraging birds are observed within 500 m of the source.	2006
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual	1389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		with impact assessments when they became available.	
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4365	Concerns about the lack of definitive clarification on how seismic testing affects the marine environment and the clash between economic interests and environmental risks.	The titleholder acknowledged the feedback, noting that they have undertaken a thorough analysis and assessment of all relevant literature to inform the impact assessments conducted to assess potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals in the Environmental Plan (EP). These findings can be found in E2, E3, E4, E5, E6, and E7 under Section 8: Predicted Levels of Impact. Additional assessments of key receptors were also completed to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level (F3). Titleholder also conducted an assessment to investigate potential impacts to other marine users from physical presence resulting from the activity (E1).	2383
4376	Relevant person expressed concern about the timing of the seismic blasting project, specifically during the breeding season of the Fairy Penguins.	Event ID 6320 - The Regia team responded that window of April/May/June has been identified as one which offers the most minimal impact to the ecosystem and its constituents. Decisions on the preferred time for conducting seismic are made after detailed assessment and consideration across all identified cause-effect pathways, including Little Penguins. The timing of the MSS to the months of April/ May / June avoids the core period of egg laying and chick rearing which is the most effective mitigation tool at our disposal.	6327

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4380	There should be no seismic during the egg laying and chick raising period; local organisations should monitor each colony in the lead up to the breeding season to ensure this.	Event ID 6882 (Doc ID 9096)- Timing has been selected in an effort to avoid the time of year when the ecosystem is most active and the majority of animals are breeding, which is the summer months. It is not appropriate to cease the activity, which occurs at a minimum 20km offshore, for animals laying eggs onshore.	6412
4384	Stakeholder claims that the Fairy Penguins could be more vulnerable to acute effects because their smaller bodies might lack the capacity to buffer the shock waves.	Event ID 6320 - There is no scientific literature to suggest that this, therefore it appears that this claim is a personal opinion. The stakeholder is encouraged to provide further information on why they may believe this.	6412
4417	The relevant person was concerned that about the proposed seismic activity effecting the behaviours of certain species.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act.	6880

Annex 3

Underwater Acoustic Sensitive Species

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Antipodean Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Australasian Gannet	Breeding known to occur within area				Listed	Aggregation	None identified
Black-browed Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on Black-browed Albatross (*Thalassarche melanopris*) (TSSC 2005)
Black-faced Cormorant	Breeding known to occur within area				Listed		Wildlife Conservation Plan for Seabirds (CoA 2020a)
Buller's Albatross, Pacific Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Blue Petrel	Species or species habitat may occur within area	Vulnerable			Listed		Conservation Advice *Halobaena caerulea* Blue Petrel (TSS 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Campbell Albatross, Campbell Black-browed Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Cape Gannet	Breeding known to occur within area				Listed		None identified
Common Diving-Petrel	Breeding known to occur within area				Listed	Breeding Foraging	None identified
Gould's Petrel, Australian Gould's Petrel	Species or species habitat may occur within area	Endangered					Gould's Petrel (*Pterodroma leucoptera leucoptera*) Recovery Plan (DEC NSW 2006)
Indian Yellow-nosed Albatross	Species or species habitat likely to occur within area	Vulnerable	Migratory		Listed	Foraging	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Little Penguin	Breeding known to occur within area				Listed		Wildlife Conservation Plan for Seabirds (CoA 2020a)
Little Tern	Breeding known to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed (as *Sterna albifrons*)		Commonwealth Listing Advice on *Sterna albifrons sinensis* (Little Tern (western Pacific)) (TSSC 2002). Conservation Advice for *Sternula albifrons* (Little Tern) (DCCEEW 2025)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
							Wildlife Conservation Plan for Seabirds (CoA 2020a)
Northern Buller's Albatross, Pacific Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable			Listed (as *Thalassarche sp. nov.)*		National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Northern Giant Petrel	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on *Macronectes halli* (Northern Giant-Petrel) (TSSC 2001)
Northern Royal Albatross	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Salvin's Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Short-tailed Shearwater	Breeding known to occur within area		Migratory	Migratory Marine Birds	Listed (as *Puffinus tenuirostris*)	Foraging	None identified
Shy Albatross	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	Foraging likely	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Conservation Advice *Thalassarche cauta* Shy Albatross (TSS 2020)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Silver Gull	Breeding known to occur within area				Listed (as *Larus novaehollandiae*)		Wildlife Conservation Plan for Seabirds (CoA 2020a)
Southern Giant-Petrel, Southern Giant Petrel	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Southern Royal Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Wandering Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Wedge-tailed Shearwater						Foraging	Wildlife Conservation Plan for Seabirds (CoA 2020a)
White-capped Albatross	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		National Recovery Plan for Albatrosses and Petrels (CoA 2022)
White-faced Storm-petrel						Foraging	Wildlife Conservation Plan for Seabirds (CoA 2020a)

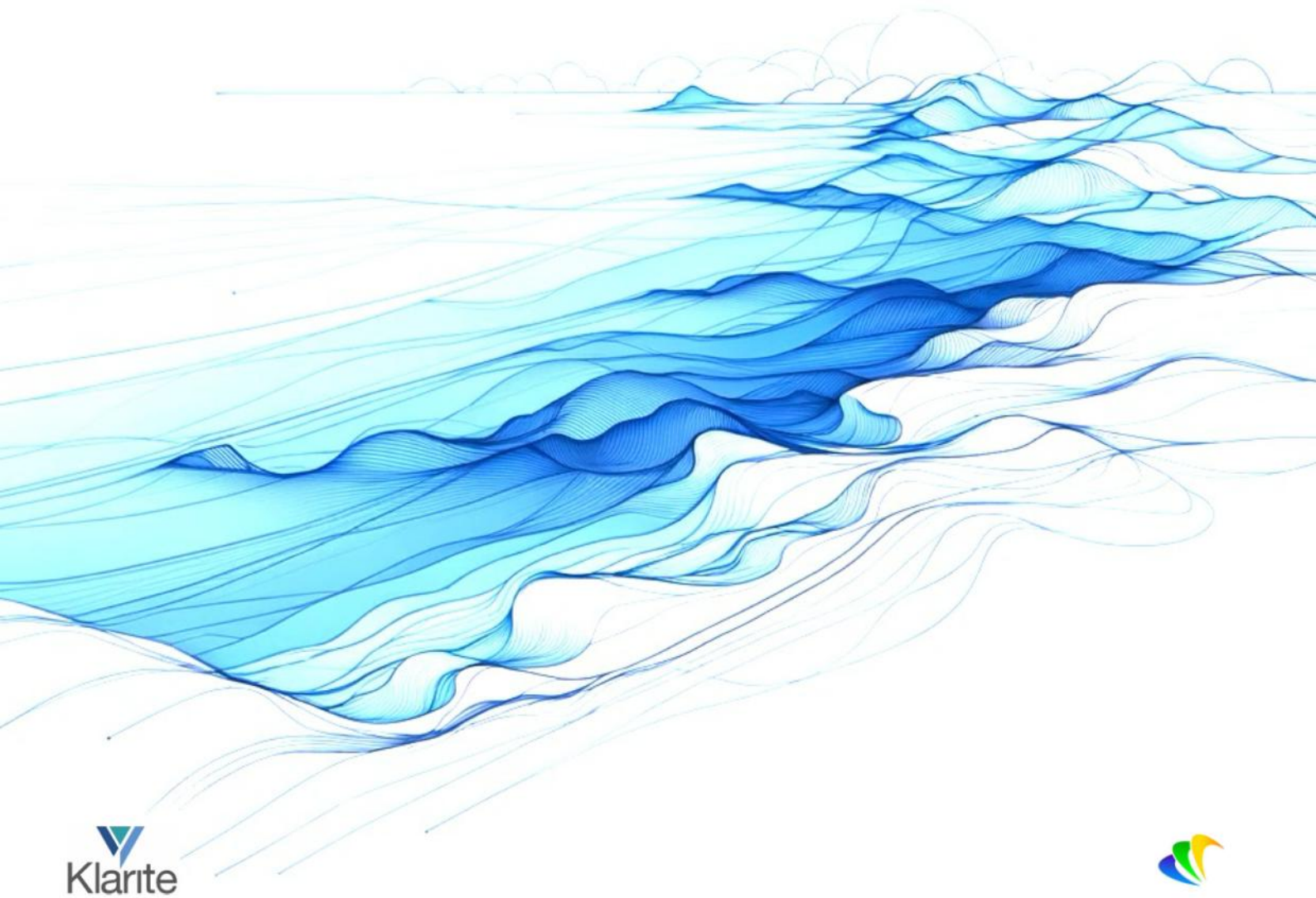
REGIA
Marine Seismic Survey

Impact Assessment
Underwater Sound: Turtles

Appendix E6: REG-EP-025-E6

Rev 5

December 2025



Klarite

Table of Contents

1 Introduction 3
1.1 Purpose and Scope 3
1.2 Consultation in Preparation of the EP 3
1.3 Modifications Arising from Further Assessment 3
2 Aspect – Underwater Sound 5
2.1 How the Aspect Occurs 5
2.2 Extent and Duration of the Aspect 5
3 Cause-Effect Pathway 6
4 Description of the Existing Environment that may be Affected by the Activity 7
4.1 Turtles 7
5 Relevant Legislative Requirements **8**
6 Defining Acceptable Levels of Impact 9
7 Consultation Input 12
8 Minimisation of Impacts Through Activity Design 13
8.1 Elimination 13
8.2 Substitution 13
9 Predicted Levels of Impact 14
9.1 Change in fauna behaviour, hearing capacity, and physical condition 14
9.2 Measures Adopted to Management Environmental Impacts 15
10 Demonstration impacts will be of an acceptable level 16
10.1 Principles of ESD, Biological and Ecological Categories 16
10.2 Economic, Cultural and Social Categories 16
10.3 Discussion on Consistency with Company Processes 17
11 Environmental Performance Outcomes 18
12 Recommendations 19
13 Document Control 20
14 References 21
Annex 1 22
Public Comment 22
Annex 2 23
Objections and Claims Raised from Consultation 23
Annex 3 43
Underwater Acoustic Sensitive Species 43

1 Introduction

Underwater Sound was identified through the Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4) as an aspect needing further assessment. Hence this document presents a detailed examination of **Underwater Sound**, as will typically be produced during the proposed Regia Marine Seismic Survey (**Regia MSS**), and its interaction with the environmental receptor we are collectively calling **Turtles.**

This assessment is built on the information contained in the following four core studies, which should be read in the order they are listed:

1. PEIRA.
2. Seismic Sound Studies Report (Appendix B8).
3. Sound Emissions Modelling Report (Appendix B7).

1.1 Purpose and Scope

The purpose of this document is to assess all acceptable sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document was initially published in draft form and uploaded to the Document Library of the Regia MSS Consultation Hub on 11 September 2023 as a stand-alone document, rather than as part of the much more substantial total EP document. This was done to maximise the ability of interested members of the public to read, interpret and respond within the mandated 30-day public comment period.

As such, public and Relevant persons were invited to comment on the document with an explicit request for feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

1.3 Modifications Arising from Further Assessment

To ensure this environmental assessment remains contemporary, accurate, and reflects feedback from the regulator and relevant persons, this document will be updated from time-to-time. In particular, the CGG environmental assessment process requires consideration of whether further assessment was needed to verify, or dive deeper into a topic, to further improve the predictive quality

of the assessment. When this has occurred, reference to such changes will be communicated in the Recommendation section and identified at relevant points in the assessment.

2 Aspect – Underwater Sound

2.1 How the Aspect Occurs

Impulsive underwater acoustic emissions will result from the seismic source releasing compressed air (seismic pulse) that creates a sound wave that is directed downwards into the seabed.

Continuous underwater acoustic emissions are generated by the survey and support vessels and helicopters. Underwater acoustic emissions from vessels are generated by thrusters, engines, and propellers. Underwater acoustic emissions from helicopters are generated via the engine and rotors. Underwater acoustic emissions from Ultra-Short BaseLine positioning beacons are generated within the streamer spread.

2.2 Extent and Duration of the Aspect

Impulsive Sound

Duration: 60 days

Extent: Active Source Area +50 m to 6.25 km based on the furthest distance to modelled sound effect criteria. [Updated in response to Matter: F17]

Seismic acquisition where the seismic source will be active will occur for up to 60 days within the Active Source area.

3 Cause-Effect Pathway

The PEIRA (Appendix B4) identified a cause-effect pathway for underwater sound for the following environmental components

Potential environmental impacts to reptiles identified from the PEIRA are:

- Change in fauna behaviour.
- Change in hearing capacity.
- Change in physical condition.

Following review of the NCVA (now AMSIS):

- No important inter-nesting habitat is within or adjacent to the area that maybe affect by underwater sound.
- No habitat critical to the survival of marine turtles are within or adjacent to the area that may be affected by underwater sound.
- No Biologically Important Areas for turtles are within or adjacent to the area that may be affected by underwater sound.

4 Description of the Existing Environment that may be Affected by the Activity

For a description of the baseline soundscape in the region relevant to the Regia MSS, refer to Section 1.1 of Appendix B8.

4.1 Turtles

To identify turtle species that may be present within the area affected by underwater sound a PMST search was undertaken using the Active Source Area with a 6 km buffer based on the furthest distance to a sound effect criterion is 6.25 km (Table E6-2). The PMST Report is available in Appendix B5. PMST searches were run again prior to resubmission to ensure any changes to species or listings were identified to control for passage of time. There are no changes to protected matters information for species that may be impacted by underwater sound [Section added in response to Matters: I16 and I17].

The PMST Report identified three turtle species within the area potentially affected by underwater sound, Green (may occur), Leatherback (likely to occur) and Loggerhead turtle (likely to occur). No BIAs or habitat critical to the survival of the species were identified. Annex 3 provides details on these turtle species and relevant conservation advice or management plans.

Green Turtles nest, forage and migrate across tropical northern Australia, spending their first 5-10 years drifting on ocean currents. They are predominantly found in Australian waters off the Northern Territory, Queensland, and Western Australian coastlines, with limited numbers in NSW, Victoria, and South Australia (DoEE 2017).

Small numbers of Leatherback Turtles nest on the Cobourg Peninsula (NT) and there are unconfirmed accounts of Leatherback Turtles nesting in Western Australia. As pelagic feeders, they are more commonly found foraging in Australian waters along the east coast and in Bass Strait however they are also regularly found in the high latitudes of all oceans (DSEWPaC 2012). The southern waters of Australia are an important feeding area for the Leatherback Turtle with five identified foraging sites (where area restricted behaviour occurs) (DoEE 2017) but no major nesting sites recorded. This has been confirmed with a recent study which compiled historical leatherback turtle observations, and satellite tracking data from their nesting beaches in West Papua, Indonesia, and down to SE Australia and found Leatherbacks in southeast Australia primarily forage in waters above 14°C, highlighting the waters off southeast Australia as important foraging area for this species (Hays et al. 2023).

There are two genetically distinct stocks of Loggerhead Turtles nesting in Australia, one in Queensland (known as the south-west Pacific stock) and one in Western Australia. Loggerhead Turtles forage in all coastal states and the Northern Territory, but are uncommon in South Australia, Victoria, and Tasmania (DoEE 2017).

5 Relevant Legislative Requirements

CGG has considered all the relevant legislative requirements, conservation management and recovery plans for all turtle species that may be affected (see Appendix B2). Measures that must be adopted are as follows:

- Recovery Plan for Marine Turtles (DoEE 2017) which includes:
  - In accordance with the EPBC Act Policy Statement 2.1 – Interactions between Offshore Seismic Exploration and Whales: Industry Guidelines, all seismic survey vessels operating in Australian waters must undertake a soft start during surveys irrespective of location and time of year of the survey. Although these guidelines are specifically designed for interactions with cetaceans, the soft start provision may also afford protection for marine turtles.

6 Defining Acceptable Levels of Impact

Marine turtles are less sensitive to sound than marine mammals as they do not have an external hearing organ. They can detect sound through bone-conducted vibration in the skull with their shell providing a receiving surface (Lenhardt et al. 1985). Morphological studies of green and loggerhead turtles (Ridgway et al. 1969; Wever 1978; Lenhardt et al. 1985) found that the turtle ear is like other reptile ears but has adaptations for underwater listening.

There is limited information on marine turtle hearing. Most studies looking at the effect of seismic noise on marine turtles have focussed on behavioural responses given that physiological impacts are more difficult to observe in living animals. Exposure criteria developed by Popper et al. (2014) based on results from the Working Group on the Effects of Sound on Fish and Turtles as well as Finneran et al. (2017) has been adopted. These thresholds are within Australia as relevant threshold levels.

Sound exposure guidelines for turtles have been established by the American National Standards Institute (ANSI) accredited report of Sound Exposure Guidelines for Fishes and Sea Turtles (Popper et al. 2014).

Though mortality or potential mortal injury to turtles from seismic sound exposure has not been reported, Popper et al. (2014) provides exposure guidelines of >207 dB re 1 µPa PK or >210 dB re 1 µPa2.s SEL_{cum}. Popper et al. (2014) also defined semi-quantitative exposure criteria for potential hearing impairment (recoverable injury and TTS). Finneran et al. (2017) recently proposed thresholds of 232 dB re 1 µPa (PK) and of 226 dB re 1 µPa (PK) for AUD INJ and TTS effects in turtles respectively. Therefore, the Popper et al. (2014) criteria for mortality/mortal injury may be conservative.

Finneran et al. (2017) identified 175 dB re 1 µPa SPL as the level at which marine turtles are expected to actively avoid seismic exposures. However, the Recovery Plan for Marine Turtles in Australia (DoEE 2017) acknowledges the 166 dB re1 µPa SPL reported by McCauley et al. (2000) as the level that may result in a behavioural response to marine turtles.

Based on the above discussion, Table E6-1 justifies and defines the acceptable levels of impact from underwater sound on marine turtles. Further information on studies in relation to seismic acoustic emission impacts to turtles can be found in the Seismic Sound Studies Report (Appendix B8).

CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that assessment specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, Table E6-1 shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding assessment specific defined acceptable levels established for this assessment. This sets the foundation for relevant and targeted demonstration later in this assessment.[1]

[1] Note: The acceptable levels related to demonstrating ALARP and the adoption of specific measures to ensure the effectiveness of control measures can be found in Appendix F2 and B3 respectively. As they are criteria integral to the acceptance of the Environment Plan, and they a documented elsewhere, these criteria are not discussed further in this assessment.

Table E6-1 - Defined acceptable levels of impact from underwater sound effects to turtles

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	Sound exposure to marine turtles must be below a permanent threshold shift at thresholds in exceedance of 232 dB PK.	The behavioural disturbance threshold of 175 dB SPL is lower than the PK threshold for AUD INJ indicating that a turtle is expected to be deterred by the approaching seismic array prior to thresholds for AUD INJ being reached.
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	For species and sensitivities with social, cultural and/or economic values, if the potential ecological impact or risk is deemed acceptable, it is likely that the corresponding impact on social, cultural and/or economic values will also be considered acceptable, as the physical presence and health of these species are key for maintaining their social, economic and cultural roles. Therefore, predicted levels of impact for social, cultural and economic values for species will be
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons. The views of public have been considered in the impact and risk assessment.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	assessed on a receptor level. Native Title will be assessed separately.
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Impacts Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of impact could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of underwater sound, elimination involves removing the source of underwater sound or preventing its generation in the first place. One main option was considered:

Continuous Line Acquisition

This method involves maintaining discharge of the acoustic source during vessel line turns to reduce the total number of operational days. In effect, the survey could be acquired without run-ins and run outs. While this could shorten survey duration, it results in longer periods of uninterrupted underwater sound exposure and eliminates natural breaks between sail lines. Furthermore, it increases the risk of degraded data quality due to inconsistent line geometry and off-angle acquisition. If data quality does not meet geophysical thresholds, reacquisition may be necessary, leading to an overall increase in survey footprint and environmental impact. This option was ultimately discarded due to both environmental and operational drawbacks.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the impact. One main option was considered and subsequently adopted:

Operate the sound source at low power during line turns and if transiting between sail lines anywhere in the Mitigation Source Area, Active Source Area, and Survey Acquisition Area

The use of lower power settings during non-acquisition phases—such as line turns, testing, or soft starts—was explored to reduce unnecessary sound emissions. A Mitigation Source Area (MSA) was developed in response to consultation feedback, particularly from the Director of National Parks, who highlighted the importance of maintaining mitigation sound emissions during non-acquisition phases.

CGG is also investigating the feasibility of acquiring the survey using a reduced source size. Environmental and technical assessments are underway to validate whether a smaller source can meet geophysical objectives. Subject to these findings, CGG commits to using the lowest practicable source power that achieves geophysical data requirements.

9 Predicted Levels of Impact

To arrive at the predicted levels of impact of underwater sound on turtles at this stage in the process requires the reader to have assimilated all prior relevant information that has been assessed on turtles. The EP documentation is coded alphabetically to guide the reader through what is a natural process of temporal accumulation and review of evidence. The following documentation forms the evidence lineage for predictions on plankton as described here.

- B5 – PMST Reports – The Protected Matter Search Tool was used to search for environmental values and sensitivities potentially located within the proposed Regia MSS planning area, with eight specific searches undertaken of which one was for Turtles within the region defined by the Regia MSS Active Source Area with an included buffer area out to 6 km.
- B7 – Sound Modelling Reports - SLR performed a numerical modelling study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic impacts on key regional receptors including plankton along with turtles, marine mammals, fish, benthic invertebrates, and recreational divers and swimmers. Acoustic thresholds derived from this document are used to guide assessments of impacts.
- B8 – Seismic Studies Report – This report provides a detailed assessment of the scientific literature related to sound (and specifically seismic) effects on turtles and other fauna. This literature is the key evidence base from which impact levels are derived.

Therefore, all species, taxa or groups identified through B5 have been assessed through the framework provided by B7 and B8. Because of commonalities among species/taxa/groups in their sensitivity to seismic it is not always necessary to describe effects to each species individually but rather as groups defined by their sensitivity to different frequency levels of sound and shared life-history behaviours.

9.1 Change in fauna behaviour, hearing capacity, and physical condition

The predicted maximum distances from the acoustic modelling from the acoustic modelling are detailed in Table E6-2.

Table E6-2 - Modelled Maximum Distances – Marine Turtles.

	AUD INJ		**TTS**		**Behavioural Disturbance**
Modelled Distances	Per pulse	SELcum	Per Pulse	24 hr	Per Pulse
	47 m – 51 m	500 m-1.06 km	59 m-64 m	4.16 -6.25 km	590 m-1.64 km

The predicted effect level to turtle species is assessed as minor as impacts are predicted to have some effect to turtles, but the effect is not considered significant or at a level to affect the population given the following:

- Mortality or mortal injury to turtles is considered highly unlikely based on no documented cases of mortality in turtles exposed to seismic source emissions under experimental or field operating conditions (Popper et al. 2016).
- As detailed above, the per pulse (PK) exposure criteria for AUD INJ and TTS are reached out to 51 and 64 m from the sound source, respectively. The cumulative exposure criteria for AUD INJ is reached out to 1.06 km, TTS is reached out to 6.25 km, and behavioural disturbance may occur out to 1.64 km. It is considered highly unlikely that a turtle would stay within the AUD INJ and TTS effect distances for 24 hours as there are no BIAs or habitat critical to the survival

of the species identified and thus turtles are likely to be transient in the area. [Section updated in response to Matter: F17]

- The Recovery Plan for Marine Turtles (DoEE 2017) identifies acute noise interference from anthropogenic noise sources, such as seismic surveys, as a low-risk threat to the stocks of marine turtles. Thus, population impacts from the seismic survey are not predicted.
- The Regia MSS is consistent with Recovery Plan for Marine Turtles (DoEE 2017) such that:
  - There is no important nesting habitat within or adjacent to the area that maybe affect by underwater sound.
  - Marine turtles will not be displaced from identified habitat critical to the survival from underwater sound.
  - Biologically important behaviours will not be impacted.

The uncertainty level for impact to turtles from seismic sound is assessed as low based on:

- There are long-term tagging studies of sea turtles in Australia, and there are no nesting habitats identified as BIAs within or adjacent to the area that may be affected by underwater sound.
- There has never been a documented mortality or mortal injury to turtles because of seismic source emissions.
- There are several published studies on the sound effect criteria of sea turtles.

The predicted level of impact based on the effect (minor) and uncertainty (low) is assessed as low. For turtles the predicted levels of impact are beneath levels of perception and/or within normal bounds of variation. Good industry practice (including legislation and standards) has been applied and therefore these impacts are of an acceptable level without further reduction measures being required.

9.2 Measures Adopted to Management Environmental Impacts

The following measures have been adopted to ensure that the impacts associated with elevated levels of underwater sound from the survey and support vessels on turtles will be of an acceptable level.

These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

Measure	Measure Type	Details and Justification
Start-up delay procedure (if sighting)	Procedure	The start-up delay procedures will include provision for turtle detections within 500m to delay the commencement of operations or require movement of the vessel before start-up.
Ramp up of sound source to full power over 30 minutes.	Practice	Mobile marine fauna (including demersal and pelagic fish, octopus, squid, diving birds, penguins, and turtles) are expected to move away from the source before it is at full power, providing them a level of protection. However, once the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I04, I05, E08].
Shutdown procedures	Procedure	The shutdown procedure will include provision for turtle observations to initiate a shutdown of the sound source if there are detections within 500 m of the sound source.

10 Demonstration impacts will be of an acceptable level

10.1 Principles of ESD, Biological and Ecological Categories

Temporary, Reversible, Small Scale and Natural variation

As described in the impact assessment, the Regia Marine Seismic Survey will generate underwater sound primarily through seismic pulses and vessel operations, with modelled acoustic emissions extending up to 6.25 km. The predicted levels of effect to turtles include potential behavioural disturbance up to 1.64km, temporary hearing shifts up to 6.25 km (TTS), and possible exposure above auditory injury (AUD INJ) criteria within 1.06 km. However, turtles are expected to avoid the sound source (O'Hara & Wilcox 1990) prior to reaching AUD INJ thresholds, and there is no identified critical habitat, inter-nesting area, or Biologically Important Area (BIA) in or near the affected zone. The affected environment is therefore not ecologically or biologically sensitive in terms of turtle use. If turtles are present, they are expected to be in low numbers and low densities.

As highly mobile, pelagic animals, turtles are likely to transit through the area without prolonged exposure. Impacts are not expected to disrupt population health, ecosystem function, or biodiversity. Overall, the impact is predicted to be minor, temporary, reversible, and limited in spatial extent.

Based on sufficient information

The assessment utilised acoustic modelling, species presence data (updated PMST searches), and peer-reviewed studies, including exposure thresholds developed by Popper et al. (2014) and Finneran et al. (2017), to evaluate both behavioural and physiological effects. While data on marine turtle hearing remains limited, these studies offer the most widely accepted criteria for evaluating impact. The Recovery Plan for Marine Turtles (DoEE 2017) was also used to assess whether impacts would be serious or irreversible. No evidence of serious harm, irreversible damage, or substantial knowledge gaps requiring application of the precautionary principle was identified. Uncertainty was assessed as low due to the strength of available evidence and absence of critical habitats.

Activity not inconsistent with EPBC Act

The survey design and environmental management measures align with the EPBC Act and its associated Recovery Plans. Three species — Green, Leatherback, and Loggerhead turtles — were identified in the area, but no nesting beaches, BIAs, or critical foraging areas were recorded within the modelled sound footprint. The soft-start (ramp-up) procedures required under EPBC Act Policy Statement 2.1 (designed for whales) are also applied here and considered protective of turtles. The assessment explicitly integrates the objectives of the 2017 Recovery Plan for Marine Turtles, concluding that no inconsistency exists.

10.2 Economic, Cultural and Social Categories

The activity is not expected to result in any material disadvantage to affected persons or cultural groups. Turtles are important in the traditions of many First Nations peoples, but no cultural heritage sites, inter-nesting areas, or foraging habitats of cultural significance occur within the area exposed to underwater sound above behavioural or injury thresholds. Relevant persons raised concerns about the accuracy of modelling and protection of marine fauna. In response, the project team updated the PMST database results, refined the acoustic model to reflect local propagation conditions, and confirmed the absence of critical turtle habitats. These changes, along with soft-start procedures and other standard mitigation measures, were included in the final assessment. The public also provided feedback via the Regia MSS Consultation Hub, with specific concerns about animal welfare, data quality, and transparency. These were addressed through clarification of assumptions and justification of modelling outcomes. Taken together, the views of affected persons, the public, and cultural stakeholders have been appropriately considered and incorporated.

10.3 Discussion on Consistency with Company Processes

The impact assessment followed the methodology in Appendix B3 and applied defined thresholds for physiological and behavioural effects. For turtles, the effect level was assessed as minor, the uncertainty as low, and the final predicted impact level as low. The sound footprint was compared with species distribution, and all mitigation measures required by regulation and good practice were adopted. As no exceedance of thresholds or high consequence outcomes were identified, the final consequence rating is within company limits.

This impact assessment has demonstrated that the effect of underwater sound to turtles has a:

- **Predicted level of effect of minor (2).**
- **An uncertainty of low (2).**
- **Predicted level of impact of low (4).**

11 Environmental Performance Outcomes

Environmental Performance Outcomes (EPOs) are measurable and activity-specific outcomes that describe the environmental performance the titleholder must achieve to ensure impacts and risks are managed to acceptable levels. EPOs are critical to the structure of an Environment Plan because they form the clear link between the defined acceptable level of impact and the predicted level of environmental consequence. Each EPO must be measurable, achievable, and within the control of the titleholder to implement, providing a transparent and enforceable statement against which performance can be assessed.

Table E9-3 - Environmental Performance Outcomes and Justifications

Defined Acceptable Level (From Table E6-1)	Environmental Performance Outcome	Rationale
Sound exposure to marine turtles must be below a permanent threshold shift at thresholds in exceedance of 232 dB PK.	**No death or injury to fauna, including listed threatened or migratory species, from the activity.**	This EPO can be demonstrated through pre-activity acoustic modelling, exclusion zone design, and shutdown protocols when turtles are observed in zones where threshold exceedance is predicted.
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	**Social, cultural, and economic features are protected, sustaining their value for people and communities.**	This EPO ensures that the activity is managed in a way that prevents unacceptable impacts to social, cultural, and economic values associated with marine mammals.
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		
Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	**The activity is conducted such that environmental impacts and risks remain within the range assessed as medium or lower, with mitigation measures in place and functioning as intended.**	This EPO enables ongoing assessment of effectiveness through internal reviews and operational audits. It provides a clear link between the risk assessment process and implementation strategy, supporting regulatory compliance and continuous improvement without requiring environmental outcome monitoring.

12 Recommendations

As demonstrated in this assessment the predicted level of impact level is low, thus, good industry practice (including legislation and standards) has been applied and these impacts are of an acceptable level without further recommendations being required.

13 Document Control

Date	Revision	Update
12 July 2023	A	Draft prepared for initial comment
23 August 2023	B	Update based on comments and relevant person feedback
12 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
29 May 2024	2	Updated following public comment and rerun of the PMST search.
24 October 2024	3	Updated following NOPSEMA assessment.
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
5 December 2025	5	Updated following NOPSEMA OMR 2 Letter

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table E6-4 shows how this feedback has been incorporated into the environmental assessments.

Table E6-4 - Public comment input.

Matter	Matter ID	Changes made arising from public comment
Matter: Flawed argument regarding animals moving away	I04	CGG has considered these claims and has updated the EP Impact Assessments (Appendices E, and F where relevant) to clarify that, while some displacement is expected from mobile taxa during the Regia MSS, the survey will not preclude animals from the Operational Area in its entirety. Instead, animals are expected to temporarily move away from the active acoustic source, but once the source passes, animals will be free to move back into the habitat that they departed from.
Matter: Effectiveness of mitigation measures	E08	EP Appendices D2 and E5 have been updated to include existing mitigation and management measures that will reduce the likelihood of injury associated with vessel collision and underwater sound including the EPBC Act Policy Statement 2.1 - Interaction between offshore seismic activities and whales (Soft-start Procedure), which provides for marine turtles to move away from the activity before the airguns reach full power.
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and the following Activity limitation: the sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the safety criterion human health safety criterion for recreational divers, surfers and swimmers along the coastline. CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F3, and G2).
Matter: Geographic range and all species need to be defined and considered	I16	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table E6-5. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table E6-5 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4030	CGG's email on September 14 indicated that the project's timing has changed to two separate 3-month windows: April-June and September-November. AMCS is concerned that the December sound speed profile may not accurately reflect the physical conditions during these new survey periods. Since acoustic propagation modelling is critical for subsequent analyses and for setting thresholds for mitigation measures required for NOPSEMA approval, AMCS requests an explanation of how the December sound speed profile differs from those in April-June and September-November.	We acknowledge this concern and agree that acoustic propagation modelling is the foundation of subsequent analysis. We will complete another modelling report prior to submission to cover the changed timeframes of the proposed survey.	3384
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4357	The stakeholder raised an objection to seismic surveys as they negatively affect the fishing industry, local economy and environment.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of commercial fish species and sensitive species within the area of operation. The MSS will also not impact the local economy. Mitigation plans are	424

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		in place to reduce any impacts to as low as practicable.	
4033	Claim that seismic testing is proven to damage and kill marine life.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1024
4050	Concern about the destruction of smaller sea life and the wounding of larger marine animals due to seismic blasting.	Regia EP has conducted thorough assessments of the literature for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	1669
4051	Concern about the detrimental impacts on marine animals.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1452
4053	Concern about the impact on marine creatures due to noise pollution from seismic surveys.	The titleholder acknowledged the feedback, noting that potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals, are assessed in the Environmental Plan (EP) and can be found in E2, E3, E4, E5, E6, and E7. Measures to minimise adverse impacts on biological receptors are outlined in the EP also and can be found in G2.	3237
4064	Concern raised by the stakeholder regarding the potential damage/kill of marine life due to seismic testing.	Titleholder responded to individual advising that CGG would not propose an activity that would lead to unacceptable impacts to marine life and advised that environmental impact assessments for each aspect of the proposed activity that has the potential to impact marine life were currently being prepared and that they would be based on scientific literature and published shortly for consultation and feedback.	1024

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration by other companies, particularly regarding the sale of seismic data.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	879
4068	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4073	Concerns about impacts both reputational and physical to the region if the activity is allowed.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1244
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4076	Concerns about potential disturbance to the marine environment, including marine parks and areas of Biological Importance.	The titleholder acknowledged this concern and noted that potential impacts to the marine environment including marine parks and biologically important areas as a result of the Regia MSS is assessed in E1 to E9 and F3 of the EP. There will be no activities with Australian Marine Parks. All areas of biologic importance have been identified and assessment in the respective impact and risk assessments.	2278
4077	Concerns about potential harm to zooplankton, whales, dolphins, sharks, seals, the Bonney	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate	722

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	Upwelling, rock lobster fishery and other local fishing industries.	mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	
4078	Concerns about seismic testing and drilling rigs impacting marine life and fishing activities.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	917
4080	Concerns about the impact of seismic testing on various marine species.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	2179
4081	Concerns about the impact on whale habitat, endangered marine life, and commercial fisheries	Titleholder acknowledged this concern and noted that potential impacts to whales and relevant endangered marine species is assessed in the EP Chapters on underwater sound and light (E2-E7, and E9). Any interactions with seismic are mitigated and managed through spatial boundaries and a comprehensive fauna management plan. Advised that control measures to reduce impacts to commercial fishers as a result of displacement are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	4551
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825
4088	Condemns seismic testing, asserting that it is deadly to marine life and unacceptable for ocean ecosystems. Call for a total ban, citing the large number of marine animals harmed by the practice. Argument that the destruction of marine ecosystems and the fishing industry is unjustifiable and express frustration, telling the parties responsible to stop.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-	422

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4093	Doubted the effectiveness of mitigation measures and believed the reports/information provided were absent of action /intention.	The mitigations applied by CGG are industry standard and comply with government policy. They have been proven to be as effective as reasonably practical for a number of years. The measures adopted to protect species from the aspects of the activity are found in the respective impact and risk assessments.	2830
4096	Environmental Risk: Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artificial light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	2766
4118	Impact on marine animals, which are the livelihood of the community.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4123	Insufficient information about potential damage from seismic testing.	The titleholder is confident that sufficient relevant and available information has been used to inform this this EP and to complete a comprehensive assessment of relevant aspects of the activity. Information used	4190

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		based around sound, peer reviewed scientific literature.	
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808
4133	Mass destruction of marine populations through the blasting process.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4136	Mention of considerable damage to marine life outweighing the benefits of mapping seafloors for gas drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1389
4145	Opposes seismic exploration claiming it is dangerous to all marine life. Cannot ensure zero risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	427
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high decibel blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making them unacceptable in a whale sanctuary area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a	537

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		comprehensive fauna management plan	
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4155	Raised concerns about sound levels from the survey and associated effects on marine mammals and other species.	Acknowledged concerns and outlined the predicted effects of sound levels of different species of marine mammals including difference between high and low frequency cetaceans, sound propagation and modelling, and different effect level thresholds. Also outlined the whale management and mitigation measures in place for Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection technology trails, and citizen science program access. Also outlined the effects on zooplankton and the case for acceptability of these	3697
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4173	Seismic blasting has adverse effects on the marine environment, with critical gaps in understanding the effects on individual species and the marine environment as a whole.	The titleholder responded with an explanation of the information sources used to inform the Regia MSS impact and risk assessments, and explained how these information sources and resulting measures are specific to the potential impact. The titleholder also made reference to documents relevant to this claim within the environment plan (Event ID 4092).	4091
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	2074

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4179	Seismic sounds have far-reaching effects on the marine environment, causing damage and suffering to species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3237
4180	Seismic testing and gas exploration/drilling pose undeniable risks to marine fauna, flora, ecosystems, local fishing, and tourism industries.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2118
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2963
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-	1653

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1659
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels.	1662

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1665
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4198	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1672
4199	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2586
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review	2886

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	signs of bleeding from their middle ears. - LINK provided.	and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments is covered below in response to concern 6.	
4202	Stakeholder objects to the proposed blasting activity due to its detrimental effects on marine ecosystems.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049
4217	Strong objection to the proposal for 3D seismic blast in the Otway Basin due to harm to oceans and unacceptable environmental impact or risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4218	Strong opposition to seismic testing in the ocean due to its effects on both wildlife and the fishing industry. Individual firmly disapproves of the practice.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-	425

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4232	The feedback expresses frustration over repeated seismic blasts in the same area, emphasising the significant environmental impacts associated with these activities. It calls for accountability from NOPSEMA to prevent future occurrences, highlighting the ongoing threat to the environment.	The Regia MSS is targeting areas that have not been surveyed before though we acknowledge there may be some overlap with previous surveys. We have to show that the environmental impacts are short-term, localised, or recoverable and that they are controllable with appropriate measures in place.	2104
4253	The possible effects to marine life and ecosystems are my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation	2256

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4260	The protection of wildlife in the Otway Basin is directly affected by drilling and seismic surveying.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1901
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064
4268	The stakeholder argues that it is impossible to ensure zero risk from seismic activities, emphasising that only zero risk is acceptable. This position reflects a strong concern regarding the potential negative impacts of seismic exploration on the marine environment.	The legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4270	The stakeholder asserts seismic surveying has been proven to be harmful and disruptive to marine life of many species.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine	3343

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	
4271	The stakeholder asserts that seismic blasts will have a direct negative impact on marine life, specifically mentioning that an "exclusion zone" will not effectively prevent the effects of the blasts from travelling through the ocean.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable. The titleholder is aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how to protect and preserve the values of this site.	2108
4272	The stakeholder asserts that the survey will have a harmful effect on millions of sea creatures.	It would be unacceptable to have long-term or permanent/unrecoverable impacts, fortunately, impacts from marine seismic surveys are short-term, temporary, and recoverable. (Event ID: 3419)	3343
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publicly responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4278	The stakeholder expresses an active interest in the wellbeing of the coastline and its flora and fauna, indicating a general concern for environmental conservation.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	1325

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4285	The stakeholder noted their concern as a resident of Port Fairy: noise (land and sea), impact on marine life, potential impacts on the environment and the future potential if gas is found.	We are also concerned about the welfare of marine fauna. We have undertaken an impact assessment process that includes whale, seals, pelagic and shorebirds. As part of this assessment, we must show that impacts to these species will be of an acceptable level. We have determined that it is acceptable to have temporary behavioural changes, such as moving away from the survey vessel, and no injury or long-term impacts. Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We are also publishing environmental impact, risk and mitigation documents as they are completed, in the document library. We are publishing the entire documents in order to remain transparent, but I have also attached a summary document.	1747
4287	The stakeholder objected to the activities due to sound levels/acoustic trauma experienced by sea creatures	The scientific literature supports that marine fauna may potentially be displaced due to a seismic survey but that these impacts are typically short term with no impact to ecosystem function. Large scale studies undertaken in Australia that you may be interested in are: Australian Institute of Marine Science. North West Shoals to Shore Marine Noise Monitoring and Impacts https://www.aims.gov.au/research-topics/monitoring-and-discovery/north-west-shoals-shore Behavioural Response of Australian Humpback whales to Seismic Surveys https://www.brahss.org.au/ Assessing the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries https://www.frdc.com.au/project/2012-008 Marine Seismic Survey Impacts on Fish and Invertebrates: Final Report for Gippsland Marine Environmental Monitoring Study https://ecat.ga.gov.au/geonetwork/srv/api/records/2292f4a7-ba2e-3533-e053-12a3070aaf2c Maxima 3D Marine Seismic Survey at Scott Reef https://www.sciencedirect.com/science/article/abs/pii/S0025326X13006528 https://www.sciencedirect.com/science/article/abs/pii/S0025326X18300687 Regarding Marine Fauna Observer's (MFOs), companies that contract MFOs such as Blue Planet Marine	2389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		and RPS Group provide training for MFOs. As part of contracting MFOs we will ensure that the persons provided meet the requirement of the Australian Government EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales, that requires MFOs to be trained and experienced in whale identification and behaviour, distance estimation, and be capable of making accurate identifications and observations of whales in Australian waters. The Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, details the competency requirements for MFOs and ongoing awareness (page 23 and 24). The Regia MSS Implementation Strategy is available on the Regia MSS Website Document Library see https://klarite.mysocialpinpoint.com.au/regiamss/document-library As detailed in the Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, CGG will only use appropriately experienced MFOs as determined by a review of their CVs (page 23). The Regia MSS Implementation Strategy also details how CGG will monitor the performance of the control measures during the activity (page 25). For example: Audits and Inspections Post acceptance of the EP, conformance will be monitored on an at least quarterly basis by the Client Site Representative, or delegate, via audits and inspections, as well as through the commitments under the Management of Risk, Management of Change, and Management of Knowledge parts of this Implementation Strategy. During the activity, conformance will be monitored on an at least fortnightly basis by the Client Site Representative, or delegate, via audits and inspections during the activity. Conformance auditing or inspection while the EP is in-force will be based on the Conformance Register and will target the following: • Conformance with regulatory requirements detailed in the accepted EP. • Management strategies and procedures to ensure EPOs and EPSs are being implemented, monitored, measured, and evaluated. • Emissions and discharges are being monitored, measured, and	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		documented As stated in the previous email, matters of national energy policy are not within the purview of CGG or the Regia MSS. We will however register claims related to the ongoing need for gas and provide those to NOPSEMA. Please find attached a brochure from NOPSEMA that describes this and may be of use to you.	
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747
4306	The stakeholder was concerned about potential negative impacts of gas exploration and development on Country, the marine and coastal environment, the local economy, Traditional Owners, and local communities.	The titleholder acknowledged the feedback, noting that all relevant impacts are assessed in the Environmental Plan (EP) and can be found in E1-E9. Measures to minimise adverse impacts on functions, interests and activities on relevant receptors are also adopted and can be found in G1.	3152
4309	The stakeholder was concerned about the impact on marine life sensibilities and populations.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2273

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4315	The statement suggests that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4323	There will be potential permanent damage to marine life due to sonic testing and drilling.	Titleholder responded and listed various information needs related to the activity, environmental assessment process, environmental aspects, predicted levels of environmental impact and risk, environmental management, consultation processes, and regulations or regulatory processes. Links to the project website and document library was provided.	1046
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and	1410

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		measures currently in place. The stakeholder was provided with consultation information and invited to engage.	
4365	Concerns about the lack of definitive clarification on how seismic testing affects the marine environment and the clash between economic interests and environmental risks.	The titleholder acknowledged the feedback, noting that they have undertaken a thorough analysis and assessment of all relevant literature to inform the impact assessments conducted to assess potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals in the Environmental Plan (EP). These findings can be found in E2, E3, E4, E5, E6, and E7 under Section 8: Predicted Levels of Impact. Additional assessments of key receptors were also completed to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level (F3). Titleholder also conducted an assessment to investigate potential impacts to other marine users from physical presence resulting from the activity (E1).	2383
4417	The relevant person was concerned that about the proposed seismic activity effecting the behaviours of certain species.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act.	6880

Annex 3

Underwater Acoustic Sensitive Species

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Green Turtle	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed	NA	Recovery Plan for Marine Turtles (DoEE 2017)
Leatherback Turtle, Leathery Turtle, Luth	Species or species habitat likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed	NA	Recovery Plan for Marine Turtles (DoEE 2017) Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle*)* (DEWHA 2008)
Loggerhead Turtle	Species or species habitat likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed	NA	Recovery Plan for Marine Turtles (DoEE 2017)

REGIA
Marine Seismic Survey

Impact Assessment
Underwater Sound: Marine Mammals

Appendix E7: REG-EP-026-E7

Rev 5

December 2025

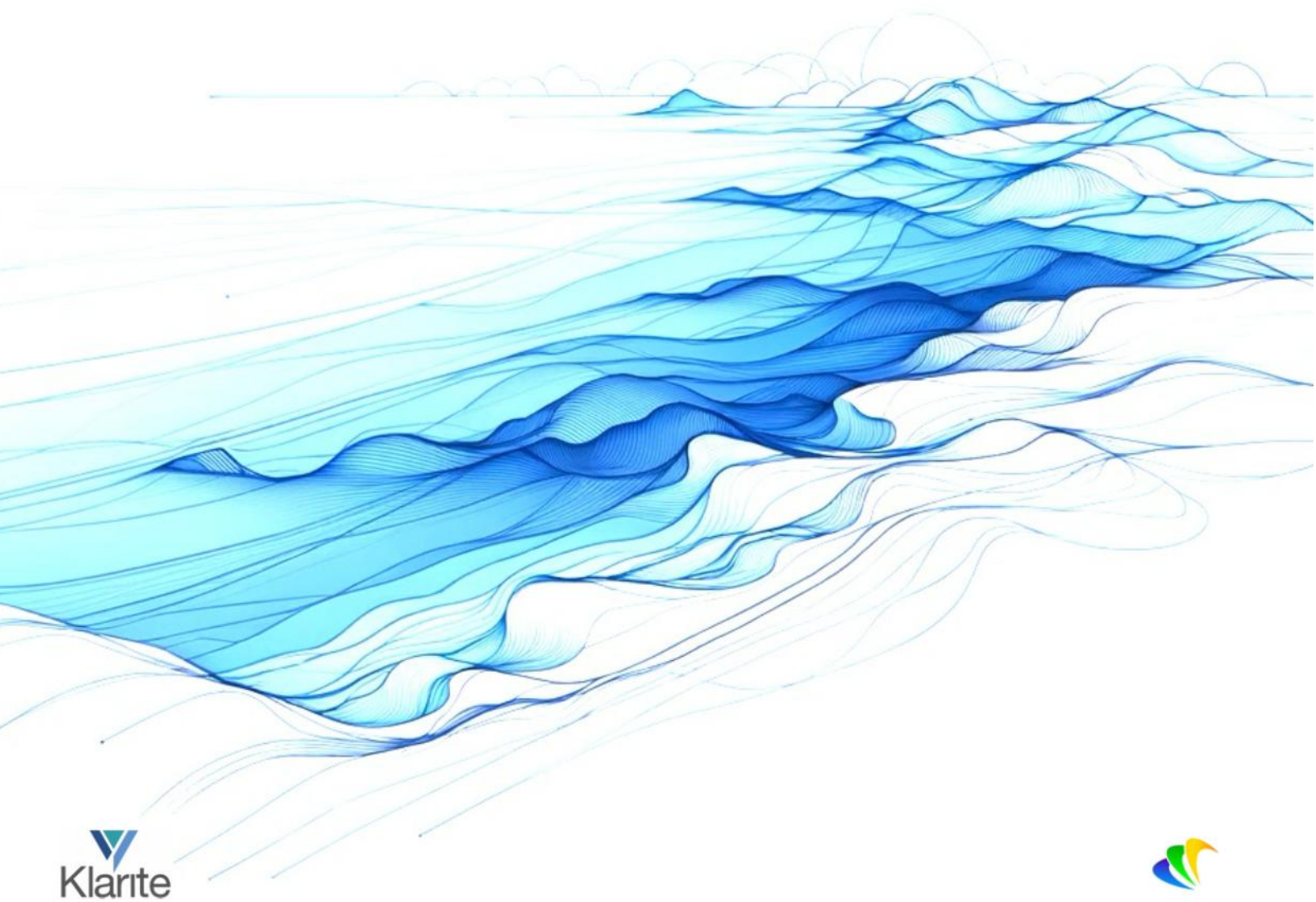

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Table of Contents

1 Introduction 4
1.1 Purpose and Scope 4
1.2 Consultation in Preparation of the EP 4
1.3 Modifications Arising from Further Assessment 4
2 Aspect – Underwater Sound 6
2.1 How the Aspect Occurs 6
2.2 Extent and Duration of the Aspect 6
3 Cause-Effect Pathway 7
4 Description of the Existing Environment that may be Affected by the Activity 8
4.1 Very High Frequency (VHF) Cetaceans 8
4.2 High Frequency (HF) Cetaceans 8
4.3 Low Frequency (LF) Cetaceans 9
4.3.1 Sei Whale 9
4.3.2 Humpback Whale 9
4.3.3 Fin Whale 10
4.3.4 Pygmy Right Whale 10
4.3.5 Blue Whale 11
4.3.6 Southern Right Whale 12
4.4 Otariid Pinnipeds 14
4.4.1 Australian Sea Lion 14
4.4.2 Australian Fur Seal 15
4.4.3 Long-nosed Fur Seal 15
4.4.4 Southern Elephant Seal 16
4.5 People and Communities 16
4.5.1 Social and economic features 16
4.5.2 Cultural features 16
5 Relevant Legislative Requirements 17
6 Defining Acceptable Levels of Impact 18
7 Consultation Input 24
8 Minimisation of Impacts Through Activity Design 25
8.1 Elimination 25
8.2 Substitution 26
9 Predicted Levels of Impact 28

9.1 Change in fauna behaviour and hearing capacity 31
9.1.1 Very-high-frequency Cetaceans 31
9.1.2 High-frequency Cetaceans 32
9.1.3 Low-frequency Cetaceans 32
9.1.4 Otariid Pinnipeds 37
9.2 Change in physical condition 38
9.2.1 Cetacean Mass Strandings 38
9.3 Measures Adopted to Manage Environmental Impacts 38
9.3.1 Additional Fauna Detection Methods 43
9.3.2 Fauna Management Plan 43
9.3.3 Acoustic Detection 43
9.3.4 Aerial Surveillance 44
9.3.5 Adaptive Approach to Monitoring 44
10 Demonstration Impacts will be of an Acceptable Level 46
10.1 Discussion on Principles of ESD, Biological and Ecological Categories 46
10.2 Economic, cultural and social categories 48
10.3 Consistency with company processes 48
11 Environmental Performance Outcomes 49
12 Recommendations 53
13 Document Control 54
14 References 55
Annex 1 61
Public Comment 61
Annex 2 63
Objections and Claims Raised from Consultation 63
Annex 3 108
Underwater Acoustic Sensitive Species 108
Annex 4 113
Summary of Blue Whale Monitoring Data for Otway Regions 113
Aerial Surveys (2001-02 to 2006-07) 113
Tagging Study (2015-2016) 117
Passive Acoustic Recorders (2009-2017) 117
Beach Energy Surveys 2021 119
References 119

1 Introduction

Underwater Sound was identified through the Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4) as an aspect needing further assessment. Hence this document presents a detailed examination of **Underwater Sound**, as will typically be produced during the proposed Regia Marine Seismic Survey (**Regia MSS**), and its interaction with the environmental receptor we are collectively calling **Marine Mammals.**

This assessment is based on information from the following studies which should be read in the order listed:

1. PEIRA.
2. Sound Emissions Modelling Reports (Appendix B7)
3. Seismic Sound Studies Report (Appendix B8)

1.1 Purpose and Scope

This document contains the second stage of the environmental assessment and ranks the impacts according to the criteria set out in the Environmental Assessment Process found in Appendix B3.

Its purpose is to demonstrate that impacts can be managed to an acceptable level through the adoption of mitigation measures and the setting of appropriate environmental performance outcomes.

The measures adopted will be carried through to the ALARP assessment in stage three of the process.

1.2 Consultation in Preparation of the EP

This document was first published in draft form and uploaded to the Document Library of the Regia MSS Consultation Hub on 11 September 2023. This was done to acknowledge that the full Environment Plan (EP) is a large document that is difficult for readers to digest within a 30-day public comment period. As such, the public and relevant persons were invited to comment on the document with an explicit request for feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

Up to 22 December 2023, there were no specific comments received on the content of the document.

1.3 Modifications Arising from Further Assessment

To ensure this assessment remains contemporary, accurate, and reflects feedback from the regulator and relevant persons, it will be updated from time-to-time. In particular, the CGG environmental assessment process requires consideration of whether further assessment was needed to verify, or dive deeper into a topic, to further improve the predictive quality of the assessment. When this has

occurred, reference to such changes will be communicated in the Recommendation section and identified at relevant points in the assessment.

2 Aspect – Underwater Sound

2.1 How the Aspect Occurs

Impulsive underwater acoustic emissions result from the seismic sound source releasing compressed air (seismic pulse) which generates a sound wave directed into the seabed. Underwater impulsive acoustic emissions also occur from Ultra-Short Baseline Positioning Beacons within the streamer spread.

Continuous underwater acoustic emissions are generated by the survey and support vessels through thrusters, engines, and propellers. Helicopters will also generate underwater sound via the engine and rotors.

2.2 Extent and Duration of the Aspect

Impulsive Sound

Duration: 60 days (within a 90-day completion window)

Extent: Active Source Area and area of sound propagation with which relevant sound effect criteria for marine mammals are exceeded as detailed in the impact assessment sections.

Seismic acquisition where the sound source will be active will occur for up to 60 days within the Active Source area.

Continuous Sound

Duration: 90 days

Extent: Operational Area

The survey and support vessels will be active in the Operational Area for the duration of the survey undertaking support activities and acquisition. Helicopters will be active within the Operational Area for short periods of time on arrival and departure from the seismic vessel helipad.

3 Cause-Effect Pathway

The PEIRA (Appendix B4) identified a cause-effect pathway for underwater sound for the following environmental components and their social, cultural, and economic features:

- Marine mammals including whales, dolphins, seals, and sea lions.
- People and communities.

Potential environmental impacts to marine mammals identified from the PEIRA include:

- Change in fauna behaviour.
- Change in hearing capacity.
- Change in physical condition.

Change in physical condition relates to the potential for mass strandings. It does not relate to the potential for mortal injury, or mortality in whales because of increased sound exposures. There has not been any recorded mortality of a marine mammal because of an interaction with impulsive sound. Further, as detailed later in this assessment, received sound levels of sufficient magnitude to cause a permanent threshold shift do occur within <400 m of the sound source, and the legislative requirements in Australia require shutdown of the sound source for observations at 500 m. Therefore, there is no cause-effect pathway for marine mammals to suffer mortality or potential mortal injury from sound exposures used for the Regia MSS.

4 Description of the Existing Environment that may be Affected by the Activity

For a description of the baseline soundscape in the region relevant to the Regia MSS, refer to Section 1.1 of Appendix B8.

Marine mammals include whales, dolphins, and pinniped species (fur-seals and sea lions). To identify marine mammals that may be present within the area affected by underwater sound, a PMST search was undertaken using the Active Source Area with a 44 km buffer based on the furthest distance to a sound effect criterion of 43.5 km, as per acoustic modelling results most-relevant at the time of searching. This distance was reduced in the secondary modelling report to 41.96 km because of changes to the sail line layout. Nevertheless, PMST searches were run with a 44 km buffer zone as a precaution. The largest predicted impact distances produced from the most up-to-date acoustic modelling report remain smaller than this buffer, so the associated PMST searches and reports remain relevant and conservative.

PMST searches were run again prior to resubmission in May 2024 and February 2025 to ensure any changes to species or listings were identified to control for passage of time. The February 2025 search report identified that the distribution BIA for the Pygmy Blue Whale has been removed from the search area. There are no other changes to protected matters information for species that may be impacted by underwater sound [Section added in response to Matters: I16 and I17].

Annex 3 in this document provides a summary of the PMST Report and identifies any relevant conservation advice and management plans.

Marine mammal species identified as may be affected by underwater sound have been grouped based on hearing sensitivities as follows.

- Very High Frequency (VHF) Cetaceans – Porpoises, Dwarf and Pygmy Sperm Whales
- High Frequency (HF) Cetaceans – Dolphins, Beaked Whales, Sperm Whales
- Low-frequency (LF) cetaceans – Baleen Whales
- Otariid Pinnipeds – Sea Lion, Fur Seals

Based on their endangered status, Southern Right Whales and Blue Whales are described separately from other low frequency cetaceans.

4.1 Very High Frequency (VHF) Cetaceans

The PMST Report (available in Appendix B5) identified that Pygmy Sperm Whales and Dwarf Sperm Whales as may occur in the area. No very high frequency species were identified that are listed as threatened or have biologically important behaviour.

4.2 High Frequency (HF) Cetaceans

The PMST Report (available in Appendix B5) identified:

- Six dolphin species that are likely to or may occur in the area,
- Eight beaked whale species that may occur in the area, and
- Five toothed whale species that are likely to or may occur in the area.

No high frequency species were identified that are listed as threatened or have biologically important behaviours.

4.3 Low Frequency (LF) Cetaceans

The PMST Report (available in Appendix B5) identified the following low frequency cetaceans:

- Fin and Sei whales are known to occur within the area and may be undertaking foraging or feeding-related behaviour.
- Pygmy Right Whales are likely to occur within the area and may be undertaking foraging or feeding-related behaviour.
- Pygmy Blue Whales occur in the area and a foraging (annual high use area) BIA and known foraging area BIA overlap with the Operational Area and sound propagation area.
- Southern Right Whales occur in the area and a migration BIA overlaps with the Operational Area and sound propagation area.
- Humpback Whales occur in the area.
- Minke Whales may occur in the area.
- Antarctic Minke Whales are likely to occur in the area.

More information is provided below on species undertaking biologically important behaviour, and species that are known to occur in the area affected by underwater sound.

4.3.1 Sei Whale

The Sei Whale (*Balaenoptera borealis*) is listed as vulnerable and migratory under the EPBC Act. Sei Whales are considered a cosmopolitan species, ranging from polar to tropical waters, but tend to be found more offshore than other species of large whales. Sei Whales move between Australian waters and Antarctic feeding areas; subantarctic feeding areas (e.g. Subtropical Front); and tropical and subtropical breeding areas. The proportion of the global population in Australian waters is unknown as there are no estimates for Sei whales in Australian waters.

In Australia, Sei Whales occur within Australian Antarctic Territory waters and Commonwealth waters, and have been infrequently recorded off Tasmania, NSW, Queensland, the Great Australian Bight, Northern Territory and Western Australia (Parker 1978; Bannister et al. 1996; Thiele et al. 2000; Chatto and Warneke 2000; Bannister 2008).

Sightings of Sei Whales within Australian waters includes areas such as the Bonney coast upwelling off South Australia (Miller et al. 2012), where opportunistic feeding has been observed between November and May (Gill et al. 2015).

There are no BIAs for the Sei Whale within Australian waters. However, Sei Whales are considered likely to be foraging in the area that may be affected by underwater sound at a similar time as Blue Whales, i.e. predominately between January and April.

4.3.2 Humpback Whale

The Humpback Whale (*Megaptera novaeangliae*) is listed as migratory under the EPBC Act. It is distributed in all oceans and due to its recovery from whaling has been removed as a threatened species under the EPBC Act (DAWE 2022a).

Humpback Whales are present around the Australian coast in winter and spring. Humpbacks undertake an annual migration between the summer feeding grounds in Antarctica and winter breeding and calving grounds in northern tropical waters. Along the southeast coast of Australia, the northern migration starts in April and May while the southern migration peaks around November and December (DCCEEW 2023).

A discrete population of Humpback Whales has been observed to migrate along the west coast of Tasmania and through Bass Strait, and these animals may pass through the area that may be affected by underwater sound. The exact timing of the migration period varies between years in accordance with variations in water temperature, extent of sea ice, abundance of prey, and location of feeding grounds (DCCEEW 2023). Feeding occurs where there is a high krill density, and during the migration this primarily occurs in Southern Ocean waters south of 55°S (DCCEEW 2023).

Humpback Whales satellite-tagged off Australia's east coast were tracked during three austral summers in 2008/2009, 2009/2010 and 2010/2011 (Andrews-Goff et al. 2018). Of the thirty tagged humpbacks, 21 migrated south along the coastline across into Bass Strait during October. In November the whales then migrated along the east coast (12 whales) and west coast (1 whale) of Tasmania to Antarctic feeding grounds. The state space model used shows both search and transit behaviour revealing new temperate feeding grounds in Bass Strait, the east coast of Tasmania and in the eastern Tasman Sea.

There is no known feeding, resting or calving grounds for Humpback Whales in the area that may be affected by underwater, although feeding may occur opportunistically where sufficient krill density is present (CoA 2015).

4.3.3 Fin Whale

The Fin Whale (*Balaenoptera physalus*) is listed as vulnerable and migratory under the EPBC Act.

The Fin Whale is a cosmopolitan migratory species that occurs from polar to tropical waters but is rarely sighted in inshore waters. Fin Whales show well defined migratory movements between polar, temperate and tropical waters which are essentially north–south with little longitudinal dispersion.

While Australian Antarctic waters are important feeding grounds for Fin Whales, the species also feeds in the Bonney Upwelling during summer/autumn sometimes in the company of Blue and Sei Whales (DCCEEW 2023b). Areas of upwelling and interfaces with mixed and stratified waters may be an important feature of Fin Whale feeding habitat with the species feeding on planktonic crustacea, krill, some fish and cephalopods (DCCEEW 2023b). Fin Whales frequently lunge or skim feed at or near the surface and they are known to dive to 230 m to feed.

There are no BIAs for the Fin Whale within Australian waters. Fin Whales are likely to be foraging in the area that may be affected by underwater sound at similar time as Blue Whales, i.e. predominately between January and April.

4.3.4 Pygmy Right Whale

The Pygmy Right Whale (*Caperea marginata*) is a little-studied baleen whale that is found in temperate and sub-Antarctic waters in oceanic and inshore locations. The species, which has never been hunted commercially, is thought to have a circumpolar distribution in the Southern Hemisphere between about 30°S and 55°S. Distribution appears limited by surface water temperature as they are almost always found in waters with temperatures ranging from 5° to 20°C (Baker 1985) and staying north of the Antarctic Convergence. There are few confirmed sightings of Pygmy Right Whales at sea (Reilly et al. 2008). The largest reported group was sighted (100+) just south-west of Portland in June 2007 (Gill et al. 2008).

Species distribution in Australia is found close to coastal upwellings and further offshore it appears that the Subtropical Convergence may be important for regulating distribution (Bannister et al. 1996). Key locations include south-east Tasmania, Kangaroo Island (SA) and southern Eyre Peninsula (SA) close to upwelling habitats rich in marine life and zooplankton upon which it feeds (Bannister et al. 1996).

There are no BIAs for the Pygmy Right Whale within Australian waters, but they are likely to be foraging in the area that may be affected by underwater sound at similar time as Blue Whales, i.e. predominately between January and April.

4.3.5 Blue Whale

The PMST Report (available in Appendix B5) identified Blue Whale foraging, feeding or related behaviour known to occur within the area.

The Blue Whale (*Balaenoptera musculus*) is listed as an endangered and migratory species under the EPBC Act. There are two subspecies of blue whales that use Australian waters (including Australian Antarctic waters), the Pygmy Blue Whale (*B. m. brevicauda*) and the Antarctic Blue Whale (*B. m. intermedia*). The Otway region is an important migratory and foraging area for Blue Whales, as shown by passive acoustic monitoring and aerial surveys (Gavrilov 2012, McCauley et al. 2018, Gill et al. 2011). Underwater acoustic monitoring programs have detected Antarctic and Pygmy Blue Whale calls in the Otway Region (McCauley et al. 2018).

Annex 4 in this document provides a summary of aerial and acoustic monitoring studies focused on Blue Whales in the Otway area.

The Blue Whale was extremely abundant until the early 20th century when they were hunted to near extinction. Approximately 341,830 Blue Whale takes were recorded by commercial whaling in the Antarctic and sub-Antarctic in the 20th century, of which 12,618 were identified as Pygmy Blue Whales (Branch et al. 2004). Recent research on historical whaling has noted blue whales were caught in the Otway region (Branch et al. 2023). The current global population of Blue Whales is uncertain but is plausibly in the range of 10,000 to 25,000, corresponding to about 3-11% of the 1911 estimated population size (Reilly et al. 2008).

Important foraging grounds for Blue Whales include the Great Australian Bight, South Australia, and off Portland Victoria (Figure E7-1). Research to date has found that Pygmy Blue Whales occupy the western area of the Bonney Upwelling system in the Eastern Great Australian Bight and adjacent to the Kangaroo Island canyons from November and December (DoE 2015c). Pygmy Blue Whales then move south-east to the Bonney Upwelling system off eastern South Australia and Victoria (e.g., between Robe, SA and Cape Otway, Vic). This occurs predominately between January to April (DoE 2015c). Recent research has used blue whale satellite data to predict suitable habitats for foraging and migration pygmy blue whales. The study predicted the shelf break and slope and the shelf off the Bonney coast as key habitats for pygmy blue whales during foraging and migration in southern and western Australia. The study validated suitable foraging habitat occurred on both the slope and on the shelf in this area. This information is generally consistent with existing knowledge on foraging BIAs and peak visitations in the region (Ferreira et al. 2024).

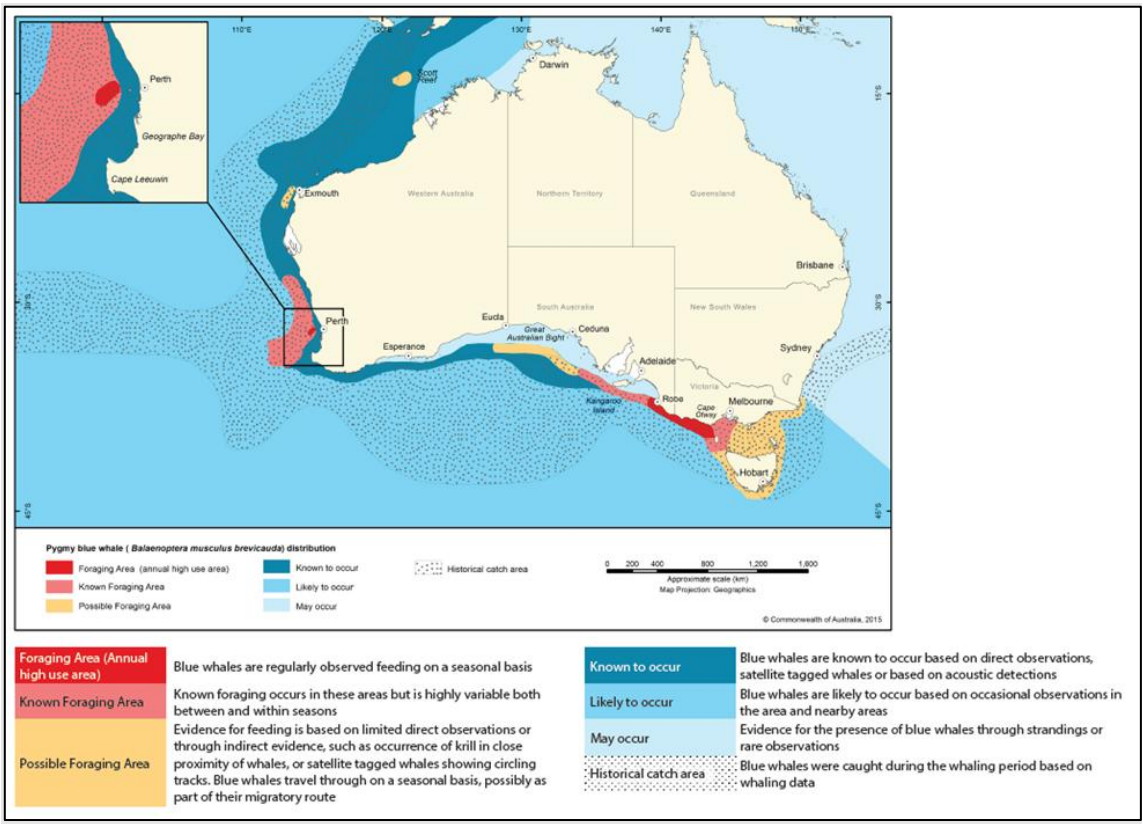

Figure E7-1 - Pygmy Blue Whale Areas around Australia (DoE 2015c).

The time and location of the appearance of Blue Whales in the east generally coincides with the upwelling of cold water in summer and autumn along this coast (the Bonney Upwelling) and the associated aggregations of krill that they feed on (Gill and Morrice 2003). The Bonney Upwelling generally starts in the eastern part of the Great Australian Bight in November or December and spreads eastwards to the Otway Basin around February as southward migration of the subtropical high-pressure cell creates upwelling favourable winds. Sighting data indicates that blue whales are seasonally distributed (Gill et al. 2011; McCauley et al. 2018).

The area that may be affected by underwater sound is within the Pygmy Blue Whale foraging (annual high use) BIA (Appendix B12 MAP-REG-EPM-068). Blue whales predominately occur in this area between January to April (DoE 2015c) though they have been recorded in the Otway area as early as September and as late as July.

4.3.6 Southern Right Whale

The PMST Report (available in Appendix B5) and the National Recovery Plan for the Southern Right Whale (DCCEEW 2024) identified Southern Right Whale breeding behaviours (i.e., mating, calving and nursing) typically occur within reproductive areas (reproduction BIAs which have been classified as habitat critical to the survival of the species) from May to September. Further, a spatially defined migration BIA has been identified with the migration period stated as approximately April to October, The PMST Report identified that Southern Right Whale breeding is known to occur within the area that may be affected by underwater sound, in addition the area where the sound effect criteria for SRW is reached overlaps the migration BIA and reproduction BIA (Appendix B12 MAP-REG-EPM-069).

The Southern Right Whale (*Eubalaena australis*) is listed as endangered and migratory under the EPBC Act. Southern Right Whales were depleted to less than 300 individuals globally due to

commercial whaling in the 19th and 20th centuries (Tormosov et al. 1998). They were protected from whaling in 1935 however, due to illegal whaling in the 1970s and because Southern Right Whales have a slow rate of increase (7% per annum) compared to other marine mammals, their numbers remain low (IWC 2013). Global abundance estimates are 13,000 for the species, across key wintering grounds in South Africa, Argentina, Australia, and New Zealand.

Southern Right Whales are distributed in the Southern Hemisphere with a circumpolar distribution between latitudes of 16°S and at least 65°S. They migrate from southern feeding grounds in sub-Antarctic waters to Australia between May and November to calve, mate and rest (Bannister et al. 1996; DCCEEW 2024). They are distributed across thirteen primary aggregation areas along the southern coast of Australia. In Australian coastal waters, they occur along the southern coastline of the mainland and Tasmania and generally extend as far north as Sydney on the east coast and Perth on the west coast (CoA 2012). There are occasional sightings further north, with the extremities of their range recorded at Hervey Bay and Exmouth (CoA 2012).

The peak period for Southern Right Whale mating is from mid-July through to August (CoA 2012). Pregnant females generally arrive during late May/early June and depart with calves in September to October however the general time of arrivals and departures varies on an inter-annual basis. Sightings of Southern Right Whales have been carried out by the Department of Energy, Environment and Climate Action (DECCA) at Warrnambool since 1985, revealing the majority of females arrive along western Victoria in May (54%) and June (42%). The majority of the last sightings occur in September (50%) and October (38%) (SWIFFT, 2025), although examination of the annual SRW monitoring reports on the SWIFFT website indicates whales were gone by Aug-Sept between 2020-2024. The earliest sighting was recorded at Portland on the 22nd of April (SWIIFT, 2025). Calving females are known to have high site fidelity and a 3 to 4-year calving interval. Other population classes stay for shorter and variable periods undertaking coastal movements and departing the coast earlier than female-calf pairs (CoA 2012). It has been found that females belonging to one subpopulation can relocate to a different calving area in a different region (Watson et al 2021). Counter-clockwise migration has been found to occur with whales from the south-western subpopulation arriving on the Australian coast from summer feeding grounds in sub-Antarctic waters. Movement tends to occur in a circular anti-clockwise direction into south-eastern Australia before traveling west to calving grounds in South Australia and Western Australia (Watson et al. 2021).

The National Recovery Plan for Southern Right Whale (2024) recognises two genetically distinct Australian stocks, the western and eastern populations. The western Australian subpopulation was estimated at 2,242 individuals (Smith et al., 2025). The eastern subpopulation is approximately 268 individuals with an overall increase of 4.7% per annum (Stamation et al., 2020).

The western population occurs in the coastal waters between Cape Leeuwin in Western Australia and Ceduna in South Australia and are particularly concentrated in three main regions of Albany east to Doubtful Island Bay (WA), Israelite Bay (WA) and Head of Bight (SA) (Charlton et al. 2022, Smith et al. 2023). The eastern population occurs to a lesser extent off Victoria, Tasmania, New South Wales and Queensland (Stamation et al. 2020). In Victoria, there is a regular aggregation area in waters off Warrnambool at Logans Beach (see Table E7-2) and increasing numbers of sightings along the Gippsland coast (east from Wilsons Promontory), and relatively regular sightings along the southeast coast of Tasmania (Stamation et al. 2020, Watson et al. 2021).

Photo identification collated between 1980 and 2021 revealed 96 calves were born at Logans Beach (Watson et al. 2021). Other important aggregation areas within the Southern Right Whale Reproductive BIA along Victoria include Portland, and Port Cambell/Peterborough. The mean calving interval for SRWs within the eastern population is estimated to be 3.5 years (Watson et al, 2021).

Recent studies have indicated SRW populations along the southwest coast of Australia are in decline with birth rates decreasing since 2016 (Smith et al. 2025, Grundlehner et al, 2025). Confounding this outcome is the recognition that SRW habitat occupancy has expanded in recent years with density increases at sites such as the Head of the Bight (HOB). It seems SRWs are recolonising historically

important areas such as Fowlers Bay (O'Shannessy et al. 2025). High density years at HOB usually correspond with high density years at Fowlers Bay, suggesting a possible redistribution of SRWs driven by crowding or saturation at the HOB (O'Shannessy et al. 2025) Very recent information from media postings has also suggested that the 2025 calving season at the HOB is one of the largest on record.

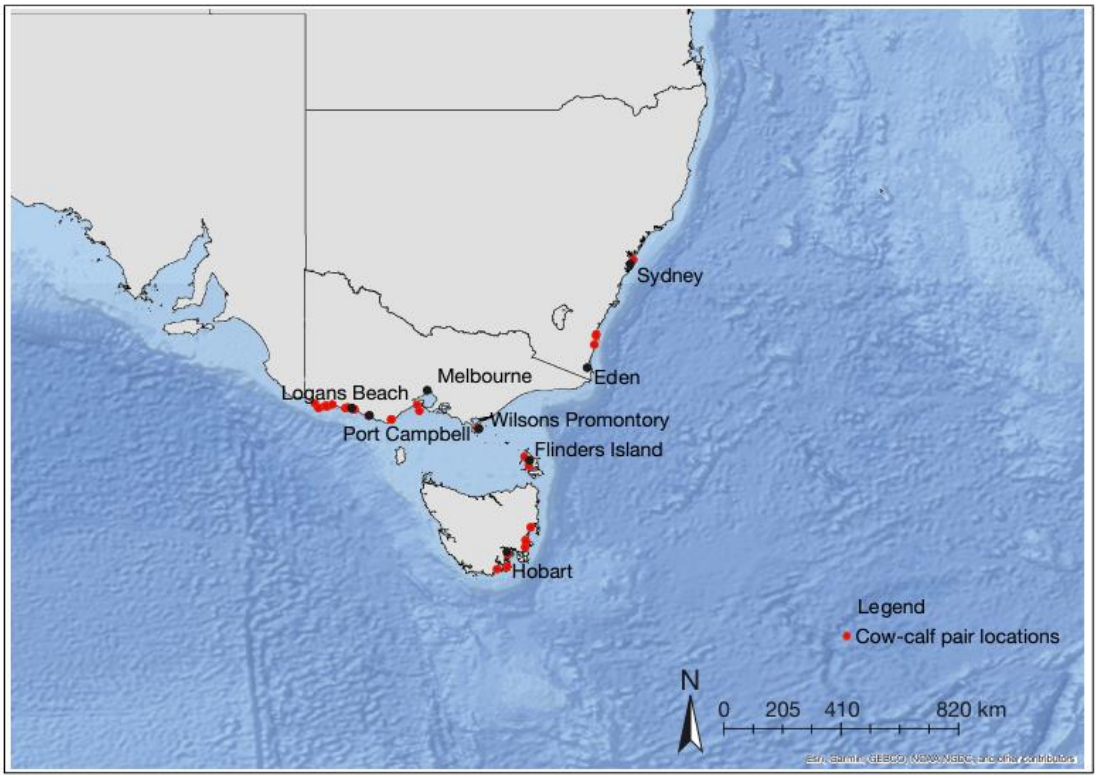

Figure E7-2: Sightings data collated by Stamation et al (2020) showing a higher concentration of Southern Right Whale calf cow pairs at Logans Beach.

4.4 Otariid Pinnipeds

The PMST Report (available in Appendix B5) identified that the Australian Sea Lion may occur in the area, Australian Fur Seal breeding is known to occur in the area, and the Long-nosed Fur Seal may occur in the area. The summer months represent an important period for otariid pinnipeds when lactating females may be alternating between feeding trips at sea and periods ashore to suckle their pups. [Section added in response to Matters M30 and M31].

4.4.1 Australian Sea Lion

The Australian Sea Lion (*Neophoca cinerea*) is listed as endangered under the EPBC Act.

The Australian Sea Lion is the only endemic pinniped, that breeds in Australia (DSEWPaC 2013). All current breeding populations are located between the Abrolhos Islands (Western Australia) and Pages Islands (South Australia). The Australian Sea Lion uses a variety of shoreline types but prefers the more sheltered side of islands and typically avoids rocky exposed coasts (Shaughnessy 1999).

The Australian Sea Lion is a specialised benthic forager, primarily feeding on the sea floor on the continental shelf, most commonly in depths of 20–100 m, with adult males foraging further and into deeper waters. They typically feed on a range of prey including fish, cephalopods (squid, cuttlefish

and octopus), sharks, rays, rock lobster and penguins (DSEWPC 2013). They typically forage up to 60 km from their colony but can travel up to 190 km when over shelf waters (Shaughnessy 1999).

4.4.2 Australian Fur Seal

The Australian Fur Seal (*Arctocephalus pusillus*) breeds on islands of the Bass Strait but ranges throughout waters off the coasts of South Australia, Tasmania, Victoria and NSW. Numbers of this species are believed to be increasing as the population recovers from historic hunting (Hofmeyr et al. 2008). The species is endemic to south-eastern Australian waters.

In Victorian waters they breed on offshore islands, including Lady Julia Percy Island (Deen Maar), Seal Rocks in Westernport Bay, Kanowna and Rag Islands off the coast of Wilson's Promontory and The Skerries off Wingan Inlet in Gippsland. The breeding sites on Lady Julia Percy Island and Seal Rocks are important, with 25% of the population occurring at each of these islands. In Tasmanian water they breed at Reid Rocks. Their preferred breeding habitat is a rocky island with boulder or pebble beaches and gradually sloping rocky ledges.

Haul out sites with occasional pup births are located at Cape Bridgewater, at Moonlight Head, on various small islands off Wilsons Promontory and Marengo Reef near Apollo Bay. Australian Fur Seals are present in the region all year, with breeding taking place during November and December.

Research being undertaken at Lady Julia Percy Island indicates that adult females feed extensively in the waters between Portland and Cape Otway, out to the 200 m bathymetric contour. Seal numbers on the island reach a maximum during the breeding season in late October to late December. By early December, large numbers of lactating females are leaving for short feeding trips at sea and in late December there is an exodus of adult males. Thereafter, lactating females continue to alternate between feeding trips at sea and periods ashore to suckle their pups. Even after pups begin to venture to sea, the island remains a focus, and at any time during the year groups may be seen ashore resting (Robinson et al. 2008, Hume et al. 2004, Arnould & Kirkwood 2007).

Lady Julia Percy Island is within the area that may be affected by underwater sound.

A study on the foraging behaviour of seals from the colony at Lady Julia Percy Island found that lactating Australian Fur Seals tended to search for prey south-east of their colony at 60-200 m depth (Arnould and Kirkwood, 2011). The Regia MSS Operational Area may therefore overlap foraging areas for the Australian Fur Seal. [Paragraph has been added in response to Matter M31].

4.4.3 Long-nosed Fur Seal

The Long-nosed Fur Seal (*Arctocephalus forsteri*) is listed as a marine species under the EPBC Act. There is no approved conservation advice or recovery plans for this species.

Long-nosed fur seals were decimated by fur trade through the 1800's and culling into the late 1900's due to perceived competition for resources with fishers (Shaughnessy, 1999).

The Long-nosed Fur Seal breeds in southern Australia from New South Wales to Western Australia; it also breeds in New Zealand and its subantarctic islands. Most of the Australian population is in South Australia, between Kangaroo Island and the southern tip of Eyre Peninsula (Shaughnessy et al. 2015). Long-nosed Fur Seals have experienced increasing population trends, with 97,200 seals recorded in the state of South Australia (2013–14 census; Shaughnessy et al., 2015) where an estimated 83% of their recorded pup production occurs.

Long-nosed Fur Seals can live up to 25 years old with females reaching maturity between 4 and 8 years of age and weigh between 50-150kg (McKenzie et al. 2007).

Prior to sealing, Long-nosed Fur Seals occupied the Bass Strait. Currently along the coast of Victoria, there are breeding colonies of Long-nosed Fur Seals located at Cape Bridgewater, Deen Maar, Kanowna Island and the Skerries (Kirkwood and Arnould. 2009). Colonies are typically occupied year-

round, with greater activity during breeding seasons. Pups are born from mid-November to January, with most pups born in December (Goldsworthy 2008). Pups begin weaning between the ages of 8 and 11 months (Baylis et al 2005).

Adult males tend to forage at the edge of the continental shelf while females typically use e continental shelf or near-shelf waters in summer and autumn, and pelagic waters associated with the subtropical front much further south during winter, the same region that is favoured by juveniles. During the summer months females and juveniles forage closer to their breeding colonies while females feed their young pups and pups start moulting (Shaughnessy and Goldsworthy, 2020). Tagging studies from lactating females at Cape Gantheaume, Kangaroo Island revealed the strength and duration of the Bonney Upwelling provides important food resources to females that forage ion the continental shelf during the winter months (Baylis et al. 2008).

Long-nosed Fur Seals have a broad diet consisting of mostly bony fish and squid (Boren, 2010). More recent research has revealed Long-nosed Fur Seals in Victoria are predating on seabirds such as shearwaters and little penguins, potentially impacting the recovery of little penguin populations (Hardy et al. 2024).

4.4.4 Southern Elephant Seal

CGG has reviewed relevant literature including Conservation Advice for this species and has noted the Southern Elephant Seal (*Mirounga leonine*) is listed as Vulnerable under the EPBC Act. It is a subantarctic species and, although some individuals have been recorded in coastal habitats, this species was not identified in the PMST search for this area. This species has a nearly circumpolar distribution and visits subantarctic islands to breed and to moult. There are two main populations found in Australian waters and the principal breeding colonies for these populations are located on Heard and Macquarie Islands (Shaughnessy 1999; McMahon et al. 2005). Southern Elephant Seals concentrate on the northern beaches of Macquarie Island, although colonies are scattered around the island (DEH 2003). In the Australian Antarctic Territory, small numbers of pups have been reported from Browning Peninsula and Peterson Island, near Casey station (Murray 1981 cited in Shaughnessy 1999), and there has been a well-frequented haul-out area at Vestfold Hills (Burton 1985). Off the coast of mainland Australia, several pups have been born and many animals recorded on Maatsuyker Island (located at the most southern end, off the south-west coast of Tasmania) (Shaughnessy 1999).

Given the likelihood of encountering this species during the Regia MSS is low, impacts to the species are not predicted and have not been assessed further. [Paragraph added in response to Matter C07].

4.5 People and Communities

4.5.1 Social and economic features

During consultation, as presented in Annex 2, objections and claims were raised regarding concerns of impacts on the local economy and environment, with activities including whale watching and tourism. Species that may be affected are described above in sections 4.1 and 4.4

4.5.2 Cultural features

During consultation, the cultural significance of marine mammals, such as the Southern Right Whale, Blue Whale, Killer Whale, seals, sea lions and dolphins, were highlighted, with connections to songlines, totemic value and kinship, and cultural practices (Appendix F3, Section 3.16.1).

The National Recovery Plan for Southern Right whale describes Whale Birthing Dreaming Sites being in coastal bay areas from Port Campbell to Portland, including Warrnambool. These places on Gunditjmara Country are known resting and feeding sites for mothers and calves and are directly related to Gunditjmara Neeyn (midwives), explaining why Gunditjmara is a Matrilineal Nation. (DCCEEW, 2024)

5 Relevant Legislative Requirements

CGG has considered all the relevant legislative requirements, conservation management and recovery plans for marine mammal species that may be affected (see Appendix B2). Measures that must be adopted are as follows:

- EPBC Act Policy Statement 2.1 - Interaction between offshore seismic activities and whales (Part A). This includes a requirement for Marine Fauna Observers and associated procedures for initiating shutdowns at predefined distances.
- Environment Protection and Biodiversity Conservation Regulations 2000 Part 8: Vessel and Operating Procedures:
  - 300 m caution zone for whales.
  - 150 m caution zone for dolphins, turtles and pinnipeds.
  - Helicopters will not fly lower than 1650 ft when within 500 m horizontal distance of a cetacean except when landing or taking off and will not approach a cetacean from head on.
- National Recovery Plan for the Southern Right Whale (*Eubalaena australis*) 2024 (NRPSRW): "Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment" and "Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that the risk of behavioural disturbance is minimised." It is important to also note that the NRPSRW defined an impact as biologically significant effect is one that reflects a change whose direction, magnitude and/or duration is sufficient to have consequences for the fitness of individuals or populations.
- Blue Whale Conservation Management Plan 2015: "Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area."

6 Defining Acceptable Levels of Impact

Marine mammals and especially cetaceans rely on sound for important life functions including individual recognition, socialising, detecting predators and prey, navigation, and reproduction (Weilgart 2007, Erbe et al. 2015, Erbe et al. 2018). Underwater sound can affect marine mammals in various ways including interfering with communication (masking), behavioural changes, a shift in the hearing threshold, physical damage, and stress (Erbe 2012, Rolland et al. 2012).

NMFS finalised technical guidance for assessing the effect of anthropogenic sound on marine mammal hearing (NMFS 2016). The guidance describes injury criteria with new thresholds and frequency weighting functions for different hearing groups described by Finneran and Jenkins (2012) and updated by Accomando et al 2025). The latest revision to this work was published in 2018; with the criteria defined in NMFS (2018). The latest criteria are from Southall et al. (2019) which are applied.

For impulsive sounds, NMFS currently uses step function thresholds of 160 dB re 1 μ Pa SPL (unweighted) to assess and regulate sound-induced behavioural impacts for marine mammals (NOAA 2018, NOAA 2019). The threshold for impulsive sound is derived from the High-Energy Seismic Survey (HESS) panel (HESS 1999) report that, in turn, is based on the responses of migrating mysticete whales to airgun sounds (Malme et al. 1984). The HESS team recognised that behavioural responses to sound may occur at lower levels, but significant responses were only likely to occur above a SPL of 140 dB re 1 μ Pa. Southall et al. (2007) found varying responses for most marine mammals between a SPL of 140 and 180 dB re 1 μ Pa, consistent with the HESS (1999) report, but lack of convergence in the data prevented them from suggesting explicit step functions.

The PTS and TTS thresholds used in the underwater sound modelling (see Appendix B7a and B7b) are from NMFS (2018) and Southall et al. (2019) and were the most current, globally recognised technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing, until October 2024.

In October 2024 the NMFS released the 2024 Update to Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0) Underwater and In-Air Criteria for Onset of Auditory Injury and Temporary Threshold Shifts (NMFS 2024).

This update provides revised underwater and in-air criteria for the onset of auditory injury and temporary threshold shifts (TTS). The 2024 guidance outlines Level A criteria for auditory injury and Level B criteria for harassment. Notably, the behavioural response thresholds remain unchanged. However, a new approach has been introduced for assessing injury: the thresholds for permanent (PTS) and temporary (TTS) threshold shifts have been updated to reflect the onset of auditory injury for different marine mammal hearing groups, and this is differentiated based on whether the sound source is impulsive or non-impulsive.

Auditory injury, as defined by NMFS, includes but is not limited to PTS and TTS. TTS is described as a temporary, reversible elevation in the hearing threshold at a specific frequency or within a portion of an animal's hearing range, relative to a baseline level. While TTS is acknowledged in the guidance, NMFS does not classify it as a true auditory injury. This position is supported by studies indicating that TTS falls within normal physiological variability and does not cause structural damage. The temporary hearing reduction following exposure to loud noise is attributed primarily to fatigue of cochlear hair cells and supporting structures rather than cell loss, and is fully reversible (Ward, 1997; Southall et al., 2007, 2019, as cited in NMFS 2024).

There were changes to the peak-to-peak thresholds for low frequency cetaceans, and otariid pinnipeds, and changes to the SELcum thresholds for high frequency cetaceans, very high frequency cetaceans and otariid pinnipeds.

It should be noted, where NMFS thresholds were updated, subsequent edits were made to the defined acceptable levels.

It is difficult to determine thresholds for behavioural response in individuals or groups of cetaceans (Southall et al. 2007, 2021). Often the way individuals or groups respond varies (Nowacek et al. 2004; Gomez et al. 2016; Southall et al. 2016, 2021) and is influenced by both biological and environmental factors such as age, sex, and activity at the time etc. The behavioural disturbance threshold criteria applied is the current NOAA (2024) criterion for marine mammals which summarises the most recent scientific literature on the impacts of sound on marine mammal hearing.

This literature was used to inform the thresholds used in the underwater sound modelling report (Appendix B7c). Previous modelling reports (Appendix 7a and 7b used the NMFS 2019 criterion.

To define acceptable levels of impact to marine mammals the species identified have been grouped according to similarity of impact pathways:

- Very-high-frequency (VHF) cetaceans
- High-frequency (HF) cetaceans
- Low-frequency (LF) cetaceans
- Southern Right Whale
- Blue Whale
- Otariid Pinnipeds

Based on the above discussion, Table E7-1 defines and justifies the acceptable levels of impact from underwater sound on marine mammals. Further information on studies in relation to seismic acoustic emission impacts to marine mammals is provided in the Regia MSS Seismic Studies Summary available in Appendix B8.

CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that aspect specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, Table E7-1 details the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding aspect specific defined acceptable levels established for this assessment. This sets the foundation for relevant and targeted demonstration later in this assessment.[1]

[1] Note: The acceptable levels related to demonstrating ALARP and the adoption of specific measures to ensure the effectiveness of control measures can be found in Appendix F2 and B3 respectively. As they are criteria integral to the acceptance of the Environment Plan, and they are documented elsewhere, these criteria are not discussed further in this assessment.

Table E7-1 - Defined acceptable levels of impact from underwater sound on marine mammals.

Category	Defined Acceptable Level (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	Marine mammals can continue critical life-cycle stages and are not injured.	Marine mammals rely on undisturbed habitats to complete vital life-cycle stages, including calving, feeding, and migration. Scientific studies and international guidelines (e.g. EPBC Policy 2.1 and Southall et al. 2019) provide injury thresholds. Ensuring no injury or long-term disruption to these life-cycle stages supports ecological sustainability and compliance with protected species legislation.
	The impact and risk assessment process is based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or the application of the precautionary principle is applied in the presence of scientific uncertainty.	Anthropogenic threats are managed consistent with ecologically sustainable development principles to facilitate recovery of all threatened whales.	This level is recognises the broader intent that all actions must align with ecologically sustainable development (ESD) principles to support threatened whale species long-term recovery. ESD ensures a balance between environmental protection and development by applying precaution, intergenerational equity, and adaptive management.
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.	Anthropogenic noise in biologically important areas must be managed such that any blue whale is not displaced from a foraging area.	This level aligns with the objectives of the Blue Whale Conservation Management Plan, which identifies the protection of biologically important foraging areas as critical to the species' survival and recovery. Avoiding displacement from foraging areas due to anthropogenic noise, particularly during peak feeding periods, ensures blue whales can continue to access necessary resources.
		Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that they do not prevent any southern right whale from utilising the area or cause auditory impairment.	This level aligns with the objectives of the National Recovery Plan for the Southern Right Whale (SRW), which requires that actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment.
		Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that they minimise behavioural disturbance.	This level is consistent with the objectives of the National Recovery Plan for the Southern Right Whale (SRW), which requires that actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that the risk of behavioural disturbance is minimised.

Category	Defined Acceptable Level (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.	Sound exposure levels to low frequency cetaceans must be below PTS per pulse and PTS 24 hr SEL thresholds of 222[2] dB and 183 dB respectively.	These thresholds are based on international scientific consensus (e.g. Southall et al. 2019 and NMFS 2024) for onset of permanent threshold shift (PTS) in very high, high, and low frequencey cetaceans, representing the point at which auditory injury occurs. Ensuring exposure does not exceed these levels is critical for compliance with protected species regulations and prevention of permanent harm.
		Sound exposure levels to high frequency cetaceans must be below PTS per pulse and PTS 24 hr SEL thresholds of 230 dB and 193[2] dB respectively.	
		Sound exposure levels to very high frequencey cetaceans must be below PTS per pulse and PTS 24 hr SEL thresholds of 202 dB and 159[2] dB respectively.	
		Sound exposure levels to otariid pinnipeds must be below PTS per pulse and PTS 24 hr SEL thresholds of 230 dB and 185 dB respectively.	These thresholds are based on international scientific consensus (e.g NMFS 2024) for onset of permanent threshold shift (PTS) in very otariid pinnipeds, representing the point at which auditory injury occurs. Ensuring exposure does not exceed these levels is critical for compliance with protected species regulations and prevention of permanent harm.
		Sound exposure to any blue whale must be below the behavioural effect threshold of 160 dB SPL.	The NOAA NMFS 2024 criteria identifies 160 dB re 1 µPa as a widely accepted threshold for behavioural disturbance in low-frequency cetaceans. While CGG acknowledges uncertainties around its applicability to blue whales, this threshold remains a precautionary reference point for managing impacts from seismic airguns. Expert input from SLR (Appendix B7c) supports its use, though studies compiled by Southall et al. (2021) highlight limited data specific to seismic sources. Southall (2024) also notes the need for more nuanced thresholds and better use of existing data. These uncertainties are further discussed in Section 12 and Appendix F3.

[2] This threshold has been updated based on the NMFS 2024 guidance.

Category	Defined Acceptable Level (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
(cont.) Biological	(cont.) Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		
		Sound exposure levels to blue whales must be below a TTS per pulse and TTS 24 hr SEL thresholds of 216 dB and 168 dB respectively.	This level is based on proposed thresholds from the scientific literature for low-frequency cetaceans, which include blue whales and SRW. The thresholds represents the onset of temporary threshold shift (TTS), a reversible reduction in hearing sensitivity.
		Sound exposure levels to southern right whales must be below a TTS per pulse and TTS 24 hr SEL thresholds of 216 dB and 168 dB respectively.	This level is consistent with the objectives of the National Recovery Plan for the SRW, which requires that Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment. The thresholds represents the onset of temporary threshold shift (TTS), a reversible reduction in hearing sensitivity.
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.	Exposure of marine mammals to impulsive sound will not result in population-level effects.	This acceptable level aligns with the general principle that impacts and risks must be temporary, reversible, and of low intensity, ensuring no long-term or population-level effects to ecological features.
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	Reflects Commonwealth and State policy objectives for sustainable resource use and protection of ecosystem services.
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	This level reflects the principle of maintaining cultural values and heritage as protected under national and state legislation. It ensures that activities do not interfere with traditional practices, spiritual connections, or ongoing access to culturally significant areas.

Category	Defined Acceptable Level (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons. The views of public have been considered in the impact and risk assessment.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	This level reflects broader social licence to operate, ensuring that environmental activities do not lead to degradation of public amenity, loss of recreational use, or impacts to non-Indigenous heritage values. It aligns with Commonwealth policies promoting public access, well-being, and sustainable use of the marine environment.
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Impacts Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of impact could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of underwater sound, elimination involves removing the source of underwater sound or preventing its generation in the first place. Two alternative technologies – marine vibrosis and BluePulse – were considered in the ALARP assessment and were not adopted. Five main options were considered:

Continuous Line Acquisition

This method involves maintaining discharge of the acoustic source during vessel line turns to reduce the total number of operational days. In effect, the survey could be acquired without run-ins and run outs. While this could shorten survey duration, it results in longer periods of uninterrupted underwater sound exposure and eliminates natural breaks between sail lines. Furthermore, it increases the risk of degraded data quality due to inconsistent line geometry and off-angle acquisition. If data quality does not meet geophysical thresholds, reacquisition may be necessary, leading to an overall increase in survey footprint and environmental impact. This option was ultimately discarded due to both environmental and operational drawbacks.

The remaining activity limitations described below have subsequently been adopted:

No petroleum activity to be carried out between 1 January and 15 September.

Timing of survey is outside summer months of Jan/Feb/Mar which avoids the peak upwelling period. The Bonney Upwelling is driven by spring-summer winds that blow from the south-east. It can vary from year to year but typically starts during November and December, is at its strongest from January to March and retreats in April. Most consultations identified that the upwelling events and the associated increase in biodiversity in the area was a high priority. In April, May and June there are departing Blue Whales and arriving SRW mother/calf pairs. . For SRW, this time of year represents a critical life-cycle stage where pregnant mothers and newborns will arrive and reside in the shallow waters off the coast. Based on analysis of 40 years of sightings data this will reduce temporal overlap with SRW presence to less than 2 weeks (see Appendix F3).

Outside of these months low numbers of Pygmy Blue Whales and other foraging whales such as Fin, Sei and Pygmy Right whales are in the BIA off Otway. Additionally, timing the survey outside of July and August, avoids peak reproduction and migration by SRWs.

Reduced source size to reduce the energy and sound transmission distances.

From the commencement of preparation for the Regia MSS, CGG has committed to using the lowest sound source size possible to meet geophysical objectives. Since new NMFS criteria were published during the EP assessment process and new modelling was required, CGG took the opportunity to undertake additional sound transmission loss modelling and test the environmental benefits of a lower source size (from 2810 to 2630 cubic inches) and new technology (BluePulse). This modelling was undertaken in parallel to geo-acoustic analysis of these sources. The lower source size has been adopted because there were environmental benefits (lower effect distances) and geophysical objectives could be met. However, BluePulse technology was rejected because geophysical

objectives could not be met despite the environmental benefits to some receptors. Further justification for rejecting BluePulse is provided in Appendix F2.

Only commence lines 1-30 after November 1st and then only if SRW are confirmed to have been absent from the reproduction BIA (between and inclusive of Cape Bridgewater to Cape Otway) for 24 hours since last observation

Predictive uncertainty related to behavioural disturbance to SRW led to further assessment in Appendix F3. In turn, to improve certainty that the Regia MSS will not prevent any SRW from utilising the reproduction BIA an activity limitation was designed whereby the most northerly sail lines closest to the reproduction BIA (indicative sail lines 1 to 30) cannot be acquired before 1 November and only after visual detection methods confirm 24 hours absence of SRW from the reproduction BIA between and inclusive of Cape Bridgewater to Cape Otway. This limitation aligns with the data about SRW absence in the reproduction BIA over this area in the previous 6 years (see Appendix F3 – Figure F3.1). The 24-hour absence criterion was selected to reflect the consideration that SRWs may remain in or return to preferred areas over short periods and extensive daily coverage of the SRW detection and management program.

No seismic acquisition within 17 km of Deen Maar / Lady Percy Julia Island

Relevant persons were concerned about behavioural effects on the Australian Fur Seal given the haul out site at Deen Maar. The distance has changed through the preparation of the EP, starting at 10.8 km, growing to 11.8 km (both justified by the behavioural disturbance threshold), and then finally to 17km, due partly to a public comment that sought clarity on the distance the survey would keep from Lady Percy Julia Island / Deen Maar and a commitment from CGG to not conduct surveys within the 50m depth contour. [Distance updated in response to Matters M31, M32, M33 and F17].

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the impact. Six main options were considered:

Daylight-Only Operations – Not Accepted

Limiting operations to daylight hours only, was considered to reduce impacts when traditional observation techniques are not effective. While potentially beneficial for a narrow range of receptors, this would double the duration of the survey, increase fuel use, and elevate overall environmental impact. The marginal benefit to a specific group of species was not considered sufficient to justify the increased impacts to others. This option was therefore rejected on the grounds of disproportionate trade-offs. The remaining activity limitations described below have subsequently been adopted:

Sound will not be emitted above the stated capacity - Accepted

Underwater sound emissions are a key concern for marine mammals, so by ensuring that sound emissions remain within predetermined capacity limits, this measure ensures that the effects on marine mammals remain below the levels predicted by acoustic modelling. Limiting sound intensity also reduces the likelihood of disrupting important biological behaviours. This option ensures that the effects of sound emissions remain within predicted and acceptable limits, ensuring compliance with environmental standards**.**

Operate the sound source at low power during line turns and if transiting between sail lines anywhere in the Mitigation Source Area, Active Source Area, and Survey Acquisition Area - Accepted

The use of lower power settings during non-acquisition phases (such as during line turns, testing, or soft starts) was explored to reduce unnecessary sound emissions. A Mitigation Source Area (MSA) was developed in response to consultation feedback, particularly from the Director of National Parks, who

highlighted the importance of maintaining mitigation sound emissions (low power settings) during non-acquisition phases.

The acquisition lines will be acquired working from the deepest lines first - Accepted

In the spring survey window, southerly lines will be acquired first to minimise overlap with Southern Right Whales as they exit the reproductive BIA, typically by mid-October. Similarly, acquiring the deepest lines first means the survey will be closer to the coast at the time the survey would overlap with the early arrival of Blue Whales. This approach delays activity in the northern survey area, where potential whale presence can continue to be monitored, and has been adopted as a precautionary scheduling measure

9 Predicted Levels of Impact

To arrive at the predicted levels of impact of underwater sound on marine mammals at this stage in the process requires the reader to have assimilated all prior relevant information that has been assessed on marine mammals. The EP documentation is coded alphabetically to guide the reader through what is a natural process of temporal accumulation and review of evidence. The following documentation forms the evidence lineage for predictions on marine mammals as described here.

- B5 – PMST Reports – The Protected Matter Search Tool was used to search for environmental values and sensitivities potentially located within the proposed Regia MSS planning area, with eight specific searches undertaken, of which one was for LF Cetaceans within the region defined by the Regia MSS Active Source Area with an included buffer area out to 44 km.
- B7– Sound Modelling Reports SLR performed a numerical modelling study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic impacts on key regional receptors including marine mammals, fish, turtles, benthic invertebrates, plankton and recreational divers and swimmers. Acoustic thresholds derived from this document are used to guide assessments of impacts.
- B8 – Seismic Studies Report – This report provides a detailed assessment of the scientific literature related to sound (and specifically seismic) effects on Marine Mammals and other fauna. This literature is the key evidence base from which impact levels are derived.

Therefore, all species identified through B5 have been assessed through the framework provided by B7 and B8. Because of commonalities among species in their sensitivity to seismic it is not always necessary to describe effects to each species individually but rather as groups defined by their sensitivity to different frequency levels of sound.

The type and scale of the effect of seismic sound on cetaceans will depend on several factors. These include the level of exposure, the physical environment, the location of the animal in relation to the sound source, how long the animal is exposed to the sound, the exposure history, how often the sound repeats (repetition period) and the ambient sound level. The context of the exposure plays a critical and complex role in the way an animal might respond (Gomez et al. 2016; NMFS 2016).

In March 2025, CGG commissioned SLR consulting to undertake an assessment using the NMFS 2024 User Spreadsheet Tool (Marine Mammal Acoustic Technical Guidance & Other Acoustic Tools | NOAA Fisheries) to calculate the maximum distances from the seismic source at which the latest noise threshold levels were reached by each marine mammal hearing group. This report was then superseded by a full Sound Transmission Loss Modelling study and accompanied ANIMAT study completed by SLR in November 2025.See Appendix B7c for the full report.

Maximum predicted distances from underwater acoustic modelling and NMFS threshold updates for Marine Mammals are presented in Tables E7-2 to E7-5. It should be noted, to be conservative, whichever modelled distance was the highest from either the secondary modelling or the updated assessments using the 2024 NMFS thresholds was used in the impact assessment.

Table E7-2 - Maximum predicted distances from underwater acoustic modelling and NMFS threshold - VHF Cetaceans

Modelled Maximum Distances – VHF Cetaceans		
Porpoises, dwarf and pygmy sperm whales		
Auditory Injury	Per Pulse (202 dB re 1 μ Pa)	232-397 m
	24 hr SEL (159 dB re 1 μ Pa2·s)	90 m
TTS	Per Pulse (196 dB re 1 μ Pa)	439 m -1.1 km
	24 hr SEL (144 dB re 1 μ Pa2·s)	380-840 m
Behavioural	Per Pulse (160 dB re 1 μ Pa)	3.1-6.9 km

Table E7-3 - Maximum predicted distances from underwater acoustic modelling and NMFS threshold - HF Cetaceans

Modelled Maximum Distances – HF Cetaceans		
Dolphins, beaked whales and sperm whales		
Auditory Injury	Per Pulse (230 dB re 1 μ Pa)	51-55 m
	24 hr SEL (193 1 μ Pa2·s)	80 m
TTS	Per Pulse (224 dB re 1 μ Pa)	63-68 m
	24 hr SEL (178 1 μ Pa2·s)	280-600 m
Behavioural	Per Pulse (160 dB re 1 μ Pa)	3.1-6.9 km

Table E7-4 - Maximum predicted distances from underwater acoustic modelling and NMFS threshold - LF Cetaceans

Modelled Maximum Distances – LF Cetaceans		
Auditory Injury	Per Pulse (222 dB re 1 μ Pa)	67-73 m
	24 hr SEL (183 dB re 1 μ Pa2·s)	6.25-8.53 km
TTS	Per Pulse (216 dB re 1 μ Pa)	80-86 m
	24 hr SEL (168 dB re 1 μ Pa2·s)	23.63-27.92 km
Behavioural	Per Pulse (160 dB re 1 μ Pa)	3.1-6.9 km
Blue Whales (Animat Distances)		
Auditory Injury	Per Pulse (222 dB re 1 μ Pa)	59-71 m
	24 hr SEL (183 dB re 1 μ Pa2·s)	71-127 m
TTS	Per Pulse (216 dB re 1 μ Pa)	71-78 m
	24 hr SEL (168 dB re 1 μ Pa2·s)	2.05-4.32 km
Behavioural	Per Pulse (160 dB re 1 μ Pa)	2.42-4.67 km
Southern Right Whales (Animat Distances)		
Auditory Injury	Per Pulse (222 dB re 1 μ Pa)	43-69 m
	24 hr SEL (183 dB re 1 μ Pa2·s)	59-77 m
TTS	Per Pulse (216 dB re 1 μ Pa)	53-77 m
	24 hr SEL (168 dB re 1 μ Pa2·s)	807 m – 3.76 km
Behavioural	Per Pulse (160 dB re 1 μ Pa)	1.26-4.61 km

Table E7-5 - Maximum predicted distances from underwater acoustic modelling and NMFS threshold - Otariid Pinnipeds

Modelled Maximum Distances – Otariid Pinnipeds		
Sea lion, fur seals		
Auditory Injury	Per Pulse (230 dB re 1 μ Pa2·s)	51-55 m
	24 hr SEL (185 dB re 1 μ Pa)	50-55 m
TTS	Per Pulse (224 dB re 1 μ Pa)	63-68 m
	24 hr SEL (170 dB re 1 μ Pa2·s)	660-1.02 km
Behavioural	Per Pulse (160 dB re 1 μ Pa)	3.1-6.9 km

9.1 Change in fauna behaviour and hearing capacity

9.1.1 Very-high-frequency Cetaceans

From the PMST it was identified that the Dwarf Sperm Whale and Pygmy Sperm Whale which are classed as very-high-frequency cetaceans (VHF) may occur within the area that may be affected by underwater sound.

The predicted effect level to these species is assessed as minor given that impacts are predicted to have some effect to VHF cetaceans, but the effect is not considered significant or at a level that may affect the population given the following:

- AUD INJ and TTS per pulse effect criteria are reached between 232m—397m and 439m-1.1km, respectively, thus the implementation of the EPBC Act Policy Statement 2.1 - Interaction between Offshore Seismic Activities and Whales for soft starts, where prior to acquisition commencing, the sound source power is ramped up over 30 minutes, will ensure no VHF cetaceans are within distances that AUD INJ or TTS could occur. However, once the sound source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I05].
- The AUD INJ 24hr cumulative effect criterion is reached within 90 m and the TTS 24hr cumulative effect criteria is reached within 380m-840m. It is not feasible that a cetacean would be within that distance of the moving vessel for 24 hrs, thus impacts are not predicted.
- Impacts to VHF cetaceans are limited to avoidance behaviour within an area between 3.1 km-6.9 km2from the sound source depending on where in the Operational Area the survey is being undertaken. As VHF cetaceans are not dependent on any specific area within the area affected, impacts may occur to individuals but not at a level to reduce fitness.
- Dwarf Sperm Whales are found in open ocean habitats in temperate to tropical waters around the world with no recorded sightings or strandings off Victoria (DCCEEW 2023a). Pygmy Sperm Whales are also found in ocean habitats in temperate to tropical waters around the world and have been recorded in all states except the NT, though as strandings (DCCEEW 2023q). The PMST identified that Dwarf Sperm Whales and the Pygmy Sperm Whales may occur in the area, however, numbers are predicted to be low and as there are no BIAs these species are likely to be transient in the area affected by sound.
- Auditory masking of high-frequency and very high-frequency cetacean vocalisations is less likely as these species generally vocalise at higher frequencies than those generated by a seismic survey. [Paragraph added in response to Matter M09.]

The uncertainty level for impacts to VHF cetaceans is assessed as medium based on:

- The sound effect criteria used in the impact assessment have been published in peer reviewed journals.
- Dwarf Sperm Whale and Pygmy Sperm Whale are not listed as threatened species and there is limited published data on noise studies specific to these species.
- Biologically important areas within Australia are based on published data that routinely acknowledge the small sample sizes in the data.
- An absence of long-term monitoring data of the effects of seismic sound sources on very high frequency cetaceans in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (minor) and uncertainty (medium) levels is assessed as medium. For VHF cetaceans the predicted level of impact is clearly below the defined acceptable levels of impact presented in Section 9.3.19.3. The mitigation and management measures presented in Section 9.3 provide sufficient confidence in the predicted effect levels.

9.1.2 High-frequency Cetaceans

From the PMST it was identified that six dolphin and eight beaked whale species, which are classed as high-frequency (HF) cetaceans potentially occur within the area that may be affected by underwater sound.

- The predicted level of impact to these species is assessed as minor given that impacts are predicted to have some effect to HF cetaceans, but the effect is not considered significant or at a level that may affect the population given the following: PTS and TTS per pulse effect criteria are reached between 51-55 m and 63-68 m, respectively, thus the implementation of the EPBC Act Policy Statement 2.1 - Interaction between Offshore Seismic Activities and Whales for soft starts, where prior to acquisition commencing, the sound source power is ramped up over 30 minutes, will ensure no HF cetaceans are within distances that PTS or TTS could occur. The TTS 24hr cumulative effect criteria is reached at up to 280-600m from the sound source, and the AUD INJ 24hr cumulative criteria is reached at up to 80m from the sound source, however, it is not feasible that a cetacean would be within that distance of the moving survey vessel for 24 hrs, thus impacts are not predicted. [Paragraph updated in response to Matter M34].
- Impacts to HF cetaceans are limited to avoidance behaviour within between 3.1-6.9 km from the sound source depending on where in the Operational Area the survey is being undertaken. As HF cetaceans are not dependent on any specific area within the area affected impacts may occur to individuals but not at a level to reduce fitness.
- Auditory masking of high-frequency and very high-frequency cetacean vocalisations is less likely as these species generally vocalise at higher frequencies than those generated by a seismic survey. [Paragraph added in response to Matter M09.]

The uncertainty level for impact to HF cetaceans is assessed as medium based on:

- The sound effect criteria used in the impact assessment have been published in peer reviewed journals.
- There is limited published data on noise studies specific to these species.
- Biologically important areas within Australia are based on published data that routinely acknowledge the small sample sizes in the data.
- An absence of long-term monitoring data of the effects of seismic on high frequency cetaceans in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (minor) and uncertainty (medium) levels is assessed as medium. For HF cetaceans the predicted level of impact is clearly below the predefined acceptable levels of impact as detailed in Section 9.3.1. The mitigation and management measures detailed in Section 9.3 provide sufficient confidence in the predicted effect levels.

9.1.3 Low-frequency Cetaceans

From the PMST Report it was identified that the following low-frequency (LF) cetaceans[3] potentially occur within the area that may be affected by underwater sound:

[3] Blue Whales and Southern Right Whales are addressed in the following section given they are listed as Endangered under the EPBC Act.

- Long-finned Pilot Whale, Minke Whale, Short-finned Pilot Whale, and Sperm whale may occur.[4]
- Antarctic Minke Whale, False Killer Whale[3], and Killer Whale[3] likely to occur.
- Humpback Whale known to occur.
- Pygmy Right Whale foraging, feeding or related behaviour likely to occur.
- Fin Whale, and Sei Whale foraging, feeding or related behaviour known to occur.

The predicted level of impact to these species is assessed as moderate given that impacts are predicted to potentially have a significant effect on LF cetacean species. The impact may require additional management measures based on:

- AUD INJ and TTS per pulse effect criteria are reached between 67-73m and between 80-86m respectively, thus the implementation of the EPBC Act Policy Statement 2.1 - Interaction between Offshore Seismic Activities and Whales for soft starts, where prior to acquisition commencing the sound source power is ramped up over 30 minutes and while acquisition is being undertaken the sound source will be shut down if a whale (except for Southern Right Whale and Blue Whale, see next section) is within 2 km of the sound source. This will ensure no LF cetaceans are within distances where per pulse PTS or TTS could occur. However, once the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I05].
- The AUD INJ 24hr cumulative effect criterion is reached within 6.25-8.53 km, and the TTS 24hr cumulative effect criterion is reached within 23.63-27.92 km for LF cetaceans. This modelling assumes that a whale remains within this distance of the sound source for 24 hrs. This is not considered realistic for species that are transient in the area such as migrating (e.g. Humpback Whales).

For whales undertaking biologically important behaviours:

- The PMST Reports identified foraging known to occur for the Fin and Sei whales. The conservation advice for both these whales (TSSC 2015b, TSSC 2015c) identify anthropogenic noise and acoustic disturbance as a minor consequence rating.
- The PMST Reports also identified Pygmy Right Whale foraging likely to occur. This species does not have a recovery plan or conservation advice.
- There is no information on foraging areas for Fin, Sei, or Pygmy Right Whales off the coast of Victoria, though it is likely foraging occurs in the same areas identified as the foraging BIA for Blue Whales as they are often recorded foraging in the same areas (Gill et al. 2008; Gill et al. 2015; McCauley et al 2018), therefore control measures applied to Blue Whales will ensure no AUD INJ, TTS or behavioural disturbance to foraging Fin, Sei, or Pygmy Right whales.

The uncertainty level for impact to LF cetaceans is assessed as medium based on:

- The sound effect criteria used in the impact assessment have been published in peer reviewed journals.
- There is limited published data on noise studies specific to species.
- Biologically important areas within Australia are based on published data that routinely acknowledge the small sample sizes in the data.

[4] In line with Southall et al. (2019) and Finneran et al. (2023), it is understood that these species may be moved into a new functional hearing group as they vocalise at a lower frequency range than the other, mostly delphinid HF species. Consequently, a conservative approach has been taken to assess these species as LF cetaceans to ensure any future increase in protections is afforded in the EP.

- An absence of long-term monitoring data of the effects of seismic on high frequency cetaceans in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (moderate) and uncertainty (medium) levels is assessed as medium. For LF cetaceans the predicted level of impact is clearly below the defined acceptable levels of impact as detailed in Section 9.3.1. The mitigation and management measures detailed in Section 9.3 provide sufficient confidence in the predicted effect levels.

9.1.3.1 Blue Whales

From the PMST Report it was identified that blue whale (**BW**) foraging, feeding or related behaviour is known to occur within the area that may be affected by underwater sound.

Animat modelling was undertaken that considers vessel and BW movements and provides a more realistic prediction of the area that may be affected by underwater sound. The predicted level of impact to BW is assessed as moderate given that impacts without any mitigation could result in temporary hearing impairment, masking and changes in behaviour or habitat use; and that these effects, either in isolation or in combination, can potentially impair population recovery or effect habitat occupancy. Consequently, the impact may require additional management measures based on:

- The predicted maximum distances to the AUD INJ 24hr cumulative effect criterion, TTS 24hr cumulative effect criterion and behavioural effect criterion for Blue Whales is 71-127 m, 2.05-4.32 km and 2.42-4.67 km, respectively. To meet the action from the Conservation Management Plan for the Blue Whale (DoE 2015c) of "Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to utilise the area without injury, and is not displaced from a foraging area", CGG will implement the following activity limitation: The sound source will only be operated in the Pygmy Blue Whale foraging BIA from 16 September and during October, November and December when low numbers of Pygmy Blue Whales and other foraging whales such as Fin, Sei, and Pygmy Right whales are in the BIA within the offshore Otway region. The months of September to December were selected based on acoustic and aerial surveys focused on Blue Whales in the Otway region as detailed in Annex 4. The TTS shut down zone for Blue Whales has been set to 5 km. To mitigate for behavioural effects, the seismic source will shut down within 5km of a blue whale detection. This will ensure the Regia MSS is consistent with the Blue Whale Management Plan, ensuring no blue whale is displaced from a foraging area.
- The sound generated by seismic surveys comprises low frequency pulses in the order of tens of milliseconds, occurring several seconds apart. At great distances from the seismic source, sound levels will be quieter, but transmission of the sound via multiple pathways (water, seabed) and reverberation mean that the pulse duration increases with distance. The sound frequencies that are emitted by seismic acoustic sources are broadband; however, most of the energy is concentrated between 0.1 kHz and 0.25 kHz. Consequently, the lowest frequency cetaceans are particularly affected since they have the most overlap with the frequencies of the seismic survey acoustic sources. As detailed in EP Appendix F3, Blue whale calls last up to 18 s and generally consist of three segments: a 9-s-long, 27-Hz tone, followed by a 1-s downsweep to 19 Hz and another, longer-lasting downsweep to 18 Hz (Širović et al 2004, Rankin et al 2005); and Antarctic blue whale source levels have been estimated to be between 188-191 decibels (Miller et al 2021). Given the short seismic pulse duration relative to the duration of marine mammal vocalisations (several seconds to several minutes or longer), marine mammals are likely to be able to detect calls in between seismic pulses (Wood et al., 2012).

  Further, several studies have documented compensation responses (anti-masking strategies) to anthropogenic underwater noise, including changes in vocalisation strength, frequency, and timing. (Erbe et al., 2016). For example, blue whales increased their calls

(emitted during social encounters and feeding) when a seismic survey was operational in the area (Di Iorio and Clark, 2010). Such adaptations have also been reported for humpback whales (Cerchio et al., 2014; McCauley et al., 1998; 2003b), right whales (Parks et al., 2007, 2011), killer whales (Holt et al., 2008), bowhead whales (Blackwell et al. 2015), and bottlenose dolphins (van Ginkel et al., 2017). It is thought that increased calling enhances the probability that communication signals will be successfully received by conspecifics by reducing the effects of auditory masking.

It is likely that marine mammals in the vicinity of the OA during the Regia MSS, particularly baleen whales, may be subject to some masking effects. The proposed survey timing, i.e. avoiding the peak productivity period for foraging blue whale and other species in the area will reduce the potential for behavioural impacts including interference with communication.

Masking levels are difficult to predict, and no auditory thresholds exist for predicting masking effects on marine mammals (Erbe et al., 2016); however, as outlined above masking responses (e.g. changes in calling rates) have been documented to occur at relatively low exposure levels (i.e. lower than would elicit any behavioural response). Any masking effects will however cease at the completion of the survey and are highly unlikely to have detectable population level effects. [Paragraphs have been added in response to Matter M09.]

The uncertainty level for impact to blue whales is assessed as high based on:

- The sound effect criteria used in the impact assessment have been published in peer reviewed journals.
- There is limited published data on noise studies specific to these species.
- The absence of direct hearing data for BW continues to warrant substantial caution in attempting to predict their hearing capabilities and any potential susceptibility of their hearing to nose exposure (South et al. 2019).
- An absence of long-term monitoring data of the effects of seismic sound on BW in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (moderate) and uncertainty (high) levels is assessed as high. For blue whales the predicted level of impact is close to the pre-defined acceptable levels and/or there is enough uncertainty to apply the precautionary principle. Therefore, BW will be assessed further in the third stage of the assessment process (see Appendix F3).

9.1.3.2 Southern Right Whales

From the PMST Report it was identified that southern right whale (SRW) breeding is known to occur within the area that may be affected by underwater sound.

Animat modelling was undertaken that considers vessel and SRW movements, including cows with calves, and provides a more realistic prediction of the area that may be affect by underwater sound. The predicted level of impact to this species is assessed as moderate given that impacts without any mitigation could result in auditory impairment and disturbance; and that impacts from anthropogenic underwater sound is greatest where sound-generating activities occur within or close to the reproduction BIA where whales demonstrate site fidelity, are resident for long periods (e.g., weeks to months) of time, young calves are present, and females are engaged in calving and nursing, either in isolation or in combination. Consequently, the impact may require additional management measures based on:

- The predicted maximum distances to the AUD INJ 24hr cumulative effect criterion, TTS 24hr cumulative effect criterion and behavioural effect criterion for SRW is 59-77 m, 807 m – 3.76 km and 1.26-4.61 km, respectively. The TTS shut down zone for Southern Right Whale has been set to 4 km. To mitigate for behavioural effects, the seismic source will shut down within 5km of a Southern Right Whale.

- CGG acknowledges the literature showing there may be behavioural responses below the NMFS recommended 160 dB SPL threshold, to address this uncertainty CGG will adopt a precautionary shut down measure at the 140 dB threshold for any SRW. CGG will implement a shutdown measure of 13km from the sound source aligning with the modelled ANIMAT distance for SRW calf-cow pairs residing in the Reproduction BIA (see Appendix B7c).
- The activity limitations and control measures that CGG will implement ensure that the survey does not prevent any SRW from utilising the BIA of HCTS, or cause auditory impairment, and that anthropogenic noise is minimised. It should be noted given the behavioural shut down distance of 5 km, CGG can ensure no TTS impacts at 4 km.
- The Conservation Management Plan for the SRW 2011 – 2021 stated that as migratory movements to and from calving grounds remain unknown, whales may be exposed to noise interference from seismic surveys during these movements (CoA 2012). On this basis, there remains the limited potential for TTS 24hr effects in SRWs throughout the Operational Area as they approach or disperse from shelf waters throughout the 'SRW Migration BIA'. However, as outlined above, TTS is only predicted if a SRW were to remain within 4 km of the active source for 24 hours.
- The National Recovery Plan for the Southern Right Whale (DCCEEW 2024) lists anthropogenic underwater noise from seismic surveys as a moderate threat to the eastern population with a high priority for action. The actions associated with a high priority risk include additional mitigation action and an adaptive management plan and the precautionary principle should be applied. CGG will implement a Fauna Management Plan (Appendix G2) which will include adaptive management measures to ensure impacts to SRW is below the acceptable level.

The uncertainty level for impact to southern right whales is assessed as high based on:

- The sound effect criteria used in the impact assessment have been published in peer reviewed journals.
- The National Recovery Plan for the SRW (DCCEEW 2024) lists anthropogenic underwater noise from seismic surveys as a moderate threat to the eastern population as moderate and a high priority.
- There is limited published data on noise studies specific to this species.
- The absence of direct hearing data for SRW continues to warrant substantial caution in attempting to predict their hearing capabilities and any potential susceptibility of their hearing to nose exposure (South et al. 2019).
- An absence of long-term monitoring data of the effects of seismic sound on SRW in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.
- Southall et al. (2021) compile various studies, but most focus on impulsive sources like pile driving or sonar, with only four addressing seismic airgun impacts on LF cetaceans, and just one (Malme et al., 1986) offering experimental data on migrating gray whales. Southall (2024) rejects the idea of simple all-or-nothing response thresholds and calls for new approaches and better use of current data to understand and mitigate the effects of human-made noise on marine mammals. In the meantime, the SPL threshold of 160 dB re 1 μ Pa remains widely accepted for assessing behavioral responses to impulsive sound sources, such as seismic air guns.

The predicted level of impact based on the effect (moderate) and uncertainty (high) levels is assessed as high. For SRW the predicted level of impact is close to the pre-defined acceptable levels and/or there is enough uncertainty to undertake further assessment. Therefore, SRW will be assessed further in the third stage of the assessment process (see Appendix F3).

9.1.4 Otariid Pinnipeds

From the PMST Report it was identified that within the area that may be affected by underwater sound the Australian Fur-seal breeds at Lady Julia Percy Island (Deen Maar), and the Australian Sea Lion and the Long-nosed Fur Seal may occur in the area.

The predicted level of impact to these species is assessed as minor given that impacts are predicted to have some effect to seals and sea lions, but the effect is not considered significant or at a level that may affect the population given the following:

- The per pulse effect criteria for AUD INJ and TTs for these species was reached at 51m-55m and 63m-68m respectively, from the sound source.
- The AUD INJ cumulative effect criteria for these species was reached at 50m-55mfrom the sound source and TTs cumulative criteria was reached at 660m-1.02 km from the sound source. It is highly unlikely that a seal or sea lion would stay within 1.02 km of the sound source for up to 24 hr, thus TTS impacts are not predicted.
- Impacts to seals or sea lions are limited to avoidance behaviour within an area between 3.1 km-6.9 km depending on where in the Active Source Area the survey is being undertaken. The Regia MSS Operational Area may overlap foraging areas for the Australian Fur Seal. [Paragraph updated in response to Matter M31]. A 10.3 km buffer from Deen Maar was initially applied to reduce risks and impacts to Australian Fur Seals to an acceptable level. This effect distance for pinnipeds was based on the initial modelling conducted for the activity (see Appendix B7a). The commissioning of subsequent modelling (see Appendix B7b Sound Emissions Secondary Modelling Report) has provided further insights relevant to the management of this species. The secondary modelling was undertaken in response to consultation with commercial divers mainly to address constraining the sound source operation to water depths of no shallower than 50 m. Results from this work show that behavioural sound effect criteria for pinnipeds is now reached at a maximum of 11.8 km from the sound source. As the Active Source Area is a minimum of 17 km from the closest haul out site (Deen Maar), behavioural impacts to pinnipeds at this location are no longer predicted. [Paragraph updated in response to Matters M30, M31, M32, M33 and F17].
- Australian Fur Seal are considered generalist feeders, foraging on a wide range of species including red bait, barracouta, jack mackerel, red cod, leatherjacket as well as Gould's squid (Arnould et al. 2011). A study of Australian Fur Seal diet revealed they prey on 60 to 70 species of fishes and cephalopods (Kirkwood et al. 2008). Impacts to prey species of Australian Fur Seal are predicted to range from negligible for squid to minor for fish species and will be temporary, reversible and of low intensity as detailed in the impact assessment of underwater sound to fish (Appendix E3) and invertebrates (Appendix E4).
- There have been some studies on the variations and changes in Australian Fur Seal diets in Victoria. These studies have found Australian Fur Seal diets are highly variable depending on the availability of prey and oceanic fluctuations, (Kirkwood et al 2008, Arnould et al. 2011). Given Australian Fur Seals exhibit flexible foraging strategies, impacts to prey and the buffer around Deen Marr, impacts to Australian Fur Seal foraging is not expected.

The uncertainty level for impact to pinnipeds is assessed as medium based on:

- The sound effect criteria used in the impact assessment have been published in peer reviewed journals.
- There is limited published data on noise studies specific to these species.
- An absence of long-term monitoring data of the effects of seismic on pinnipeds in the presence of frequent seismic surveys, and other anthropogenic sound generating activities, in the region.

The predicted level of impact based on the effect (minor) and uncertainty (medium) levels is assessed as medium. For pinnipeds the predicted levels of impact are clearly below the pre-defined acceptable levels of impact and the mitigation and management measures in place provide sufficient confidence in the predicted effect levels.

9.2 Change in physical condition

9.2.1 Cetacean Mass Strandings

While there has been considerable conjecture that the displacement of cetaceans from seismic surveys (because of avoidance) could result in stranding events, no solid evidence has yet been forthcoming to support this link. The most recent assessment of whale stranding patterns in Victoria (Foord et al., 2019) makes no reference to seismic surveys and found no seasonal stranding pattern. While Foord et al (2019) didn't specifically investigate the relationship between strandings and seismic surveys, seismic surveys typically occur over the summer months off the south coast of Australia; hence if causal links were present, some evidence of seasonal patterns would be expected. The Foord et al (2019) study nevertheless provides a detailed assessment of cetacean strandings along the Victorian coastline. Dolphins are the only group involved in regular stranding events. Figure 6 in the paper indicates the complete lack of strandings of baleen whales in the Otway region. The design of our management and mitigation program around Pygmy Blue Whales and Southern Right Whales has been guided by the very latest in scientific guidance – for example Southall et al (2023); Southall et al (2021), Popper et al (2024) and Accomando et al (2025). CGG has demonstrably embraced the Precautionary Principal in its deliberations and used current literature for guidance.

Further to this, NOPSEMA (2019) states that "Evidence of mass whale stranding exists from six to seven million years ago, long before anthropogenic sound became a factor, and it is likely that any observable increase in occurrence [of stranding events] is due to greater visibility of previously inaccessible coastline." [Paragraph has been added in response to Matter M11 and M13].

9.3 Measures Adopted to Manage Environmental Impacts

The following measures have been adopted to ensure that the impacts associated with elevated levels of underwater sound from the survey and support vessels on marine mammals will be of an acceptable level.

These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

After the NMFS guidance assessment, CGG re-assessed the mitigation measures based on the updated distances for marine mammals. No distances in this assessment surpassed the 500m shutdown applied for all marine mammals, therefore no additional mitigation measures were implemented.

Measure	Measure Type	Details and Justification
Survey Environment Advisor	Person	This person is the offshore representative of the titleholder for all on-water decision making related to the management of interactions with marine fauna.
Environmental Officer	Person	This person is the onshore specialist coordinating compliance activities across the entire activity.

Measure	Measure Type	Details and Justification
Marine Fauna Observers	Person(s)	Trained and qualified MFOs with previous survey experience are resident on the seismic vessel at all times during daylight operations. Dedicated, trained and experienced MFOs will also be onboard a dedicated spotter vessel at all times (except for during port calls, bunkering, or crew transfers).
Passive Acoustic Monitoring Operator	Person(s)	PAM operators with previous survey experience are present on the seismic vessel, covering 24-hour operations to detect marine mammals.
Relief PAM/MFO Observer	Person	An MFO who can provide relief, as required, across both visual observation and acoustic detection monitoring tasks. [Sentence added in response to Matters M43, M45 and M49].
Whale Expert Panel	Person(s)	The Expert Panel will have expertise and qualifications in BW, SRW, and marine fauna observations at sea respectively. The Expert Panel will be comprised of: • One expert on Southern Right Whales in Southern Australia • One expert on Blue Whales in Australia • An expert on whale detections/observations. • A CGG operations representative The objective of the panel is to provide technical expertise and advice to CGG on Adaptive Management procedures to minimize impacts to Southern Right Whales and Blue Whales in the Otway Basin The panel will meet at least once prior to the survey to provide input relating to the location of the spotter vessel and design of the flight paths for the aerial surveillance. During the survey the panel will meet at least fornightly to review observation data from MFOs, and PAM and provide advice to CGG on regarding triggers for aerial surveys, and how many aerial surveys are appropiate, reporting and monitoring to minimise impacts to SRW and BW.
Spotter Vessel	Item of Equipment	Vessel will observe for all whales and if not a BW or SRW will communicate the approximate location and bearing of the whale sighting to the SEA on the survey vessel (except for during port calls, bunkering, or crew transfers).

Measure	Measure Type	Details and Justification
Spotter Vessel Procedures	Procedure	These procedures govern the spotter vessel movements in different modes. The detection range for marine fauna monitoring varies depending on the likelihood of encountering Blue Whales (BW) or Southern Right Whales (SRW) during different times of the year. **May to October** – When SRW presence is more likely, the spotter vessel will remain **20 km**[5] to the shoreside from the seismic vessel, therefore adjacent to the SRW reproduction BIA Each procedure should be applied according to the appropriate detection range based on the operational period. Any changes to these ranges will be communicated by the Environment Officer as required. In *Scouting Mode*, it conducts reconnaissance **20 km** ahead of the survey vessel before commencement of the survey and each line turn. In *Sentry Mode*, it maintains a **20 km** distance to the shoreside from the seismic vessel to maximise SRW detection capabilites. **November-December** In *Blue Whale Sentry Mode,* it maintains position **20 km** west of the seismic vessel because blue whale abundance data shows an initial tendency for foraging to occur in South Australian waters and move eastward throughout the summer months. Therefore, it is more likely that the survey will encounter blue whales on its western flank, and if the spotter vessel is in either other mode, it would be positioned on the eastern side of the survey and is less likely to encounter blue whales. In *Scouting Mode*, it conducts reconnaissance **10[6] km** ahead of the survey vessel before commencement of the survey and each line turn.
Pre-survey and aerial surveillance procedures	Procedure	These requirements are derived from adopting and improving on Policy Statement 2.1 and are written into the Fauna Managemnet Plan. Whilst Policy Statement 2.1 requires a 2 km low-power zone and a 500 m shutdown zone, CGG's experience is that moving to low-power during a line is an effective shutdown. As such, a precautionary shutdown zone for all whales can be applied of 2 km.
Pre-Start Up Procedure	Procedure	
Start-up Procedures	Procedure	
Start-up delay procedures (if sighting)	Procedure	
Operating Procedure	Procedure	

[5] The 20 km separation distance is informed by the performance of the PAM systems installed on both the seismic and spotter vessels, each capable of detecting whales at ranges of ~10 km. By positioning the spotter vessel 20 km away from the seismic vessel, CGG maximises combined detection coverage and enhances the likelihood of detecting Southern Right Whales and Blue Whales.

[6]

Measure	Measure Type	Details and Justification
Shutdown procedures	Procedure	Implementation of EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with Cetaceans to reduce the risk of collision with marine fauna during the activity for all vessels at all times. Additionally, start-up delay and shutdown procedures will be implemented to protect dolphins and pinnipeds.
Night-time and low visibility procedures	Procedure	
Helicopter Operation Procedure	Procedure	
Marine fauna detection and observation zone of 40[7]0+ km horizontal radius from the seismic source	Practice	
End-of-Survey Procedure	Procedure	The survey activity limitiation have been set to allow for acquisition into December. There are activity limitiations that mean the survey must stop 90 days after it started and there are ecological triggers that may or may not occur before the 90 days expire, and/or before the end of December. The criteria for early cessation of the survey are outlined in the Fauna Management Plan and will be the performance standards for this control measure.
Integration of marine fauna observations from third parties in the region	Responsibility	Other petroleum titleholders, commercial shipping, and offshore wind project, research institutes and government agencies may have activities on the water that may detect whales. CGG will offer to share its detection data in real-time anticipating that this will be reciprocated, if possible.
Ramp up of sound source to full power over 30 minutes.	Practice	Mobile marine fauna (including demersal and pelagic fish, octopus, squid, diving birds, penguins, and turtles) are expected to move away from the source before it is at full power, providing them a level of protection. However, once the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I04, I05, E08].
Reduce the sound source to low power if flocks of foraging birds are observed within 500 m of the source.	Practice	This measure has been adopted because of the consultation. It protects foraging little penguins and uses flocks of foraging birds as and indicator of schooling fish that may be targeted by foraging little penguins.

[7] By deploying PAM systems on both the seismic vessel and spotter vessel, each capable of detecting whales out to 10 km, the project achieves 40 km of continuous linear monitoring coverage. When the vessels are positioned approximately 20 km apart along the survey line, each PAM system contributes 20 km of linear detection capability (10 km port and 10 km starboard). Together, these form a seamless 40 km detection corridor, significantly enhancing early-warning potential for whales moving toward the survey area.

Measure	Measure Type	Details and Justification
Acquire Seismic On Paper	Practice	This measure brings together all staff and contractors directly involved in the activity to build connections between participants, familiarise staff with operational requirements, and perform scenario planning for environmental management.
Fauna Management Plan	Resource	This includes the on-water instructions for the various persons involved in protecting marine fauna. It also documents compliance with Policy Statement 2.1.
Sail Line Plan	Resource	Ensures the active source area is located more outside of the distances required by the activity limitations.
Accountability for implementation of the Fauna Management Plan procedure.	Responsibility	CGG Site Representative
Provide sufficient resources to implement the FMP.	Responsibility	CGG Technical Operations Manager
Convene and coordinate the Whale Expert Panel as needed	Responsibility	Environment Officer
Coordinate and document the review of effectiveness and compliance with the FMP.	Responsibility	
A review of the effectiveness and compliance with the FMP will be undertaken within one week of commencement of the Regia MSS and thereafter every four weeks while the Regia MSS is being undertaken.	Responsibility	
Ensure the Regia MSS induction provides an overview of the FMP.	Responsibility	

9.3.1 Additional Fauna Detection Methods

The nature and scale of the impact to marine fauna are also lessened through the adoption of measures that mitigate impacts. The Regia MSS will employ two additional types of fauna detectors Passive Acoustic Monitoring (**PAM**) Operators who are on the vessel. These roles, along with the MFOs, collaborate through the Survey Environment Advisor (**SEA**) to correlate vocalizing marine mammals' identification and localization. The role of these people will support minimising the impact of seismic survey operations on marine mammals, including SRW, BW, and other protected species.

MFOs and PAM operators provide environmental expertise to the vessel crew, implementing various measures outlined in the EPBC Act Policy Statement 2.1, the Australian National Guidelines for Whale and Dolphin Watching 2017, and the FMP.

9.3.2 Fauna Management Plan

The Fauna Management Plan (**FMP**) is designed to safeguard marine fauna, with a primary focus on protection of Southern Right Whales (**SRW**s) and Blue Whales (**BW**), during the Regia MSS. The FMP outlines how various surveillance methods will be used to detect marine mammal presence, assess their classification, monitor behaviour, and ensure the adaptation of the acquisition plan to minimize the impact of sound on these mammals. The FMP is the documentation that implements Policy Statement 2.1.

9.3.3 Acoustic Detection

CGGs whale detection strategy includes the integration of acoustic detection systems, recognising the dynamic nature of whale behaviour. While they may not be visually detected by MFOs unless present on the surface, whales often vocalise allowing for electronic detection. Acoustic detection systems will consist of passive acoustic monitoring (**PAM**) and the use of acoustic detection monitoring.

Acoustic detection methodologies adopted will have 24-hour operation and near real time reporting of whale species and location. The system to be engaged will be able to detect low-frequency whales such as BW and SRW, subject to a successful test deployment prior to the commencement of the survey.

The underwater area is not a constant symphony of whale songs, and the likelihood of vocalisation can vary. Whales are known to communicate using a diverse range of vocalisations, from intricate songs to simpler clicks and whistles, depending on their species and circumstances. Therefore, the effectiveness of our acoustic detection methods can be influenced by factors such as species presence, behaviour, and environmental conditions that may affect vocalization patterns.

This variability underscores the importance of a multifaceted approach to whale detection. While acoustic detection adds a valuable dimension to detection capabilities, it is inherently dependent on whales vocalising. Consequently, the use of multiple detection methods, including visual and aerial observations and acoustic detections systems, enhances overall confidence in detecting whales, both above and below the water surface, regardless of their vocalisation patterns.

9.3.3.1 Marine Fauna Observers

Marine Fauna Observers (MFOs) will be stationed on the survey vessel to undertake observations for marine fauna during daylight hours. MFOs conduct their observations using binoculars and the unaided eye, primarily from the bridge of the vessel (typically the most elevated point on a vessel) or, ideally, from an elevated vantage point. In optimal weather conditions, visual observations are effective up to ~5 km from the survey vessel.

The MFOs will be experienced in whale and other marine fauna observation, distance estimation, data gathering, mitigation procedures and reporting.

9.3.3.2 Passive Acoustic Monitoring

The PAM system can detect cetaceans across all frequency hearing groups including low-frequency hearing group whales such as BW and SRW. Thus, the PAM system, which has a detection distance range of ~10 km from the survey vessel, will be the primary whale detection method at night and during low visibility.

PAM operators will be experienced in identifying whale vocalisation detection, species identification, data gathering, mitigation procedures and reporting.

In addition, officers of the watch on the attending support vessels will be trained to identify whales during daylight hours to support the visual detection of marine mammals. [Sentence added in response to Matters M43, M45 and M49].

9.3.4 Aerial Surveillance

Aerial surveillance is a key component of CGG's multifaceted approach for detecting whales in support of the Regia MSS. Unmanned Aerial Vehicles (UAVs, drones) will be used to detect all whales within the monitoring area, with a particular focus on the movement of Southern Right Whales (SRWs) into and out of the coastal reproduction Biologically Important Area (BIA) and the movement of Pygmy Blue Whales (PBWs) into and out of the Otway region. This capability will help to reduce uncertainty around whale presence and distribution in the broader region, including areas potentially exposed to elevated sound from the Regia MSS. Aerial surveillance outputs will contribute directly to real-time mitigation decision-making and will complement vessel-based observations, Passive Acoustic Monitoring (PAM), and land-based visual monitoring.

UAVs will be deployed from elevated coastal vantage points between Cape Bridgewater and Cape Otway by trained Drone Pilots-in-Command (PICs) working alongside Marine Fauna Observers (MFOs) as Whale Monitoring Teams (WMTs). This approach extends the effective detection range of shore-based observers, increases spatial coverage across nearshore and mid-shelf zones, and enables flexible, weather-responsive monitoring throughout daylight hours. Drone operations will only occur under safe and compliant operating conditions. The combined use of visual observers and UAV-mounted sensors, including high-resolution zoom and thermal imaging, enhances the probability of detecting whales at extended distances and supports the verification of species identity, group composition, and general behaviour.

For PBWs, UAV-based surveillance will also be used as part of the pre-season coastal aerial programme. Early-season flights launched from Cape Nelson Lighthouse, one of the first coastal landforms encountered by PBWs arriving from the west, will survey nearshore to mid-shelf waters up to approximately 40 km offshore, which includes historical migration pathways. These flights are intended to provide an early indication of PBW presence and will inform advice from subject-matter experts on any required scaling of monitoring effort or modifications to mitigation measures during acquisition. All aerial surveillance activities will be undertaken by experienced operators with a proven record of whale-focused UAV operations, ensuring high-quality detection outcomes and alignment with all relevant regulatory requirements.

9.3.5 Adaptive Approach to Monitoring

In addition to described approaches to visual observations, acoustic detections and aerial surveys to ascertain the presence of whales, additional and adaptive approaches may be deployed subject to the advice of the Whale Expert Panel, namely, deployment of additional aerial surveys during the Regia MSS (in addition to a minimum of one (1) aerial survey prior to commencement of the Regia MSS). The Whale Expert Panel will have an advisory role to assist CGG in decision making, help with whale monitoring and provide advice on escalation triggers CGG may need to adapt to ensure impacts to whales are minimised.

Any marine fauna observations from additional aerial surveys or spotter vessel MFOs will contribute to monitoring of pre-acquisition detection criteria and soft start procedures that will affect sound source operations, if not met.

The Whale Expert Panel will be engaged prior to commencement of the Regia MSS and will be informed of any SRW- or BW-related shutdowns within 24 hrs of occurrence during the survey. This will provide the panel with timely opportunity to provide advice and recommendations for ongoing and adaptive management of the activity.

10 Demonstration Impacts will be of an Acceptable Level

10.1 Discussion on Principles of ESD, Biological and Ecological Categories

Temporary and Reversible

Auditory injury (AUD INJ) in cetaceans and Otariids, a permanent damage to hearing, is not predicted to occur because of seismic noise from the Regia seismic activity. It is theoretically possible for AUD INJ to occur both instantaneously and through exposure over 24 hours. However, the impact assessment sets out reasoned and supported rational for why it is not feasible for very high frequency and low frequency cetaceans to remain in close enough proximity to the seismic source for cumulative exposure to practically occur over 24 hours. Where AUD INJ could feasibly occur as demonstrated through animat modelling for BW and SRW, control measures have been adopted to prevent this permanent impact from occurring.

Temporary threshold shift (TTS), changes in cetacean and Otariid behaviour and masking for both these receptors are by definition temporary and reversible when caused by a temporary and moving seismic noise source. TTS temporarily reduces auditory sensitivity, and the best available science indicates this is non-neuropathic (reversible) within approximately 6 to 24 hours (Houser 2021). Behavioural changes are anticipated to return to normal once animals are outside the effect range for altered behaviour (Southall 2021). Similarly, masking will also cease once noise levels return to background levels either as the separation distance between the cetacean/Otariid increases or once the seismic activity ceases. This reasoned and supported evidence demonstrates that potential seismic noise impacts on cetaceans and Otariids will be temporary and reversible and consistent with this aspect of ESD.

Small scale

The spatial scale of potential impacts to cetaceans and Otariids is considered small in the context of their distribution, habitat utilisation and movements within their biologically important areas (BIAs). With the control measures adopted for the seismic survey to manage impacts, cetaceans will be able to utilise their BIAs during the seismic activity. For VHF, HF cetaceans control measures ensure that PTS and TTS will not occur in a BIA, and that if behavioural effects occur, they will only extend up to 7 kms from the survey area. These species of cetaceans can move to other parts of their BIA and continue their biological and ecological activities. For BW the behavioural effects noise threshold will only occupy 0.17% of the foraging BIA and for SRW will only occupy 0.2% of the migration BIA. These extremely low levels of overlap with the BIAs leaves the rest of the BIA available without impact which is deemed inherently acceptable due to such low levels of overlap. There is not expected to be any overlap of seismic noise thresholds with any Otariid BIAs. The evidence presented here demonstrates the spatial extent of noise impacts on cetaceans and Otariids is inherently acceptable due to the extremely small spatial footprint of the noise emissions relative to their biological and ecological functions.

Table E7-6 shows total ensonified area overlaps of behavioural effect area that has been conservatively calculated by using the entire behavioural noise footprint from the entire survey to estimate the proportional overlap (i.e. not just the noise footprint from a single shot).

Table E7-6 - Proportion (%) of overlap between the total ensonified area with noise levels that could influence cetacean behaviour within their BIAs

Species	Migration BIA	Foraging BIA	Reproduction BIA
Blue Whale (BW)	0	0.17	NA
Southern Right Whale (SRW)	0.2	NA	0
Humpback Whale	0	0	NA
Sperm Whale	NA	0	NA

Natural variation

The activity will be managed to prevent injury to cetaceans and Otariids and so that areas and periods important to biologically important foraging and reproduction are avoided or prevented. Therefore, it is not possible for impacts to important foraging locations or reproductive BIAs to be greater than natural variations of these ecological processes.

The only temporary impacts to cetaceans and Otariids that could occur are to their behaviour during general migratory or foraging behaviour. Both these behaviours naturally occur over extremely large spatial areas on a scale of many 1000s of km as demonstrated by their migratory routes and BIAs. Any change to these general migratory and foraging behaviours are only predicted to occur up to 12 km from the seismic source. Therefore, the maximum potential change to their behaviour could only result in changes in movement that are a fraction of 1% of their natural movement patterns. As such, any potential minor impact is considered acceptable with this aspect of ESD.

Based on sufficient information

The assessment drew upon site-specific acoustic modelling, peer-reviewed literature, and regulatory guidance, including EPBC Policy Statement 2.1 and sound exposure thresholds recommended by Southall et al. (2019) and NMFS 2024. Exposure criteria for both impulsive sound (SPL_{peak} and SEL_{cum}) and behavioural disturbance (SPL_{rms}) were applied across marine mammal hearing groups. Where uncertainty existed, such as in the behavioural sensitivity of specific species, conservative assumptions were used. The modelling demonstrated that zones of potential injury are small, species-specific, and highly localised, with no overlap with critical habitats. No serious or irreversible harm was predicted, and the level of scientific uncertainty was considered low due to the maturity of available data and the application of conservative assessment methods. As such, the precautionary principle was not triggered.

Activity not inconsistent with EPBC Act

The assessment reviewed relevant management and recovery plans for marine mammals listed under the EPBC Act, including the Recovery Plan for the Blue Whale and Conservation Advice for species such as the Southern Right Whale and Australian Sea Lion. Whilst the activity overlaps blue whale and southern right whale BIAs, the measure in place to shut down the activity and move away ensure that behavioural effects are avoided and there will be no auditory impairment. At the northern most corner of survey area there is a small overlap with parts of the SRW reproductive BIA (Map - REG-EPM-069). However, the activity will be managed such that no SRW will be exposed to noise levels that could prevent SRW from utilising the reproductive or migration BIA's and is not expected to reduce reproductive success.

Acceptability with the relevant plans of management has been achieved through the adoption of significant and costly additional control measures that are commensurate with the nature and scale of this seismic survey. The control measures adopted to achieve this level of protection for BW and SRW are rarely adopted for other seismic surveys and demonstrates the Titleholder's commitment to a high level of environmental stewardship.

The activity design incorporates all required management measures under the EPBC Act Policy Statement 2.1, including species-specific exclusion zones, pre-start visual observation periods, soft-start procedures, and operational shutdowns where required and will prevent injury to BW and SRW. These measures are consistent with both the objectives of the relevant management instruments and recognised industry standards. As such, environmental management of the activity is not inconsistent with the EPBC Act or its associated plans of management.

10.2 Economic, cultural and social categories

Consultation feedback from relevant persons highlighted concerns regarding the potential for underwater sound to disturb or injure marine mammals, particularly species of cultural or ecological importance such as whales and dolphins. Specific concerns included the adequacy of exclusion zones, the sensitivity of migratory species, and possible effects on species with cultural significance.

In response, CGG incorporated updated species databases, refined exclusion zone boundaries using current modelling, and confirmed alignment with EPBC Policy Statement 2.1 requirements for all marine mammal functional hearing groups. No culturally significant practices or spiritual sites were identified within or near the sound exposure zones, and no affected persons were found to be materially disadvantaged by the activity. While no formal objections were raised, several relevant persons requested stronger justification of threshold distances and clearer presentation of impact characterisation. These inputs were reflected in updates to the impact assessment, which now includes refined species-specific mitigation, expanded justification of assumptions, and clear documentation of all relevant concerns in Annex 2. The process confirmed that cultural values were respected, stakeholder views were incorporated, and appropriate measures were adopted to manage all claims raised.

10.3 Consistency with company processes

The impact assessment followed the methodology outlined in Appendix B3 and applied defined thresholds for physiological and behavioural effects based on regulatory criteria and scientific literature, including SEL_{cum} and SPL_{peak} levels relevant to marine mammals. Mitigation measures consistent with the EPBC Policy Statement 2.1, including pre-start observation periods, and soft-start procedures, were incorporated. No exceedance of regulatory thresholds or high-consequence outcomes was identified, and the final consequence rating remains within company limits. Using the ranking tables from this process the results of assessment are shown in Table E7-7.

Table E7-7 - Environmental Assessment Rankings

Marine Mammal Group	Predicted Level of Effect	Uncertainty	Predicted Level of Impact
Very-high-frequency cetaceans	Minor (2)	Medium (3)	Medium (6)
High-frequency cetaceans	Minor (2)	Medium (3)	Medium (6)
Low-frequency cetaceans	Moderate (3)	Medium (3)	Medium (6)
Blue Whale	Moderate (3)	High (4)	High (12)
Southern Right Whale	Moderate (3)	High (4)	High (12)
Otariid pinnipeds	Minor (2)	Medium (3)	Medium (6)

CGG's own criteria for proceeding with the activity requires that impacts and risks are managed to a 'Medium' ranking. Therefore, further assessment of the species, and relevant behavioural context, will be required. Further mitigation measures will need to be considered to either reduce the predicted level of effect and/or the levels uncertainty in the assessment, as demonstrated in Appendix F3.

11 Environmental Performance Outcomes

CGG is required to set environmental performance outcomes (EPOs) to ensure that impacts are of an acceptable level.

Table E7-8 - Environmental Performance Outcomes and Justifications

Defined Acceptable Level (From Table E7-1)	Environmental Performance Outcome	Rationale
Marine mammals can continue critical life-cycle stages and are not injured.	**As a result of shutting down or relocating the sound source when whales enter shutdown zones, no physical injury or sustained interference with marine mammal life-cycle behaviours occurs during the activity.**	This EPO is supported through implementation of observation zones, pre-start clearance, shutdown protocols, and verification that sound exposure levels do not exceed recognised injury and disturbance thresholds at relevant distances from the source.
Anthropogenic threats are managed consistent with ecologically sustainable development principles to facilitate recovery of all threatened whales.	**As a result of complying with the activity limitations and environmental performance standards in place to protect threatened whales, environmental impacts and risks associated with the activity are managed in a manner that is demonstrably consistent with ecologically sustainable development principles.**	This EPO allows for holistic assessment of environmental performance beyond individual thresholds. It can be evidenced through documentation of ALARP assessments, adoption of mitigation measures consistent with recovery goals, and clear links between impact assessment outcomes and long-term species conservation objectives.

Defined Acceptable Level (From Table E7-1)	Environmental Performance Outcome	Rationale
Anthropogenic noise in biologically important areas must be managed such that any blue whale is not displaced from a foraging area.	**As a result of shutting down or relocating the sound source when a blue whale is observed within 5 km, blue whales will not be behaviourally disturbed within this range, leading to the protection of important foraging areas and avoidance of displacement.**	The modelled range at which sound exposure reaches 160 dB SEL was 4.67 km, justifying the application of a 5km behavioural exclusion zone. This EPO is measurable, precautionary, and aligned with key blue whale protection strategies. It can be implemented using visual and acoustic monitoring techniques and operational shutdown procedures to prevent displacement from critical foraging habitat. This level aligns with the objectives of the Blue Whale Conservation Management Plan, which identifies the protection of biologically important foraging areas as critical to the species' survival and recovery. It ensures that anthropogenic noise does not displace blue whales from key feeding areas, especially when they are actively foraging. The 5 km distance aligns with the 160 dB behavioural disturbance threshold for low-frequency cetaceans under NOAA NMFS 2024 criteria, and matches the modelled maximum distance at which this threshold is predicted to occur.
Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment.	**As a result of implementing shutdown or relocation procedures when a SRW enters the 13 km ensonified area SRW are not prevented from utilising the area nor subject to auditory impairment.**	This EPO can be met through adherence to modelled thresholds for TTS and AUD INJ, 160 dB SPL and 140 dB SPL behavioural thresholds implementation of visual and acoustic monitoring, and application of precautionary shutdown and exclusion protocols when whales are detected near sensitive areas. It ensures protection of SRW critical habitat functions and compliance with recovery objectives.
Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it minimises behaviour disturbance.	**As a result of the implementation of real-time monitoring and activity limitations, SRW are not exposed to sound levels that cause sustained behavioural disturbance within or adjacent to BIAs or HCTS.**	This EPO can be achieved through the application of conservative behavioural disturbance thresholds (e.g. 160 dB SPL and the precautionary 140 dB SPL), exclusion zones based on modelled sound fields, and operational controls (e.g. shutdowns, delays) when whales are detected near sensitive areas. It ensures behavioural integrity is maintained during critical life-cycle periods.

Defined Acceptable Level (From Table E7-1)	Environmental Performance Outcome	Rationale
Sound exposure to low frequency cetaceans must be below PTS per pulse and PTS 24 hr SEL thresholds of 222[8] dB and 183 dB respectively.	**As a result of shutting down the sound source if:** - **any pinniped or dolphin is observed within 500 metres (except for bow riding dolphins),** - **any whale[9] is detected within 2 km of the sound source, and** - **any low frequency cetacean is detected within 9km of the sound source** **cetaceans will not be exposed to sound levels associated with auditory injury.** **No death or injury to fauna, including listed threatened or migratory species, from the activity.**	This EPO is justified by the fact that all cetacean species hearing groups have been modelled and the largest predicted distance to onset of AUD INJ effects is 397 m. Applying a 500 m shutdown zone ensures all cetaceans are protected from injury in accordance with the defined acceptable level and is operationally enforceable and measurable. It provides a clear, measurable outcome based on accepted injury thresholds. Cetaceans are not exposed to sound levels exceeding 219 dB PK per pulse or 183 dB SEL $_{cum24hr}$. This EPO aligns with acoustic modelling predictions and introduces a conservative time threshold to prevent PTS in low frequency cetaceans. It is operationally clear and verifiable through visual and acoustic observation logs. This EPO is an additional level of protection for low frequency cetaceans related to AUD INJ effects.
Sound exposure to high frequency cetaceans must be below PTS per pulse and PTS 24 hr SEL thresholds of 230 dB and 193[2] dB respectively.		
Sound exposure to very high frequency cetaceans must be below PTS per pulse and PTS 24 hr SEL thresholds of 202 dB and 159[2] dB respectively.		
Sound exposure to otariid pinnipeds must be below PTS per pulse and PTS 24 hr SEL thresholds of 230 dB and 185 dB respectively.		
Sound exposure to blue whales must be below a TTS per pulse and TTS 24 hr SEL thresholds of 216 dB and 168 dB respectively.	**As a result of implementing shutdown or relocation procedures if a blue whale is detected within the 5 km ensonified area, blue whales will not be exposed to physical injury from sound exposure.**	This EPO reflects a measurable acoustic exposure limit based on peer-reviewed scientific criteria and can be verified through comparison of sound source discharges to modelled exposure contours with observed blue whale presence data. Applying this limit ensures consistency with published risk criteria and supports species protection goals under environmental regulations.

[8] This threshold has been updated based on the NMFS 2024 guidance.

[9] As per Policy Statement 2.1 'Whales' includes baleen whales and larger toothed whales, such as, sperm whales, killer whales, false killer whales, pilot whales and beaked whales.

Defined Acceptable Level (From Table E7-1)	Environmental Performance Outcome	Rationale
Sound exposure to southern right whales must be below a TTS per pulse and TTS 24 hr SEL thresholds of 216 dB and 168 dB respectively.	**As a result of implementing shutdown or relocation procedures when a SRW is detected within the 4 km ensonified area, SRW will not be exposed to auditory impairment.**	The 4 km radius is based on the modelled TTS distance (3.76 km) and allows a precautionary spatial buffer. This EPO is supported by real-time visual and acoustic monitoring to detect presence and duration of SRW occupancy.
Exposure of marine mammals to impulsive sound will not result in population-level effects.	**As a result of the implementing the suite of mitigation measures, marine mammals will not experience auditory injury or sustained behavioural disturbance affecting survival, reproduction, or population distribution.**	This EPO is supported through the acoustic modelling, use of scientifically defined injury and behavioural thresholds, implementation of visual and acoustic monitoring, and shutdown protocols. All other EPO's also support the delivery of this EPO. It provides a clear linkage between the suite of mitigation actions, ensuring that exposure remains below levels of ecological significance.
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	**Social, cultural, and economic features are protected, sustaining their value for people and communities.**	This EPO ensures that the activity is managed in a way that prevents unacceptable impacts to social, cultural, and economic values associated with marine mammals.
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		

12 Recommendations

For most species/taxa/groups of marine mammals reviewed, this document provides the final assessment of impacts. However, despite an extensive review of the relevant literature around the effects of seismic on marine mammals, there has been a high level of concern voiced throughout consultation with relevant persons around the effects of seismic on certain species of marine mammals. High levels of engagement on an aspect are a trigger for CGG to undertake additional assessment. In this case looking at the effects of the activity on the ability of some marine mammal species to undertake their usual activities. This additional assessment is detailed in Appendix F3 – Further Assessment of Key Values and Sensitivities under Sections

- 3.1 – Southern Right Whales
- 3.2 – Blue Whales
- 3.3 – Australian Sea Lion

It is important to note that F3 is a response to further information requests and/or clarification and not a reflection of any prior assessment being insufficiently thorough. It is a recognition that more explanation and detail was sometimes necessary to better inform all groups involved in the consultation process, including the regulatory authority.

Hence F3 does not provide further assessment on all aspects and values identified through the EP process only those that were identified as

- Having some residual uncertainty about whether impacts or risks were of an acceptable level; and/or
- Contained environmental values and sensitivities (species) of key importance due to their protection status or commercial value; and/or
- Consultation with relevant persons revealed a particular value or sensitivity required further attention and material to support the consultation.

13 Document Control

Date	Revision	Update
20 July 2023	A	Draft prepared for initial comment
30 August 2023	B	Update based on comments and relevant person feedback
11 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
14 May 2024	2	Updated following public comments, reruns of PMST searches, and additional modelling report.
24 October 2024	3	Updated following NOPSEMA assessment
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
9 December 2025	5	Updated following NOPSEMA OMR 2 Letter

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Annex 1

Public Comment

The completed EP was published for public comment on the NOPSEMA website on 25 Jan 2024 for a 30-day period, closing 26 February 2024. Table E7-9 shows how this feedback has been incorporated into the environmental assessment.

Table E7-9 - Public comment input.

Matter	Matter ID	Changes made arising from public comment
Matter: Flawed argument regarding animals moving away	I04	CGG has considered these claims and has updated the EP Impact Assessments (Appendices E, and F where relevant) to clarify that, while some displacement is expected from mobile taxa during the Regia MSS, the survey will not preclude animals from the Operational Area in its entirety. Instead, animals are expected to temporarily move away from the active acoustic source, but once the source passes, animals will be free to move back into the habitat that they departed from.
Matter: Impacts on biologically important behaviours (foraging/ feeding, calving and migrating) and masking	M09	CGG has updated the information provided in EP Appendix E7 (Underwater Sound (Marine Mammals).
Matter: Failure to consult with relevant persons	C07	CGG has considered these claims and the EP Appendix E7 will be updated with the assessment of Southern Elephant Seals.
Matter: Impacts on dolphins	M34	CGG has considered these claims and has updated EP Appendix EP Appendix E7.
Matter: Research on impacts of anthropogenic noise on marine mammals.	M11	Updates have been made to EP Appendix E7 (Impact Assessment – Underwater Sound: Marine Mammals).
Matter: Mass strandings	M13	Updates have been made to EP Appendix E7 (Impact Assessment – Underwater Sound: Marine Mammals).
Matter: Impacts to juvenile seals	M30	Updates have been made to EP Appendix E7 and EP Appendix F1 (Environmental Plan).
Matter: Displacement of Deen Maar and Portland seal colonies	M31	CGG has made updates to EP Appendix E7.
Matter: Operational Buffer around Deen Maar	M32	CGG has made updates to EP Appendix E7.
Matter: Insufficient mitigation measures for seals and sea lions	M33	CGG has made updates to EP Appendix E7.
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and the following Activity limitation: the sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the safety criterion

Matter	Matter ID	Changes made arising from public comment
		human health safety criterion for recreational divers, surfers and swimmers along the coastline. CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, and G2).
Matter: Geographic range and all species need to be defined and considered	I16	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table E7-10. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table E7-10 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4002	Risks to the lives of ancient marine mammals	The titleholder acknowledged the feedback, noting that impacts and risks to marine mammals are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to marine mammals are outlined in the EP in E7 and G1.	5114
4035	Comment about the impact of human activities on wildlife habitats and calls for a halt to such destruction for profit. It emphasises the negative consequences of competing interests in the area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2109
4036	Comment claims that seismic activity is known to cause significant harm to marine life, arguing that the proposed project will lead to further degradation of the coastal environment and should be abandoned as a result.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2098
4038	Commenter highlights that fish populations have been adversely affected by seismic testing over the past few years, leading to a decline in their numbers. This decline could also impact other marine species and have negative effects on whale populations.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. A fauna management plan is in place to manage whale interactions.	1432
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any	4230

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		evidence you can share so that we can consider it fully prior to our submission.	
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4357	The stakeholder raised an objection to seismic surveys as they negatively affect the fishing industry, local economy and environment.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of commercial fish species and sensitive species within the area of operation. The MSS will also not impact the local economy. Mitigation plans are in place to reduce any impacts to as low as practicable.	424
4006	A call for a moratorium on seismic surveying in biologically important areas during times when whales are present, emphasizing the need to protect vulnerable species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine mammals are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to marine mammals are outlined in the EP in E7 and G1.	612
4009	Activities are timed to avoid species' peak migration and foraging behaviours.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of	653

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		measures is included in E7 Section 8 and G1.	
4010	Activities that may prevent or displace Pygmy Blue Whales or Southern Right Whales' use of BIAs are avoided.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales and ensures The Regia MSS does not prevent SRW and BW utilising their BIAs include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in E7 Section 8 and G1.	653
4012	AMCS critiques the proposed monitoring plan for detecting foraging whales and Southern Right Whales in Biologically Important Areas (BIAs), which relies on two marine fauna observers (MFOs) aboard the survey vessel during daylight hours. They note that this approach may not reliably detect whales that are submerged, in low visibility conditions, or during nighttime operations. Given the potential for seismic surveys to cause temporary and permanent injury to EPBC-listed cetaceans, AMCS requests that CGG provide a comprehensive monitoring plan that ensures reliable detection of whales in all weather conditions and throughout the entire operational schedule, rather than just during daylight or optimal visibility.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in E7 Section 8 and G1.	3384
4013	AMCS highlights discrepancies in the impact thresholds for blue whales as presented in Table 1. The predicted maximum distances for cumulative thresholds—Permanent Threshold Shift (PTS) at 1.4 km, Temporary Threshold Shift (TTS) at 13.2 km, and behavioural effects at 8.09 km—are notably smaller than those for baleen whales (PTS at 4.89 km, TTS at 43.5 km, and behavioural effects at 10.3 km). This is also in stark contrast to	We note that the JASCO modelling report provides some justification for the use of ANIMAT modelling. We will update our impact assessment to comprehensively explain why we have used the effect threshold distances and why we believe these to be more accurate and still apply the precautionary principle. This will also consider information from the updated sound propagation modelling report.	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	previous modelling by JASCO for the Otway's project, which indicated that continuous blasting could affect blue whales up to 156 km away. AMCS requests an explanation for CGG's choice to use shorter distances from animate modelling for setting impact thresholds when more conservative figures are available in the same table and in other assessments by the same company. AMCS highlights the need for more research on baleen whales' responses to seismic surveys, noting current studies show varied individual and species responses. They criticize CGG's reliance on animat modelling, which lacks ground-truthing, for reducing maximum cumulative effects distances. AMCS urges CGG to adopt the precautionary principle by using the maximum TTS distance of 43.5 km for baleen whales. Additionally, they seek justification for the proposed 12 km buffer around southern right whale calving grounds and call for its revision, citing inadequate support for this less conservative threshold.		
4014	AMCS notes that the predicted maximum distances for Southern Right Whales (SRWs) are 1.5 km for PTS, 11.6 km for TTS, and 8.17 km for behavioural effects. To comply with the draft National Recovery Plan, CGG plans to implement a 12 km activity limitation around SRW Biologically Important Areas (BIAs) and Habitat Critical to Survival (HCTS) during their presence. However, AMCS requests that this buffer be increased to 44 km. The EIA indicates that CGG used a 44 km buffer in the Protected Matters Search Tool (PMST) to identify marine mammal species in the area, based on the predicted injury distance of 43.5 km for baleen whales. AMCS points out that the maximum distances for SRWs from animat modelling are significantly smaller than those for baleen whales listed in the same table (4.89 km, 43.5 km, and 10.3 km). They request a clear explanation from CGG on why the shorter animat modelling distances were used for setting impact thresholds when more conservative figures are available in the same table.	We note that the JASCO modelling report provides some justification for the use of ANIMAT modelling. We will update our impact assessment to comprehensively explain why we have used the effect threshold distances and why we believe these to be more accurate and still applying the precautionary principle. This will also consider information from the updated sound propagation modelling report.	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4016	AMCS raises objections regarding the need to update the Environmental Plan (EP) to reference the final endorsed recovery plan for the southern right whale (SRW).	The EP considered and adhered to the draft National Recovery Plan for the Southern Right Whale, produced by Department of Climate Change, Energy, the Environment and Water (DCCEEW). Now the final recovery plan has been released, we are identifying changes and additions and will make the necessary updates to the Regia MSS Environment Plan after the next decision. The Regia MSS EP outlines how CGG have committed to handling new information such as changes to legislation, policies, or scientific literature that becomes available. This is provided in Section 4 of B3 - Implementation Strategy. This section describes the environmental management system we use, including management of change, knowledge, and communications - all of which are relevant to your query. As part of following these processes, we are currently compiling an information sheet for distribution, to both inform of the update to the SRW Conservation Management Plan, how it relates to the Regia MSS EP, and details any updates that have been made.	5040
4028	Cetacean strandings - Stakeholder cited an unusual mortality caused by strandings of adult Humpback whales in Abrolhos Bank, Northeastern coast of Brazil during the 2002 breeding season following 3D seismic surveys. LINK provided.	The titleholder acknowledged the feedback, noting that this claim was assessed in E7, Section 8. Seismic surveys and whale beaching has been an area of research and investigation, and no causal link has been found.	2886
4030	CGG's email on September 14 indicated that the project's timing has changed to two separate 3-month windows: April-June and September-November. AMCS is concerned that the December sound speed profile may not accurately reflect the physical conditions during these new survey periods. Since acoustic propagation modelling is critical for subsequent analyses and for setting thresholds for mitigation measures required for NOPSEMA approval, AMCS requests an explanation of how the December sound speed profile differs from those in April-June and September-November.	We acknowledge this concern and agree that acoustic propagation modelling is the foundation of subsequent analysis. We will complete another modelling report prior to submission to cover the changed timeframes of the proposed survey.	3384
4032	Claim regarding Southern Right Whale calves' hearing sensitivity, stating that no evidence supports the idea that calves have different	The titleholder conducted an extensive scientific literature search and found no evidence suggesting that Southern Right Whale calves have different or	5123

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	sensitivities from adults. CGG invites the sharing of any relevant studies and references several existing studies to support their conclusions.	more sensitive hearing ranges compared to adults.	
4033	Claim that seismic testing is proven to damage and kill marine life.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1024
4035	Comment about the impact of human activities on wildlife habitats and calls for a halt to such destruction for profit. It emphasises the negative consequences of competing interests in the area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2109
4036	Comment claims that seismic activity is known to cause significant harm to marine life, arguing that the proposed project will lead to further degradation of the coastal environment and should be abandoned as a result.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2098
4038	Commenter highlights that fish populations have been adversely affected by seismic testing over the past few years, leading to a decline in their numbers. This decline could also impact other marine species and have negative effects on whale populations.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. A fauna management plan is in place to manage whale interactions.	1432
4040	Comprehensive suite of whale detection measures should be identified.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales and ensures The Regia MSS does not prevent SRW and BW utilising their BIAs include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while	653

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in E7 Section 8 and G1.	
4048	Concern about sustained noise impact on cetaceans in the area.	CGG has conducted a thorough impact assessment relating to underwater sound and marine mammals, with mitigation measures and management adopted as a result of both this assessment (which includes relevant marine mammal species) (E7) and a further assessment (which includes two key whale species: Blue Whale and SRW) (F3). A comprehensive fauna management plan was also established as part of this EP development (G2).	1835
4050	Concern about the destruction of smaller sea life and the wounding of larger marine animals due to seismic blasting.	Regia EP has conducted thorough assessments of the literature for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	1669
4051	Concern about the detrimental impacts on marine animals.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1452
4053	Concern about the impact on marine creatures due to noise pollution from seismic surveys.	The titleholder acknowledged the feedback, noting that potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals, are assessed in the Environmental Plan (EP) and can be found in E2, E3, E4, E5, E6, and E7. Measures to minimise adverse impacts	3237

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		on biological receptors are outlined in the EP also and can be found in G2.	
4058	Concern about the mass destruction the blasting will cause to local sea animals, particularly mentioning the Southern Right Whales that migrate to Warrnambool every year to give birth.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of Southern Right Whales, within the area of operation. A fauna management plan, along with a suite of measures are also in place to reduce any impacts to as low as practicable.	886
4060	Concern about the vulnerability of seal pups due to seismic testing.	Regia EP has conducted a thorough assessment of the literature and found potential seismic impacts to seals do not pose any threat to the long-term health and sustainability of any populations of these taxa found within the operational area. Any interactions with seismic are mitigated and managed through spatial boundaries and a comprehensive fauna management plan.	3237
4061	Concern about the welfare of whales, seals, and birds due to the activity.	The titleholder acknowledged concerns outlined in email regarding welfare of whales, seals and birds due to the activity. Outlined approach to assessment that included demonstrating that impacts to these species will be of an acceptable level and advised that it had been determined that is acceptable to have a temporary behavioural change such as moving away from the survey vessel and that injury or long-term impacts were not acceptable.	835
4064	Concern raised by the stakeholder regarding the potential damage/kill of marine life due to seismic testing.	Titleholder responded to individual advising that CGG would not propose an activity that would lead to unacceptable impacts to marine life and advised that environmental impact assessments for each aspect of the proposed activity that has the potential to impact marine life were currently being prepared and that they would be based on scientific literature and published shortly for consultation and feedback.	1024
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration by other companies, particularly regarding the sale of seismic data.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	879

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4068	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4073	Concerns about impacts both reputational and physical to the region if the activity is allowed.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1244
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4076	Concerns about potential disturbance to the marine environment, including marine parks and areas of Biological Importance.	The titleholder acknowledged this concern and noted that potential impacts to the marine environment including marine parks and biologically important areas as a result of the Regia MSS is assessed in E1 to E9 and F3 of the EP. There will be no activities with Australian Marine Parks. All areas of biologic importance have been identified and assessment in the respective impact and risk assessments.	2278
4077	Concerns about potential harm to zooplankton, whales, dolphins, sharks, seals, the Bonney Upwelling,	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate	722

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	rock lobster fishery and other local fishing industries.	mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	
4078	Concerns about seismic testing and drilling rigs impacting marine life and fishing activities.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	917
4080	Concerns about the impact of seismic testing on various marine species.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	2179
4081	Concerns about the impact on whale habitat, endangered marine life, and commercial fisheries	Titleholder acknowledged this concern and noted that potential impacts to whales and relevant endangered marine species is assessed in the EP Chapters on underwater sound and light (E2-E7, and E9). Any interactions with seismic are mitigated and managed through spatial boundaries and a comprehensive fauna management plan. Advised that control measures to reduce impacts to commercial fishers as a result of displacement are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area.	4551
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825
4088	Condemns seismic testing, asserting that it is deadly to marine life and unacceptable for ocean ecosystems. Call for a total ban, citing the large number of marine animals harmed by the practice. Argument that the destruction of marine ecosystems and the fishing industry is	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	422

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	unjustifiable and express frustration, telling the parties responsible to stop.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4093	Doubted the effectiveness of mitigation measures and believed the reports/information provided were absent of action /intention.	The mitigations applied by CGG are industry standard and comply with government policy. They have been proven to be as effective as reasonably practical for a number of years. The measures adopted to protect species from the aspects of the activity are found in the respective impact and risk assessments.	2830
4096	Environmental Risk: Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artificial light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	2766
4101	Expresses concern that, while the project has accounted for the presence of Southern Right Whales,	We will have a comprehensive management plan for all whales with a particular focus on blue whales and	2081

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	it may overlook the protection of endangered blue whales, which are in the area from November to May.	southern right whales. SRW are our priority to protect due to our proximity to their critical life stage habitat. This doesn't mean our protection of blue whales is compromised, it means we have to protect them in a different way. We have been gathering data on BW so that we can work around there foraging behaviours.	
4105	Feedback questions who determine acceptable risks for whales, expressing concern over the impact of seismic testing on whale communication and hunting in vital zones. Argument that such risks are only acceptable to gas companies, highlighting frustration with the situation.	The Federal Department of Environment, through the EBPC Act, protect matters of national environmental significance. Whale species have specific levels of protection enacted through legal instruments such as Conversation Management Plans. These plans often contain information about the levels of impact that is unacceptable, and we must adopt them to comply with the law (Event ID 422).	423
4106	Feedback raises concern for the welfare of whales that come to calve in local waters, emphasising the need to consider the impact of proposed activities on these vulnerable marine animals.	We will not survey while SRW mothers and calves are in the area. Oil and gas have successfully co-existed with wildlife in this area for 25 years and we are doing everything we can do protect the wildlife and natural beauty of the area (Event ID 1781).	1781
4118	Impact on marine animals, which are the livelihood of the community.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4123	Insufficient information about potential damage from seismic testing.	The titleholder is confident that sufficient relevant and available information has been used to inform this this EP and to complete a comprehensive assessment of relevant aspects of the activity. Information used based around sound, peer reviewed scientific literature.	4190
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4133	Mass destruction of marine populations through the blasting process.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4135	Mention of being heavily impacted by the whales in the tourism industry.	Title holder has undertaken a thorough analysis and assessment of all relevant literature related to Marine Mammals to inform its decisions. The MSS will not impact the population stability of marine mammals within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1244
4136	Mention of considerable damage to marine life outweighing the benefits of mapping seafloors for gas drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1389
4140	No mention of ceasing activities when whales are present in the area.	CGG has conducted a thorough impact assessment relating to underwater sound and marine mammals, with mitigation measures and management adopted as a result of both this assessment (which includes relevant marine mammal species) (E7) and a further assessment (which includes two key whale species: Blue Whale and SRW) (F3). A comprehensive fauna management plan was also established as part of this EP development (G2).	1835
4141	No mention of survey in a Biologically Important Area for pygmy blue whales.	The titleholder responded by welcoming the stakeholder's specialist knowledge on blue whales, provided detailed summaries of the current whale measures that had been put in place for the Regia MSS, and informed the stakeholder of other control measures being evaluated with expert opinion from acoustic specialists and whale researchers (Event ID1933).	4036
4145	Opposes seismic exploration claiming it is dangerous to all marine life. Cannot ensure zero risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in	427

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high decibel blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making them unacceptable in a whale sanctuary area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	537
4152	Potential harm to marine species like dolphins and whales due to disorientation caused by intense noise.	The Regia EP has conducted a thorough assessment of the literature which is both aspect-focused and receptor- focused for those taxa of increased public concerns. Marine mammals, Blue Whale and Southern Right Whale in particular, have been subject to increased levels of assessment which have been used to decide outcomes.	1263
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4155	Raised concerns about sound levels from the survey and associated effects on marine mammals and other species.	Acknowledged concerns and outlined the predicted effects of sound levels of different species of marine mammals including difference between high and low frequency cetaceans, sound propagation and modelling, and	3697

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		different effect level thresholds. Also outlined the whale management and mitigation measures in place for Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection technology trails, and citizen science program access. Also outlined the effects on zooplankton and the case for acceptability of these	
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4170	Scientific evidence indicates that seismic blasting using air guns has chronic impacts on whales. These effects include the exclusion of marine mammals from crucial areas during important times, interference with migration, habitat degradation, disruption of vital behaviours, and increased stress levels. Statement that such findings underscore the unacceptable risks associated with seismic testing in marine environments.	The titleholder acknowledged the feedback, noting that impacts to whales are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales are outlined in the EP in E7 and G1.	2073
4173	Seismic blasting has adverse effects on the marine environment, with critical gaps in understanding the effects on individual species and the marine environment as a whole.	The titleholder responded with an explanation of the information sources used to inform the Regia MSS impact and risk assessments, and explained how these information sources and resulting measures are specific to the potential impact. The titleholder also made a reference to documents relevant to this claim within the environment plan (Event ID 4092).	4091
4174	Seismic blasting in southern right and blue whale migratory and breeding waters.	An additional impact management area for SRW's (which extends 11.3km beyond the proposed reproductive biologically important area), and the change in timing to avoid the expected increase in blue whales associated with the summer upwelling. In addition, we will not be acquiring in water shallower than 50m, increasing the survey's distance from shore and offering additional biodiversity protection.	4808

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4179	Seismic sounds have far-reaching effects on the marine environment, causing damage and suffering to species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3237
4180	Seismic testing and gas exploration/drilling pose undeniable risks to marine fauna, flora, ecosystems, local fishing, and tourism industries.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2118
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-	2963

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are	1659

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares	1663

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		those to the previously defined acceptable levels and is presented in the Environment Plan	
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1665
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4198	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk,	1672

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4199	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2586
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments is covered below in response to concern 6.	2886
4202	Stakeholder objects to the proposed blasting activity due to its detrimental effects on marine ecosystems.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels.	2255

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4203	Stakeholder outlined impacts to marine animals from seismic testing. It was noted that to communicate with other whales, humpbacks use a complex combination of noises in beautiful melodics and that seismic airguns emit a wide range of frequencies with sounds in the lower frequency ranges which can travel long distances being particularly troublesome sounds with humpback whales known to stop singing when subjected to the sound of a seismic airgun near Scotland. Ending the humpback's haunting song could impact migration, breeding and feeding. (Credit: NOAA's National Ocean Service.) LINK provided.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of dolphins or whales within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	2886
4206	Stakeholder raised concerns about the number of planned overflights stating that 12 was insufficient	CGG has revised its commitment to only 1 aerial surveillance flight as a minimum, there may be up to 10 but the need will be established by the Whale Expert Panel.	3783
4207	Stakeholder stated objection to seismic blasting and gas/oil exploration due to the destructive effects on marine ecosystems, including the southern right whale that is beloved by locals and traditional owners.	Titleholder responded to individual acknowledging concerns and providing information about MSS and the potential to harm marine life if mitigation plans are not in place. Advised that marine mammals, fish, and other marine fauna can be affected by the sound levels they are exposed to from a seismic survey and that the sound generated by the survey can cause hearing loss or injury, as well as disturbance of feeding, breeding, and other essential behaviours. Advised of the requirement and importance to minimise the levels of sound input into the marine environment and manage sound impacts appropriately. Provided overview of measure used to mitigate impacts on marine life and advised that the PEIRA was currently available on consultation website.	836
4210	Stakeholder stated they were concerned at the impact the activity	The Regia MSS will be undertaken in a manner that does not prevent or	870

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	will have on the nearby whale nursery and marine sanctuary. We need to be protecting our oceans and marine life from further disruption and climate change not attempting to extract more gas through seismic blasting.	displace Pygmy Blue Whales or Southern Right Whales' use of BIAs. This will be done by implementing spatial and/or temporal zones and where these cannot be implemented mitigation controls will be implemented. Controls will be evaluated with expert opinion from acoustic specialists and whale researchers to ensure they are effective.	
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049
4217	Strong objection to the proposal for 3D seismic blast in the Otway Basin due to harm to oceans and unacceptable environmental impact or risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4218	Strong opposition to seismic testing in the ocean due to its effects on both wildlife and the fishing industry. Individual firmly disapproves of the practice.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined	425

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		acceptable levels and is presented in the Environment Plan.	
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try to demonstrate to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4231	The feedback expresses concern that the project might disrupt blue whale migration, movements, and natural behaviour due to potential interference in their habitat.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for blue whales and an extensive detection area. These measures have been assessed in E7, F3 and G2.	2081
4232	The feedback expresses frustration over repeated seismic blasts in the same area, emphasising the significant environmental impacts associated with these activities. It calls for accountability from NOPSEMA to prevent future occurrences, highlighting the ongoing threat to the environment.	The Regia MSS is targeting areas that have not been surveyed before though we acknowledge there may be some overlap with previous surveys. We have to show that the environmental impacts are short-term, localised, or recoverable and that they are controllable with appropriate measures in place.	2104
4236	The feedback questions priorities, suggesting that profit motives may overshadow environmental concerns. It calls for a reconsideration of project locations to avoid populated areas and protect wildlife.	We will not survey while SRW mothers and calves are in the area. Oil and gas have successfully co-existed with wildlife in this area for 25 years and we are doing everything we can do protect the wildlife and natural beauty of the area (Event ID 1781).	1781
4253	The possible effects to marine life and ecosystems are my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation	2117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4260	The protection of wildlife in the Otway Basin is directly affected by drilling and seismic surveying.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1901
4262	The random placement of animats representing Southern right whales (SRW) and pygmy blue whales (PBW) is inappropriate, as whale presence in the area is not random. SRWs and PBWs migrate significant distances for calving and feeding in the waters of the OA. Assuming a random distribution in a model meant to reflect complex animal behaviour influenced by environmental factors is flawed. Additionally, the proposed spacing of four animats per square kilometer underestimates the likely higher density of SRWs, particularly in aggregation and calving areas from May to October.	We understand the concern regarding the random placement of animats in the model. The animat modelling creates a foundational understanding of potential whale response to sound emissions once they are in or near the OA. We recognize and agree that the overall migratory and behaviour patterns of the SRWs and PBWs are far from random. The decision to start with a random distribution was in fact a conservative first step to ensure we didn't inadvertently overlook potential areas of concern. Recognizing the specific migratory and behavioural patterns of SRWs and PBWs, is completed in the subsequent impact assessment. Regarding the spacing of animats at 4	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		per sq km, your feedback is valuable. We believe that a 4 per sq km is a significantly conservative density for the model to take given the population levels of these species and their observed behaviours.	
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064
4268	The stakeholder argues that it is impossible to ensure zero risk from seismic activities, emphasising that only zero risk is acceptable. This position reflects a strong concern regarding the potential negative impacts of seismic exploration on the marine environment.	The legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4270	The stakeholder asserts seismic surveying has been proven to be harmful and disruptive to marine life of many species.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	3343
4271	The stakeholder asserts that seismic blasts will have a direct negative	Title holder has undertaken a thorough analysis and assessment of all relevant	2108

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	impact on marine life, specifically mentioning that an "exclusion zone" will not effectively prevent the effects of the blasts from travelling through the ocean.	literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable. The titleholder is aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how to protect and preserve the values of this site.	
4272	The stakeholder asserts that the survey will have a harmful effect on millions of sea creatures.	It would be unacceptable to have long-term or permanent/unrecoverable impacts, fortunately, impacts from marine seismic surveys are short-term, temporary, and recoverable. (Event ID: 3419)	3343
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publicly responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4275	The stakeholder did not support the project due to the impact it will have on the significant whale nursery at Logan's Beach.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of whales within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	2250
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined	2255

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		acceptable levels and is presented in the Environment Plan	
4277	The stakeholder expressed concerns regarding the immediate consequences of these explorations, specifically the SRW and for the climate. The stakeholder stated that the activity should not go ahead.	Titleholder responded to individual acknowledging concerns and providing information about MSS and the potential to harm marine life if mitigation plans are not in place. Advised that marine mammals, fish, and other marine fauna can be affected by the sound levels they are exposed to from a seismic survey and that the sound generated by the survey can cause hearing loss or injury, as well as disturbance of feeding, breeding, and other essential behaviours. Advised of the requirement and importance to minimise the levels of sound input into the marine environment and manage sound impacts appropriately. Provided overview of measure used to mitigate impacts on marine life and advised that the PEIRA was currently available on consultation website. CGG acknowledges claims regarding global warming and has reviewed Environment Plan (EP) B4 (Regia MSS Preliminary Environmental Impact and Risk Assessment (PEIRA)), which provided preliminary information on the potential impacts and risks to support consultations with relevant persons and provided the context to the subsequent impact and risk assessments.	836
4278	The stakeholder expresses an active interest in the wellbeing of the coastline and its flora and fauna, indicating a general concern for environmental conservation.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	1325
4279	The stakeholder expresses concern that the proposed seismic blasting will disrupt the travel paths of whales, particularly after efforts have been made to allow their populations to recover. They emphasise the potential harm to these animals from creating explosions in their migratory routes, arguing against any activities that threaten their sustainability.	We are working hard to design our survey so that we limit our impacts to acceptable levels. Our activity is no more than 90 days, so we'll find an appropriate window to operate in. We will not destroy any wildlife habitat as a result of our activity (Event ID 2109).	2109
4282	The stakeholder highlights concern regarding Deen Maar (Lady Julia Percy Island), which is home to the largest fur seal colony in the Southern Hemisphere. They are objecting to the proposed activities,	We are aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how we	2108

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	suggesting that such actions could negatively impact this critical habitat for fur seals, emphasising the ecological significance of the island.	protect and preserve the values of this site (Event ID 2108).	
4285	The stakeholder noted the following concerns as a resident of Port Fairy: Noise (land and sea), impact on marine life, potential impacts on the environment and the future potential if gas is found.	We are also concerned about the welfare of marine fauna. We have undertaken an impact assessment process that includes whale, seals, pelagic and shorebirds. As part of this assessment, we must show that impacts to these species will be of an acceptable level. We have determined that it is acceptable to have temporary behavioural changes, such as moving away from the survey vessel, and no injury or long-term impacts. Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We are also publishing environmental impact, risk and mitigation documents as they are completed, in the document library. We are publishing the entire documents in order to remain transparent, but I have also attached a summary document.	1747
4287	The stakeholder objected to the activities due to sound levels/acoustic trauma experienced by sea creatures	The scientific literature supports that marine fauna may potentially be displaced due to a seismic survey but that these impacts are typically short term with no impact to ecosystem function. Large scale studies undertaken in Australia that you may be interested in are: Australian Institute of Marine Science. North West Shoals to Shore Marine Noise Monitoring and Impacts https://www.aims.gov.au/research-topics/monitoring-and-discovery/north-west-shoals-shore Behavioural Response of Australian Humpback whales to Seismic Surveys https://www.brahss.org.au/ Assessing the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries https://www.frdc.com.au/project/2012-008 Marine Seismic Survey Impacts on Fish and Invertebrates: Final Report for Gippsland Marine Environmental Monitoring Study https://ecat.ga.gov.au/geonetwork/srv/api/records/2292f4a7-ba2e-3533-e053-12a3070aaf2c	2389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Maxima 3D Marine Seismic Survey at Scott Reef https://www.sciencedirect.com/science/article/abs/pii/S0025326X13006528 https://www.sciencedirect.com/science/article/abs/pii/S0025326X18300687 Regarding Marine Fauna Observer's (MFOs), companies that contract MFOs such as Blue Planet Marine and RPS Group provide training for MFOs. As part of contracting MFOs we will ensure that the persons provided meet the requirement of the Australian Government EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales, that requires MFOs to be trained and experienced in whale identification and behaviour, distance estimation, and be capable of making accurate identifications and observations of whales in Australian waters. The Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, details the competency requirements for MFOs and ongoing awareness (page 23 and 24). The Regia MSS Implementation Strategy is available on the Regia MSS Website Document Library see https://klarite.mysocialpinpoint.com.au/regiamss/document-library As detailed in the Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, CGG will only use appropriately experienced MFOs as determined by a review of their CVs (page 23). The Regia MSS Implementation Strategy also details how CGG will monitor the performance of the control measures during the activity (page 25). For example: Audits and Inspections Post acceptance of the EP, conformance will be monitored on an at least quarterly basis by the Client Site Representative, or delegate, via audits and inspections, as well as through the commitments under the Management of Risk, Management of Change, and Management of Knowledge parts of this Implementation Strategy. During the activity, conformance will be monitored on an at least fortnightly	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		basis by the Client Site Representative, or delegate, via audits and inspections during the activity. Conformance auditing or inspection while the EP is in-force will be based on the Conformance Register and will target the following: • Conformance with regulatory requirements detailed in the accepted EP. • Management strategies and procedures to ensure EPOs and EPSs are being implemented, monitored, measured, and evaluated. • Emissions and discharges are being monitored, measured, and documented As stated in the previous email, matters of national energy policy are not within the purview of CGG or the Regia MSS. We will however register claims related to the ongoing need for gas and provide those to NOPSEMA. Please find attached a brochure from NOPSEMA that describes this and may be of use to you.	
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4292	The stakeholder raised concern about the sound level from the survey and its effect on marine mammals and other species.	Outlined the predicted effects of sound levels of different species of marine mammals including difference between high and low frequency cetaceans, sound propagation and modelling, and different effect level thresholds. Outlined the whale management and mitigation measures in place for Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection technology trails, and citizen science program access. Outlined the effects on zooplankton and the case for	3697

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		acceptability of these impacts noting the movement of the survey timing to avoid the upwelling period. (event ID 3697)	
4298	The stakeholder stated Australia has adequate gas reserves and was concerned that exploration was to take place in a region that is a whale sanctuary and unspoiled.	We understand community views about the ongoing need for gas in Australia (or lack thereof) as the country navigates the energy transition. The current government policy is that more gas is needed, and petroleum exploration titles continue to authorise the exploration process, including seismic surveys. Matters of national energy policy are not within the purview of CGG or the Regia MSS. We will register claims related to the ongoing need for gas and provide those to NOPSEMA. We also advise that these concerns are better directed to your State or Federal members of parliament and/or the State or Federal Resources Ministers. The Otway Basin has been one of Australia's largest producing gas fields since the 1980's, servicing both domestic and commercial energy needs for the East Coast. It is for this reason that the government has awarded titles for further exploration.	1747
4299	The stakeholder stated that elevated sound levels are an unacceptable impact to marine mammals.	The titleholder acknowledged the feedback, noting that impacts to marine mammals are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to marine mammals are outlined in the EP E7 and G1.	1890
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747
4306	The stakeholder was concerned about potential negative impacts of gas exploration and development on Country, the marine and coastal	The titleholder acknowledged the feedback, noting that all relevant impacts are assessed in the Environmental Plan (EP) and can be	3152

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	environment, the local economy, Traditional Owners, and local communities.	found in E1-E9. Measures to minimise adverse impacts on functions, interests and activities on relevant receptors are also adopted and can be found in G1.	
4309	The stakeholder was concerned about the impact on marine life sensibilities and populations.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2273
4315	The statement suggests that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4323	There will be potential permanent damage to marine life due to sonic testing and drilling.	Titleholder responded and listed various information needs related to the activity, environmental assessment process, environmental aspects, predicted levels of environmental impact and risk, environmental management, consultation processes, and regulations or regulatory processes. Links to the project website and document library was provided.	1046
4325	This feedback asserts that seismic blasting will significantly disrupt migration routes and birthing grounds for Southern Right Whales, Humpbacks, and Blue Whales.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for whales to ensure there is no injury (TTS) to southern right whales and blue whales. Humpback whales are also protected from a PTS threshold with shutdowns in place should whales enter designated shut down zones. These shut down zones are justified in E7.	2097
4327	This feedback claims the negative impacts of seismic noise on marine ecosystems, including zooplankton mortality, hearing damage, physiological harm to larger marine animals, and disruptions to essential	We acknowledge that there may be mortal effects on zooplankton within a few meters of the sound source. However, given natural mortality rates of 20-50% along with their abundance the population effects to zooplankton are considered negligible (Event ID 2097). There are significant protections	2097

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	behaviours like feeding, breeding, and escape responses.	in place for effects on large marine animals which we will detail in our full impact assessments. The acceptable levels of impacts to whale species are defined in their conservation management plans. It is unacceptable to injure a Blue Whale or displace it from its foraging area. it is unacceptable to injure or disturb a Southern Right Whale. Humpback Whales are recovering and no longer on the endangered list and we are required to protect them along with all other marine life. This project is in the early stages of exploration and the purpose of the survey is to determine if commercially viable deposits of petroleum are even present (Event ID 2097).	
4332	This statement calls for a respectful approach, urging stakeholders to engage deeply with Indigenous knowledge and perspectives, including the views of Elders and Traditional Owners. It emphasises empathy and a meaningful understanding of the environmental and cultural impact of activities on marine life.	The titleholder acknowledged this concern and confirmed that CGG will not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country.	2101
4333	This statement expresses strong feedback to the potential impacts of seismic activities on whale communication and hunting abilities, emphasising the unacceptable risks to marine life and local ecosystems for the sake of gas company profits. It reflects concerns about environmental responsibility and the prioritisation of corporate interests over ecological health.	The Federal Department of Environment, through the EBPC Act, protect matters of national environmental significance. Whale species have specific levels of protected enacted through legal instruments such as Conservation Management Plans. These plans often contain information about the levels of impact that is unacceptable, and we must adopt them to comply with the law (Event ID 2099).	2099
4334	This statement opposes seismic blasting in areas designated as Sacred Birthing Grounds for Southern Right Whales, underlining the cultural and environmental significance of these grounds. It also expresses solidarity with the Gunditjmara Traditional Owners, acknowledging the cultural heritage and environmental stewardship of this region by Indigenous communities. The feedback emphasises the perceived risks to both marine life and Indigenous heritage in the area.	The titleholder acknowledged this concern and confirmed that CGG will not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country (Event ID 2101).	2101
4335	This statement opposes the disruption of marine habitats,	The titleholder acknowledged this concern and confirmed that CGG will	2101

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	migratory patterns, and cultural songlines due to perceived corporate exploitation. It reflects a strong stance against environmental harm driven by profit, emphasising the cultural and ecological importance of these areas.	not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country (Event ID 2101).	
4338	Concerned that whales in the southwest will no longer return to birth and nurture calves	Titleholder responded to the stakeholder, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1255
4344	Asking for clarification on what measures are in place to ensure the protection of blue whales, specifically in terms of mitigating interference with their natural behaviours and habitat.	The titleholder has acknowledged this feedback relating to mitigation measures for blue whales. CGG has committed to various mitigation measures to reduce impacts to blue whales. These include: -The sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway. -Operate the sound source at low power during line turns and if transiting between survey lines anywhere in the Operational Area. -If the survey occurs in September, October, November or December, the acquisition lines will be acquired working from the deepest lines first. -No discharge of the sound source in January, February, March. - The use of aerial surveys, MFOs, PAM, and fixed PAM technology. The full list of measures is included in E7 Section 8 and G1.	2081
4350	Blue whales are particularly vulnerable to disturbances that may displace them from their food sources, as they do not store significant blubber reserves and rely on daily feeding for energy. A query to another stakeholder in the meeting was raised regarding the alignment of this understanding with observations about underweight blue whales, indicating a need for clarification on how these factors interrelate.	Titleholder acknowledged this concern and noted that impacts to blue whales is assessed in the EP Chapter E7 Section 8.The titleholder advised that control measures to reduce impacts to blue whales as a result of disturbance from the seismic source are outlined in the EP and include several activity limitations including: The sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway and No discharge of the sound	2007

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		source in January, February, March during peak upwelling months. The full list of mitigation measures for blue whales is listed in E7 Section 8 and G1.	
4351	There is a request for information concerning detection technologies utilised for monitoring blue whales.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. CGG has committed to several detection methods including aerial surveys, MFO's, PAM systems, and a fixed buoy detection system. CGG will also establish a whale expert panel to help inform decision making during the survey. This information is included in the EP E7, G1 and G2.	2007
4353	Concerns about the impact of oil and gas exploration on the marine environment, particularly in regard to seismic testing and its harmful impacts on whales.	Titleholder responded that a detailed assessment has been completed of all available relevant scientific literature to inform the management and mitigation of MSS and their interaction with whales. Spatial and temporal zoning in conjunction with mitigation measures will ensure that interactions will minimise disturbances to whales.	612
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4361	Stakeholder shared concern about whales ceasing to visit the Southwest coast to give birth and nurture calves.	The titleholder has undertaken a thorough review of the effects of seismic on whales - see E7 Section 8 and F3 Section 4.1 and 4.2. There is no evidence to suggest whales will cease to visit, give birth and nurture their calves in the southwest as a result of the Regia MSS.	1255
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual	1389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		with impact assessments when they became available.	
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4365	Concerns about the lack of definitive clarification on how seismic testing affects the marine environment and the clash between economic interests and environmental risks.	The titleholder acknowledged the feedback, noting that they have undertaken a thorough analysis and assessment of all relevant literature to inform the impact assessments conducted to assess potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals in the Environmental Plan (EP). These findings can be found in E2, E3, E4, E5, E6, and E7 under Section 8: Predicted Levels of Impact. Additional assessments of key receptors were also completed to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level (F3). Titleholder also conducted an assessment to investigate potential impacts to other marine users from physical presence resulting from the activity (E1).	2383
4373	Objection to seismic blasting occurring in SRW migration routes, which are habitat critical to the survival of the species, and adjacent to the calving and nursing grounds while the whales are in the area.	Event ID 6529 - The stakeholder has misused the definition of Habitat critical to the survival (HCTS) described in the SRW recovery plan. The migration areas are not HCTS and have their own definition in the act. Section 2.10.2 of the SRW National Recovery Plan has a further definition of HCTS which does not include any reference or possible interaction with the definition of the migration area. CGG are of the view that there is no significant impact to SRW habitat	6410

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		critical to the survival of the species as there is no possibility that the proposed Regia MSS (the action) will adversely affect habitat critical to the survival of a species.	
4375	Claims that threats from the survey to SRW and their migration routes and HCTS means that impacts from the Regia survey are not ALARP.	"Event ID 6529 - ALARP (As Low As Reasonably Practicable) is a criterion used to determine whether control measures should be implemented by balancing the environmental benefit with the sacrifice required for their adoption. NOPSEMA guidance and the Regia MSS EP provide details on how to demonstrate that environmental impacts and risks are reduced to ALARP.	6410
4377	Stakeholder claims that the lack of consultation with local experts and scientists could lead to adverse effects on the Fairy Penguin colonies and other species.	The stakeholder claims that ""such threats do not pass the ALARP test,"" but its statements about SRWs and the eastern SRW population, some of which are directly copied from the SRW National Recovery Plan, fail to address control measures, their benefits or costs, or critique the ALARP demonstration presented in the Regia MSS EP. As a result, this claim is unclear in its application of the ALARP concept.	6412
4388	Concerned about the impacts of the seismic survey on Southern Right Whales.	CGG is open to further educating the stakeholder on the ALARP concept, assuming they are trying to provide information that might lead CGG to reconsider the control measures implemented or rejected, which have already demonstrated that environmental impacts and risks of the proposed Regia MSS have been reduced to ALARP."	6878
4389	The relevant person was concerned about the timing of the proposed survey and impacts to the southern right whale.	"Event ID 6882 (Doc ID 9096) - CGG consulted with Parks Victoria (PV) during the planning of the proposed survey, meeting on 11/08/2023. The consultation records are available in the EP (Appendix C2). PV raised concerns about the survey's proximity to the Twelve Apostles Marine Park, leading to a refinement of the survey area. Fairy Penguins were not mentioned in this meeting. CGG also consulted with the Warrnambool Coastcare Landcare Network and their Middle Island Penguin Project. A referenced expert in scientific literature was consulted about penguin foraging ecology and at-sea movements. They advised against relying on outdated population estimates for penguins due to rapid ecosystem changes and predation pressures. CGG has sent the F3	6624

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		assessment from the Regia EP to the Professor for feedback and is awaiting a response. CGG also reached out to DECCA but has not received any information.	
4395	The project is adjacent to Warrnambool's Logans Beach Whale Nursery for Southern Right Whales and upstream of the Bonney Upwelling Key Ecological Feature, which could be affected.	Regarding the other individuals mentioned, they were consulted, with records available on the public website. The Regia MSS EP includes extensive references to studies by blue whale (EP E7 and F3) and Southern Right Whale experts. Additionally, a Professor's work on Fairy Penguins is referenced, along with the Middle Island Penguin Project.	6432
4405	objects to the assertion that ± 50% interannual variation in upwelling extent, mostly climate-driven, has not constrained whale population recovery.	CGG based its impact assessment on peer-reviewed literature, including studies by the scientists mentioned, and disagrees with any suggestion that knowledge was bypassed or cherry-picked. The process has been fully transparent, and CGG has actively sought additional relevant literature. CGG also met with Warrnambool City Council to discuss the Middle Island Penguin Project and is looking to support efforts to gather data on penguin populations.	6432
4417	The relevant person was concerned that about the proposed seismic activity effecting the behaviours of certain species.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act.	6880
4451	Stakeholder claims the EP is inconsistent with recovery plans including SRW National Recovery Plan and BW Conservation Management Plan, especially in light of newly published literature regarding the Eastern SRW population.	In event ID 6859 (see feedbacks 2352 & 2353) the titleholder provided the stakeholder with how the EP is consistent: The Regia team responded that as per EP Appendix E7, CGG will ensure there are no behavioural impacts to Blue Whales, as the seismic source will be shut down within 10km of a blue whale. This is based on the underwater sound modelling commissioned by CGG where behavorial impacts to blue whales was predicted to occur within 9.83km of the sound source. The Regia team responded that as per Appendix E7, There are only 3 BIAs associated with whales that are relevant to the Regia MSS, the Southern	7136

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Right Whales Reproductive and Migration BIA, and the Blue Whale Foraging BIA. The sound source will be operated within the Southern Right Whale Reproductive BIA at any time. CGG will ensure the seismic source will only not be operated within the pygmy blue whale foraging BIA if there are low numbers of blue whales present. CGG will use a whale expert panel to help define 'low numbers' CGG will also shut down if a blue whale is detected within 10km of the seismic source. This 10km will ensure there are no behavioural impacts which may displace whales from their foraging BIASs. CGG will shut down the sound source if a blue whale remains resident in the 23 km ensonified area for more than 12 hours, this will ensure blue whales will not experience TTS (temporary auditory injury).	
4487	Claims that CGG's proposed activities are inconsistent with the Recovery Plans made under the EPBC Act, the Southern Right Whale Recovery Plan and the Blue Whale Recovery Plan. GMTOAC states that these activities pose known physical and behavioural risks to the Eastern Population of Southern Right Whales and to Pygmy Blue Whales. These risks include impacts from anthropogenic underwater noise, particularly seismic noise, vessel strikes, climate-driven changes in prey availability, and the cumulative effects of these pressures, all of which have the potential to injure or kill individuals and affect populations. GMTOAC notes that under the EPBC Act Program and NOPSEMA's decision-making guidelines, an Environment Plan cannot be accepted if it is inconsistent with a recovery plan. It emphasises that both Recovery Plans contain "Very High" importance actions requiring that Blue Whales and Southern Right Whales must be able to continue using their Biologically Important Areas (BIAs) without auditory impairment, injury, or displacement. The plans also call for preventing disruption and displacement of Karntubul (Southern Right Whales) from BIAs due to anthropogenic noise such as seismic surveys.	CGG maintains that its approach aligns with statutory obligations and industry best practice. It asserts that all regulatory requirements under Regulation 34 have been met, and that its environmental performance outcomes and control measures are grounded in the best available science and tailored to the ecological and cultural sensitivities revealed through consultation. The Regia MSS Environment Plan (EP) was designed to ensure impacts and risks are reduced to As Low As Reasonably Practicable (ALARP) and to an acceptable level. Regarding whale protection, CGG highlights that the EP includes specific mitigation measures for culturally and ecologically significant marine fauna, including species noted in relevant Recovery Plans. Early correspondence in February 2023 identified Southern Right Whales and Pygmy Blue Whales as key sensitivities, and the EP commits to spatial and temporal avoidance measures, sound-source shutdowns, and exclusion zones to protect them. These measures explicitly consider cultural significance, such as timing restrictions to avoid the Karntubul (Southern Right Whale) birthing period. The whales, Karntubul and Wuuloc, are identified in the EP as sensitive receptors with dedicated protective measures. CGG confirms that these cultural and ecological sensitivities were incorporated into the environmental assessment. The EP acknowledges the	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		sacred cultural status of Koontapool (Southern Right Whale) and Wuuloc (Pygmy Blue Whale) for the Gunditjmara people and includes them in impact and cumulative risk assessments. Appendix F3 references the Nyamat Mirring Plan 2023–2033 and recognises Gunditjmara spiritual connections, including to Karntubul. CGG substantively addresses the relevant issues, including underwater noise, vessel interactions, and cumulative effects. The EP sets out noise-management frameworks, timing restrictions, and cumulative impact analyses consistent with the concerns raised.	
4491	Claims about the SRW and BW BIAs. States proposed activity will cause unacceptable impacts to all Karntubul species, including temporary & permanent hearing loss, displacement from BIAs, vessel strike, prey depletion during peak feeding/migration period, calving interruption, and impact to ecosystems and cultural landscapes as a result of the cumulative impact of these.	CGG has identified all Biologically Important Areas (BIAs) relevant to blue whales (BWs) and southern right whales (SRWs) and incorporated seasonal BIA use into the survey design through substantial temporal and spatial restrictions detailed in the EP. Predicted underwater-sound impacts on these Karntubul species, along with mitigation measures presented in Appendices E7 and F3, demonstrate impacts will remain acceptable and will avoid auditory impairment or displacement from BIAs or Habitats Critical to Survival (HCTS). CGG further notes that vessel-strike risk is already extremely low during seismic surveys and that additional controls in Appendix D2 ensure this risk is prevented and acceptable. It concludes that no changes to ecosystem structure, diversity, or function are expected from the one-off survey, with sound exposure too limited in extent and duration to affect prey, food webs, or predator–prey relationships. A cumulative impact assessment found residual cumulative effects to be low, reduced to ALARP, and acceptable, with no impacts predicted for regional marine parks. CGG also asserts consistency with the National Recovery Plan for Southern Right Whales and the Blue Whale Conservation Management Plan, stating that their objectives and recommended measures have been incorporated. Finally, CGG maintains that all marine mammal species likely to occur in the region have been adequately assessed using up-to-date EPBC Protected Matters data, and that mitigation measures ensure impacts to all listed species will remain acceptable	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		and not inconsistent with EPBC Act protection provisions.	
4492	Claims that the eastern population of the Southern Right Whale, estimated at only 200–300 individuals, is at particularly high risk because its migration and reproduction Biologically Important Areas (BIAs) overlap directly with CGG's Operational Area and sound propagation footprint. According to the Southern Right Whale Recovery Plan, these whales use the affected region for reproduction between May and September and for migration between April and October. The Recovery Plan also notes that Southern Right Whales do not feed in coastal waters but are expected to feed, and possibly conceive, within the Australian Whale Sanctuary—an area entirely overlapped by the proposed Regia MSS activity. As a result, the seismic survey could occur within, or affect, conceiving, calving, and feeding grounds for this critically endangered sub-population. The species is particularly vulnerable to human impacts due to its low reproductive rate, long lifespan, and strong site fidelity to key habitats. The submission therefore emphasises the relevance of underwater noise, habitat degradation, and vessel-strike risks in the context of the proposed seismic activities.	The Recovery Plan explains that BIAs can be designated for key behaviours such as reproduction, foraging, migration, and resting. While Southern Right Whale BIAs in the Plan cover reproduction and migration, the Plan notes that foraging occurs across a much broader offshore latitudinal range (30°S–65°S) and is not linked to these BIAs. Because the Regia MSS is not located in Antarctic waters, it will not affect cetaceans that forage there. CGG states the survey will avoid peak SRW abundance in the mapped BIA and apply mitigation measures to ensure no SRWs are harmed, injured, or interfered with.	EVT352
4494	The claim highlights guidance from the Blue Whale Recovery Plan, which stresses the need for a precautionary approach when assessing threats at the population level. It notes that blue whales may continue feeding despite disturbance if alternative feeding grounds are limited, meaning that anthropogenic noise may still present significant risk even when behavioural responses are subtle. Drawing on the Recovery Plans, the submission identifies key threats relevant to assessing potential impacts of the Regia MSS activity: underwater anthropogenic noise, climate change, habitat degradation, vessel strikes, prey depletion, and the cumulative effects of these pressures. GMTOAC argues that CGG has not adequately assessed these threats, either individually or cumulatively, given that consultation on these matters remains ongoing. The submission	The EP is consistent with the Blue Whale Conservation Management Plan, which identifies seismic noise as a threat, by implementing measures that ensure blue whales can continue using the area without injury or displacement. This includes using MFOs and PAM, shutting down the seismic source if whales enter behavioural, or TTS-impact ranges, and complying with EPBC vessel-operation requirements such as maintaining a 300-metre caution zone. CGG states it will also avoid peak-abundance periods by commencing the survey after most SRWs have left the BIA and during months when blue whale numbers are low. Drawing on current scientific literature, the recovery plans, and detailed impact assessments, CGG maintains that all risks and impacts have been reduced to acceptable levels. While Appendix E7 initially identifies major impacts for SRWs and BWs due to their threatened status, CGG notes	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	states that, based on CGG's own impact metrics, the proposed seismic activities may result in moderate to major impacts from underwater noise, major risks of vessel strikes, major impacts associated with climate change, and potentially more severe cumulative impacts. It references the Commonwealth's Significant Impact Guidelines, which define significant impact and list criteria for determining when an action may threaten an endangered species' survival or recovery. GMTOAC concludes that moderate to major impacts, especially when cumulative effects are considered, meet the threshold of significant impacts and are therefore unacceptable. Finally, the submission notes that both Recovery Plans and EPBC Act Policy Statement 2.1 emphasise that seismic surveys should avoid biologically important areas during biologically important times and assess 3-4 years of baseline data. GMTOAC argues that this principle is not met in the timing and location of the proposed Regia MSS survey, increasing the potential for displacement from critical habitats essential to whale survival and recovery.	that both species were reassessed in Appendix F3, which added further measures for SRWs; Appendix F3 concludes that residual impacts to both species are reduced to an acceptable level.	
4496	GMTOAC objects to CGG removing a previous control measure limiting seismic discharge in the Pygmy Blue Whale foraging BIA during periods of low whale presence, replacing it with a vague condition requiring CGG to determine whether whale presence is "compatible" with proceeding. GMTOAC argues this new measure lacks detail on how whale presence or "unacceptable disturbance" will be assessed, and that it fails to reference Recovery Plans which define unacceptable impacts. GMTOAC warns that the proposed survey timing (April–June 2026) coincides with peak Pygmy Blue Whale foraging season and Southern Right Whale migration and calving periods, meaning the seismic survey is likely to occur when both species are using their BIAs. Preventing whales from accessing these areas, or exposing them to injury while they remain, would constitute unacceptable impacts inconsistent with Recovery Plan objectives.	CGG has further reduced the likelihood of interactions with marine mammals by excluding the April–June period and commencing the survey only after 15 September. Because blue whales typically do not arrive from Western Australia until November, CGG argues that most of the survey will occur when blue whales are absent from the area. It adds that sighting data show very few blue whales in November and December, with peak abundance occurring later, from January to March during the Bonney Upwelling.	EVT352
4497	GMTOAC objects to 160dB threshold, noting that both Recovery Plans call for precaution, that behavioural impacts occur below 160 dB, and that	CGG's use of a 160 dB behavioural threshold for blue whales is consistent with industry standards, current	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	NOAA and NMFS consider the 160 dB threshold a coarse midpoint, not a universal behavioural threshold. Recent research suggests a more precautionary threshold of around 139–140 dB for low-frequency cetaceans, and GMTOAC notes that some previous seismic proposals adopted stricter thresholds in recognition of species vulnerability.	scientific guidance, and established regulatory practice, noting that this threshold is appropriate for non-reproductive foraging stages when sensitivity to noise is lower. For Southern Right Whales, CGG has adopted an even more precautionary, real-time protection approach by verifying ambient sound levels and implementing immediate shutdowns for any SRW detected within the reproduction BIA, restarting only once whales have clearly departed. This provides a higher level of protection than numerical thresholds used by NOAA or NMFS and aligns with the intent of the National Recovery Plan. CGG also asserts that stakeholder reliance on U.S. "Take Authorization" documents is irrelevant to Australian regulation and that the stakeholder has misrepresented Darias-O'Hara et al. (2025). The study did not recommend a universal 139 dB threshold but instead reported a median expert-elicited response value with large uncertainty, limited applicability, and explicit caveats. CGG maintains that the stakeholder's interpretation selectively uses science out of context and does not reflect the study's stated limitations.	
4498	GMTOAC claims that CGG has not demonstrated these methods' effectiveness in conditions of low visibility or high ambient noise, and that CGG's analogy to motion sensors and security cameras greatly overstates the capability of detection systems. GMTOAC further notes that whale behaviours, such as Pygmy Blue Whales diving in response to vessels, or Southern Right Whale mother–calf pairs communicating quietly, reduce detectability and have not been adequately factored into the assessment.	No single detection method is fully reliable under all conditions, so the survey uses a multi-layered system combining visual observers, passive acoustic monitoring, autonomous detection buoys, vessel-based systems and aerial surveillance. Each method contributes different strengths, such as autonomous buoys providing near-real-time detections regardless of visibility, and visual observers offering species identification and behavioural interpretation, and together they compensate for the limitations of any one tool. This integrated approach maintains effective detection even when environmental conditions or animal behaviour reduce the performance of individual methods, providing a robust and precautionary system for managing uncertainty.	EVT352
4500	GMTOAC claims that the Regia MSS may contribute to cetacean strandings, particularly for vulnerable species such as Pygmy Blue Whales and Southern Right Whales. They note that the EP contains only minimal discussion of this issue and appears to dismiss the risk on the	Strandings were assessed in the EP using the best available evidence, which shows only a very low risk of seismic surveys causing cetacean strandings. CGG states that GMTOAC's reliance on a single, outdated reference (Castellote & Llorens 2016) misinterprets the current science, noting that CGG's	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	basis that no conclusive evidence links seismic surveys to strandings. GMTOAC finds this reasoning inadequate, especially given that seismic surveys can occur outside the summer period typically referenced in studies and that CGG itself originally planned to survey in September 2025. CGG cites recent assessments and NOPSEMA's 2019 Senate Inquiry submission, which found no demonstrated causal links between seismic activity and strandings. However, GMTOAC points out that NOPSEMA acknowledges military sonar, another intense anthropogenic sound source, has been linked to mass strandings, and experts caution that seismic surveys often involve additional high-power acoustic equipment that significantly expands the acoustic footprint. International research by Castellote and Llorens indicates that existing mitigation guidelines do not account for behavioural reactions that may lead to strandings, and that such risks cannot be identified without dedicated monitoring during and after surveys. GMTOAC notes that the Regia MSS EP includes no such monitoring plans. Because the possibility of a seismic link to strandings cannot be ruled out, GMTOAC argues that the precautionary principle must apply and that scientific uncertainty should not be used to justify exposing Karntubul and other cetaceans to potentially unacceptable harm.	approach is in fact consistent with the review's main conclusion that seismic operations can alter cetacean behaviour—hence CGG's adoption of updated management and mitigation protocols. CGG emphasises that GMTOAC overlooked more recent literature, including Foord et al. (2019), which documents Victorian stranding patterns and shows no baleen whale strandings in the Otway region, with regular strandings involving only dolphins. CGG maintains that its management program for pygmy blue whales and southern right whales is informed by the latest scientific guidance (e.g., Southall et al. 2021, 2023; Popper et al. 2024; Accomando et al. 2025) and asserts that it has applied a precautionary approach supported by current evidence.	
4505	GMTOAC claims that the April 2025 EP removed the earlier restriction preventing seismic surveying in waters shallower than 50 metres and replaced it with a fixed 17 km buffer around Deen Maar. Given uncertainty in bathymetry data, GMTOAC questions how CGG will reliably ensure it avoids shallow waters outside this buffer. GMTOAC further questions whether either the 17 km buffer or the former 50 m depth limit would protect Koorn Moorn during foraging, as CGG itself notes that adult females feed widely between Portland and Cape Otway out to the 200 m contour. They also highlight NOPSEMA's earlier concerns that the EP did not adequately assess behavioural impacts on the Deen Maar seal colony, including effects on foraging and prey availability. GMTOAC therefore remains	Appendix B12 shows that the Regia MSS uses a 17 km buffer, which is the minimum distance between the active source area and Deen Maar where water depths are ≥50 m, ensuring no seismic work occurs in waters shallower than 50 m. Following NOPSEMA advice, Appendix E7 was updated to assess impacts on foraging Australian Fur Seals at Deen Maar and their prey.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	concerned that the revised control measures do not provide sufficient protection for this culturally important species or for cultural values associated with Deen Maar.		
4512	GMTOAC claims significant concerns about CGG's definition of "acceptable levels" of impact on Blue Whales and Southern Right Whales. CGG maintains that impacts are acceptable so long as each offshore operator conducts activities in a manner consistent with relevant Conservation and Recovery Plans, ensuring whales can continue using the area without injury or displacement. However, NOPSEMA has already criticised this approach, noting that measures designed for individual projects cannot simply be assumed to prevent cumulative impacts from overlapping noise fields without a clearer understanding of combined exposure regimes. Despite this critique, CGG appears to have carried this same rationale forward from its November 2024 EP into the April 2025 version, without addressing the deficiencies identified by NOPSEMA. GMTOAC argues that this is inadequate, especially in light of current environmental pressures affecting Nyamat Mirring.	CGG notes that GMTOAC appears to have referenced an outdated version of the Environment Plan. In the current EP, acceptable impact levels for Blue Whales and Southern Right Whales are defined using each species' Recovery Plan, and these levels are assessed through rigorous, literature-supported impact assessments in Appendices E7 and F3. In response to NOPSEMA's advice, the cumulative impact assessment was updated to include the sound sources and timing of all future and reasonably foreseeable activities. This added detail ensures that any potential cumulative impacts from additive sound exposure are assessed with appropriate contextual information.	EVT352
4513	GMTOAC claims that any cumulative impact assessment must incorporate the ongoing Karenia mikimotoi harmful algal bloom, as required under the Regulations for describing the affected environment and assessing all direct and indirect risks. They point out that harmful algal blooms have been linked to increased calf mortality in Southern Right Whales elsewhere, raising concerns that species already under stress may be unable to withstand additional impacts from CGG's proposed seismic survey.	CGG clarifies that the South Australian algal bloom is caused by Karenia cristata, not K. mikimotoi as stated by GMTOAC. Although the exact cause is not confirmed, the most likely drivers are Murray River flooding with agricultural runoff, upwelling of nutrient-rich deep water, and a marine heatwave. The bloom has been largely confined to the gulfs and northern Kangaroo Island and is now significantly reduced. While harmful algal blooms are known to cause marine mammal deaths, the species responsible in past cases differ from those present in South Australia, and there is little evidence linking K. cristata to whale mortality. The event is being closely monitored, and the Regia MSS EP will be updated if necessary.	EVT352

Annex 3

Underwater Acoustic Sensitive Species

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Dolphins							
Bottlenose Dolphin	Species or species habitat may occur within area						None identified
Common Dolphin, Short-beaked Common Dolphin	Species or species habitat may occur within area						None identified
Dusky Dolphin	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species			None identified
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin	Species or species habitat likely to occur within area						None identified
Risso's Dolphin, Grampus	Species or species habitat may occur within area						None identified
Southern Right Whale Dolphin	Species or species habitat may occur within area						None identified
Whales							

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Andrew's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Antarctic Minke Whale, Dark-shoulder Minke Whale	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Arnoux's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Blainville's Beaked Whale, Dense-beaked Whale	Species or species habitat may occur within area					None identified	None identified
Blue Whale	Foraging, feeding or related behaviour known to occur within area	Endangered	Migratory	Migratory Marine Species		Foraging (annual high use area)	Conservation Management Plan for the Blue Whale (DoE 2015c)
Cuvier's Beaked Whale, Goose-beaked Whale	Species or species habitat may occur within area					None identified	None identified
Dwarf Sperm Whale	Species or species habitat may occur within area					None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
False Killer Whale	Species or species habitat likely to occur within area					None identified	None identified
Fin Whale	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		None identified	Conservation Advice *Balaenoptera physalus* Fin Whale (TSSC 2015b)
Gray's Beaked Whale, Scamperdown Whale	Species or species habitat may occur within area					None identified	None identified
Hector's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Humpback Whale	Species or species habitat known to occur within area		Migratory	Migratory Marine Species		None identified	Listing Advice *Megaptera novaeangliae* Humpback Whale (DAWE 2022a)
Killer Whale, Orca	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Long-finned Pilot Whale	Species or species habitat may occur within area					None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Minke Whale	Species or species habitat may occur within area					None identified	None identified
Pygmy Right Whale	Foraging, feeding or related behaviour likely to occur within area		Migratory	Migratory Marine Species		None identified	None identified
Pygmy Sperm Whale	Species or species habitat may occur within area					None identified	None identified
Sei Whale	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species		None identified	Conservation Advice *Balaenoptera borealis* sei whale (TSSC 2015c)
Short-finned Pilot Whale	Species or species habitat may occur within area					None identified	None identified
Southern Right Whale	Breeding known to occur within area	Endangered	Migratory (as Balaena glacialis australis)	Migratory Marine Species		Reproduction Migration	Conservation Management Plan for the Southern Right Whale (CoA 2012) National Recovery Plan for the Southern Right Whale (DCCEEW 2024)
Sperm Whale	Species or species habitat may occur within area		Migratory	Migratory Marine Species		None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale	Breeding known to occur within area					None identified	None identified
True's Beaked Whale	Species or species habitat may occur within area					None identified	None identified
Pinnipeds							
Australian Fur-seal, Australo-African Fur-seal	Breeding known to occur within area				Listed	None identified	None identified
Australian Sea-lion, Australian Sea Lion	Species or species habitat known to occur within area	Endangered			Listed	None identified	Conservation Advice *Neophoca cinerea* Australian Sea Lion (TSSC 2020b) Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaC. 2013a)
Long-nosed Fur-seal, New Zealand Fur-seal	Species or species habitat may occur within area				Listed	None identified	None identified

Annex 4

Summary of Blue Whale Monitoring Data for Otway Regions

Several whale surveys have been undertaken in the Otway Regionwith a focus on blue whales. A summary of the publicly available studies is provided in this section.

Aerial Surveys (2001-02 to 2006-07)

Gill et al. (2011) undertook 69 seasonal aerial surveys for blue whales between Cape Jaffa and Cape Otway over six seasons (2001-02 to 2006-07). This study found that the general pattern of seasonal movement of blue whales is from west to east, with whales foraging in between the Great Australian Bight and Cape Nelson in November and spreading further east in December. Whales are typically widely distributed throughout Otway shelf waters from January through to April (Gill et al. 2011) (Figure E7-4 and Figure E7-5).

Blue whale encounter rates in the central and eastern study (Cape Nelson to Cape Otway) area by month is shown in Figure E7-3 with sighting and effort data presented geographically in Figure E7-4 and Figure E7-5. Data is pooled for all seasons, for central and eastern areas, overlaid on gridded aerial survey effort (10 km x 10 km squares), represented as minutes flown per grid square (key, upper right). Thick solid lines represent 50% and 95% probability contours for blue whale distribution from density kernel analysis. Dashed lines are central and eastern boundaries (Gill et al. 2011).

There had been fewer than 50 sightings of blue whales in Bass Strait up to the year 1999, but since that time feeding blue whales have been more regularly observed in the Discovery Bay area and more generally along the Bonney coast from Robe to Cape Otway. Gill et al. (2011) found that across the eastern zone (Cape Nelson to Cape Otway), there were no blue whale sightings in November (2001-2007) despite significant effort (Figure E7-2).

Based on the pooled aerial survey data (2001-2007), encounter rates increased from 1.6 whales per 1,000 km in December, to 9.8 whales per 1,000 km in February, decreased slightly to 8.8 whales per 1,000 km in March, then declined sharply to a single sighting for May (0.4 whales per 1,000 km) (Gill et al. 2011). A mean blue whale group size of 1.3±0.6 was observed per sighting with cow-calf pairs observed in 2.5% of the sightings. Gill et al. (2011) also identified that 80% of blue whale sightings are encountered in water depths between 50 and 150 m; 93% of sightings occurred in water depths <200 m and 10% of sightings occurred within 5 km of the 200 m isobath in the eastern and central zones.

The data from Gill et al. (2011) shows:

- Blue whales are typically widely distributed throughout central and eastern areas shelf waters from January through to April.
- Blue whale numbers are significantly lower in November, December and January in the eastern area compared to the central area.
- No blue whales were sighted in the eastern area during November for any season despite significant effort. Pooled monthly encounter rates increased from 1.6 whales 1,000 km–1 in December, 5 whales 1,000 km–1 in January, peaked at 9.8 whales 1,000 km–1 in February, dropped slightly to 8.8 whales 1,000 km–1 in March, then declined sharply to a single sighting for May (0.4 whales 1,000 km–1).
- Encounter rates in central and eastern zones peaked in February, coinciding with peak upwelling intensity and primary productivity.

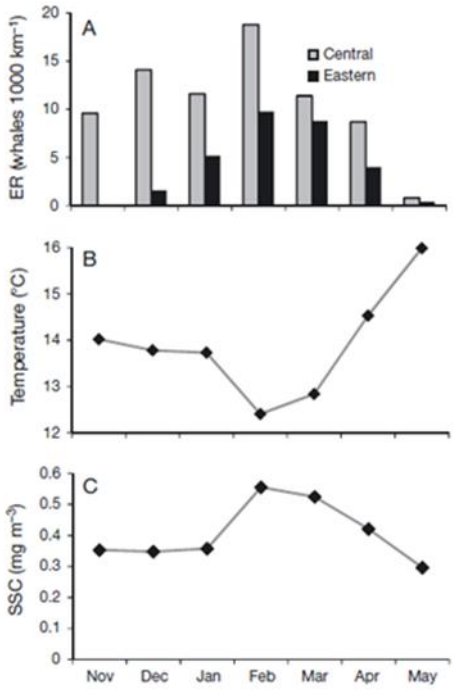

Figure E7-3 - Blue Whale Encounter Rates in the Central and Eastern Study (Cape Nelson to Cape Otway) Area by Month (Gill et al. 2011).

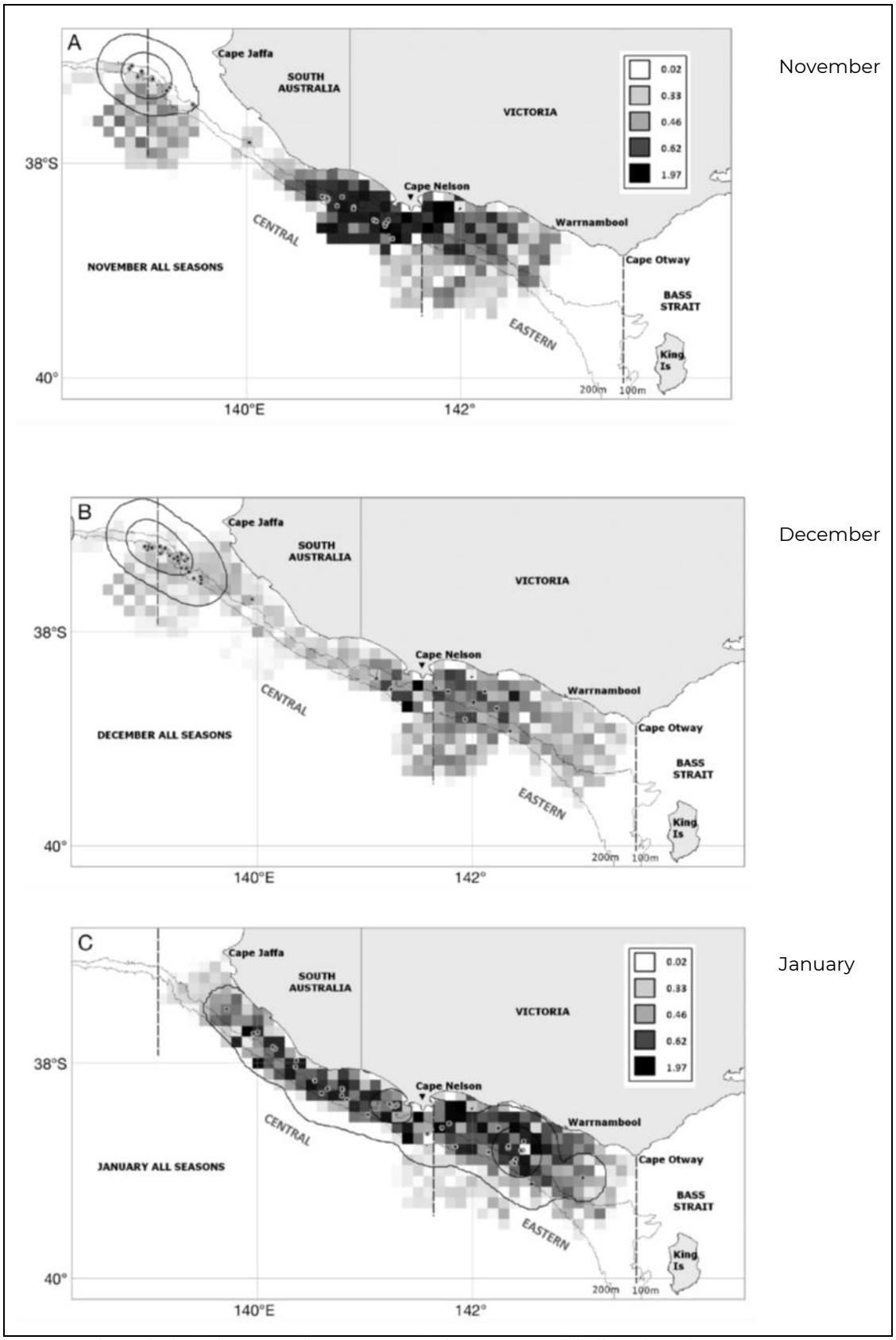

Figure E7-4 - Blue Whale Sightings in the Otway Basin (Nov, Dec, Jan) (Gill et al. 2011).

Note: Dots represent blue whale sightings while squares are aerial survey effort (10 km x 10 km squares) represented as minutes flown per grid square (key, upper right corner of the November and January figures).

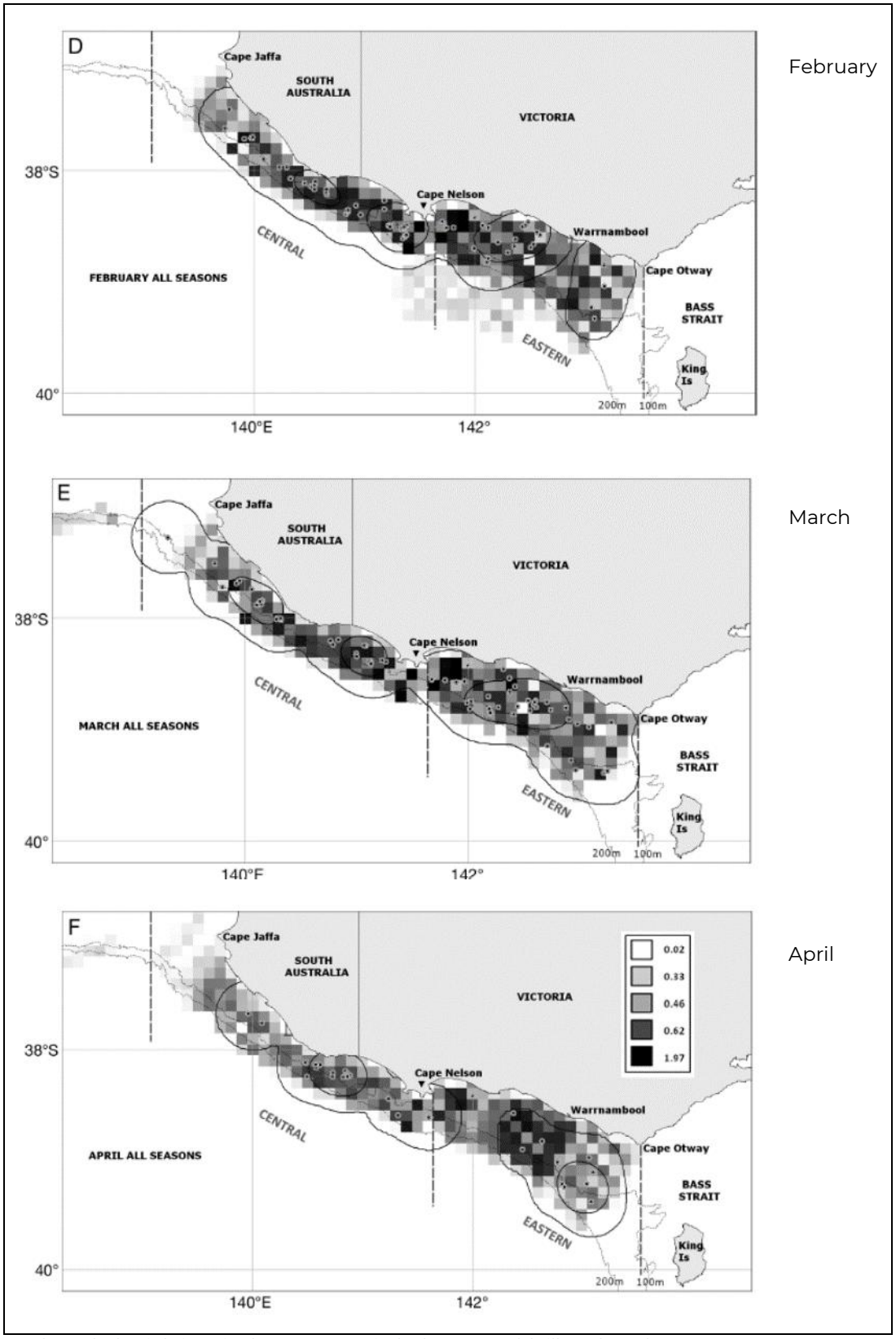

Figure E7-5 - Blue Whale Sightings in the Otway Basin (Feb, Mar, Apr) (Gill et al. 2011).

Note: Dots represent blue whale sightings while squares are aerial survey effort (10 km x 10 km squares) represented as minutes flown per grid square (key, upper right corner of the April figure).

Tagging Study (2015-2016)

Möller et al. 2020 analysis data from the tags of 13 pygmy blue whales that were tagged in the Bonney upwelling region in January 2015 with tags transmitting up to March 2016. In summary:

- Whale movements in the Great Southern Australian Coastal Upwelling System (GSACUS) ranged mostly from eastern South Australia, over the continental shelf south of Kangaroo Island, to between mainland Australia and Tasmania), with a few whales performing some movements to the continental slope and the deep-sea (Figure E7-6).
- In the GSACUS, most tagged whales remained over the continental shelf, utilising this region from at least January to July. This was the area of highest occupancy by the whales, with one whale returning to the Bonney Upwelling in January the year after and remaining there for at least three months. This timing coincides with the upwelling season, which generally occurs from November to March each year.
- A low probability of area restricted search (ARS) behaviour (i.e., high probability of transiting behaviour) was mainly observed between April and June, and then between November and December, suggesting that the pygmy blue whales were mainly migrating during those times.
- Seascape correlates of ARS behaviour for these whales suggested the importance of sea surface temperature, sea surface height anomaly, wind speed and chlorophyll a concentration as proxies of upwelling productivity and presence of krill patches.

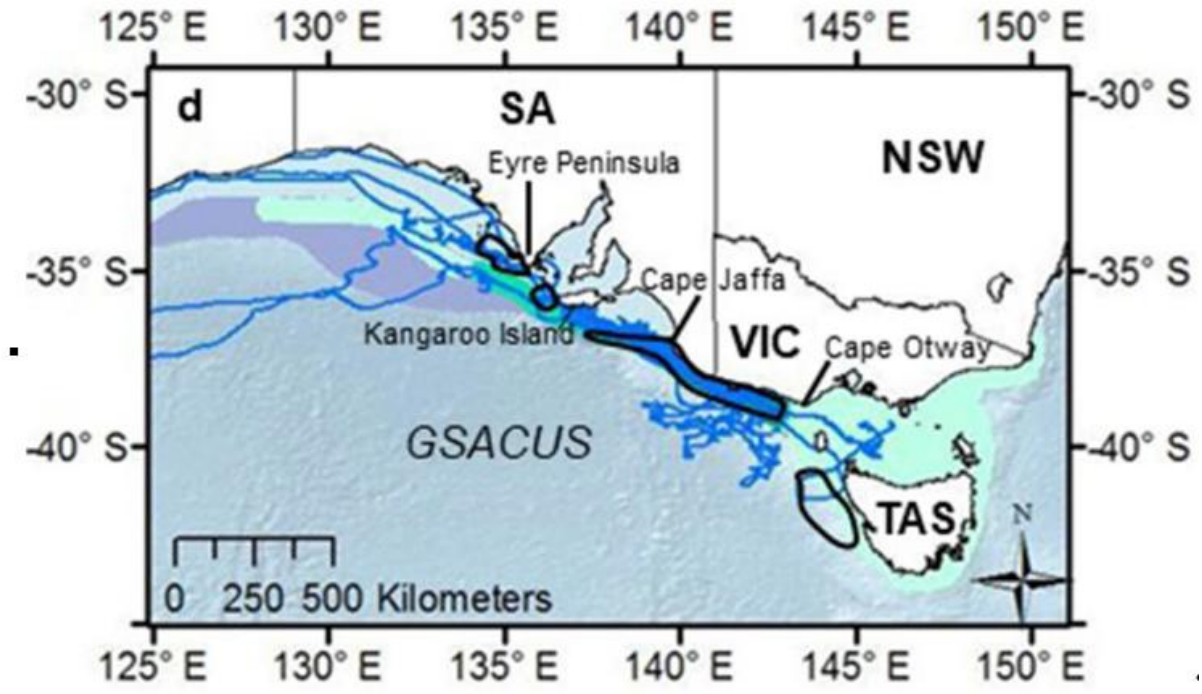

Figure E7-6 - Tracks of 13 Pygmy Blue Whales in the GSACUS (Möller et al. 2020).

Passive Acoustic Recorders (2009-2017)

Between 2009 and 2017 the Integrated Marine Observing System (IMOS) recorded underwater sound south of Portland, Victoria. McCauley et al. (2018) analysed the data from to look at blue whale presence, distribution, and population parameters.

McCauley et al. (2018) analysed data from passive acoustic recorders that were located around Australia to look at blue whale presence, distribution, and population parameters. The primary sites comprised central Bass Strait, western Tasmania, the southeast Australian coast, and the Great Australian Bight area. Each study area had multiple receivers and may have had several sites sampled within the area. Temporal sampling focussed on the southern Australian site southwest of Portland, Victoria. Data was used from 2004 to 2016. The study concluded:

- Antarctic blue whale calls were received via deep sound channel propagation south of Portland and the maximum chorus levels occurred from late February to late June with yearly increases in chorus levels. McCauley et al. (2018) suggests that acoustic detection of Antarctic blue whales indicate they predominantly occur along the entire southern coastline.
- Pygmy blue whales have three migratory stages around Australia; the "southbound migration stage" were predominantly between October to December (sometimes into January) whales travel from Indonesian waters down to the WA coast, the "southern Australian stage" where between January and June whales spread across the southern Australian waters, and the "northbound migration stage" where whales travel back up to Indonesia between April and August.
- The "southern stage" involves animals searching for feeding sites, feeding, and then marking their way north towards June.
- Along the southern Australian coastline pygmy blue whales are most frequently detected towards the east along the Bonney coast over late February to early June, utilising secondary productivity produced by a seasonal upwelling event.
- Within a season it is difficult to predict whale numbers and their specific locations, but when correlated across seasons the strength and persistence of this upwelling event as given by time integrated water temperature south of Portland, significantly correlates with time integrated number of individual whales calling from the same site.
- The Bonney coast upwelling is a strong predicator of pygmy blue whale presence at Portland where whale presence in the area is linked to prey availability.
- Sea noise data was available from the Portland site from 2009 to early 2017 detailed:
    - In 2009 and 2011 pygmy blue whales arrived in November or December whereas in the other years, calls were not detected until January or February (Figure E7-7). There was substantial variation in presence within a season, with some whales remaining in the Portland detection area until mid-June each year.
    - There was considerable variability in whale persistence and presence within a season (Figure E7-7) with no consistent trend other than a peak in presence somewhere over February to June.
- It is difficult to predict numbers within a season but when correlated across seasons the strength and persistence of the Bonney coast upwelling, given by time integrated water temperature, significantly correlates with time integrated number of individual whales calling from the same site. The upwelling index explains 83% of the variability in blue whale calling presence across seasons when using seasonal whale counts (not corrected for population growth). When a growth rate of 4.3% is applied a correlation of 90% of the variance in seasonal occurrence is predicted by the upwelling index.
- The number of pygmy blue whale calling in Portland could be expected in increase yearly with whale population growth.

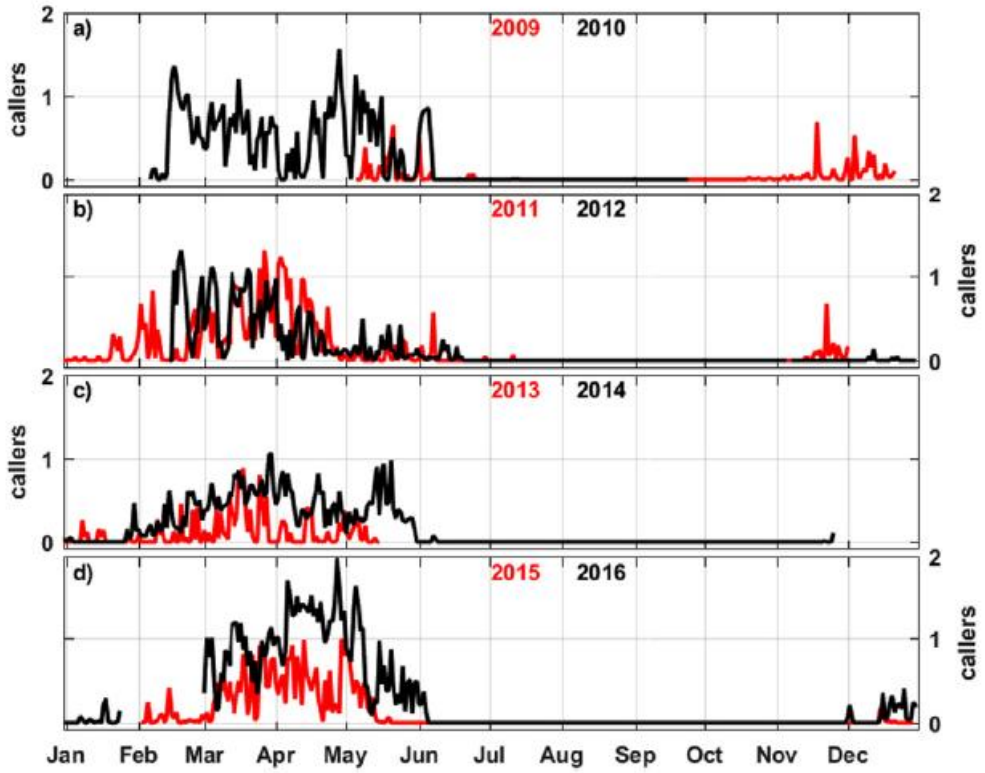

Figure E7-7 - Mean Number of Individual Pygmy Blue Whales Calling (McCauley et al. 2018).

Beach Energy Surveys 2021

Beach Energy commenced its Otway drilling program in February 2021 and engaged the Blue Whale Study to undertaken aerial surveys from February to May 2021 to identify blue whale and krill surface swarms within the Otway Development Area and outside of this area (Beach Energy 2022). A preliminary data summary provided to Beach detailed:

- Nine aerial surveys were undertaken from 25 February to 21 May 2021.
- There were 34 blue whale sightings consisting of 43 individuals.
- The highest number of blue whale sightings was on 7 April with 19 blue whales sighted.
- The first blue whale was sighted 25 February and final blue whale sighted 7 April.
- Blue whales and krill surface swarms were distributed throughout the area surveyed.

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REGIA
Marine Seismic Survey

Impact Assessment
Underwater Sound: Diving, Surfing and Swimming

Appendix E8: REG-EP-027-E8

Rev 5

December 2025

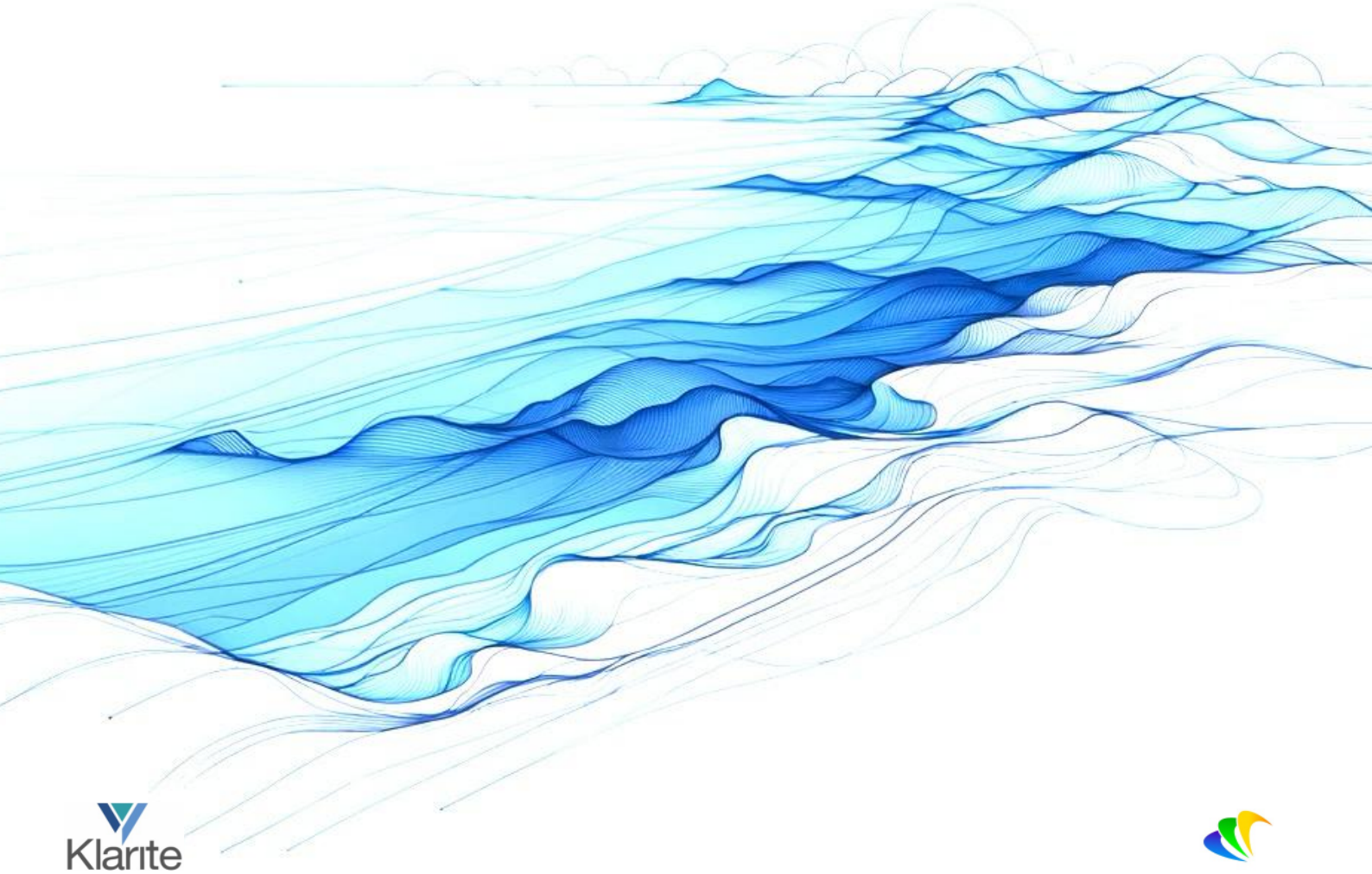

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Table of Contents

1 Introduction 3
1.1 Purpose and Scope 3
1.2 Consultation in Preparation of the EP 3
1.3 Modifications Arising from Further Assessment 3
2 Aspect – Underwater Sound 5
2.1 How the Aspect Occurs 5
2.2 Extent and Duration of the Aspect 5
3 Cause-Effect Pathway 6
4 Description of the Existing Environment that may be Affected by the Activity 7
5 Relevant Legislative Requirements 8
6 Defining Acceptable Levels of Impact 9
7 Consultation Input 12
8 Minimisation of Impacts Through Activity Design 13
8.1 Elimination 13
8.2 Substitution 13
9 Predicted Levels of Impact 14
9.1 Change in physical condition 14
9.1.1 JASCO Modelling 14
9.1.2 SLR Modelling 16
9.2 Measures Adopted to Manage Environmental Impacts 17
10 Demonstration Impacts will be of an Acceptable Level 18
10.1 Principles of ESD 18
10.2 Biological and Ecological Categories 18
10.3 Economic, Cultural and Social Categories 18
10.4 Consistency with Company Processes 19
11 Environmental Performance Outcomes 20
12 Recommendations 22
13 Document Control 23
14 References 24
Annex 1 25
Public Comment 25
Annex 2 26
Objections and Claims Raised from Consultation 26

1 Introduction

This document presents analysis of an environmental aspect, underwater sound, between the Regia Marine Seismic Survey (Regia MSS) and the existing environment that may be affected by that aspect. This environmental aspect was identified by the Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4) for further assessment.

This analysis is based on information provided in the preceding studies:

1. Sound Emissions Initial Modelling Report (Appendix B7)
2. Sound Emissions Secondary Modelling JASCO and SLR Reports (Appendix B7b and B7d)
3. Seismic Sound Studies Report (Appendix B8)
4.

1.1 Purpose and Scope

The purpose of this document is to assess all acceptable sources of information to provide clear outcomes around levels-of-impact, and any associated mitigation and management measures that may be needed.

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document was first published in draft form to the Document Library of the Regia MSS Consultation Hub on 11 September 2023. This was done to acknowledge that the final full Environment Plan (EP) can be a large document that is difficult for readers to digest in the 30-day public comment period. As such, the public and relevant persons were invited to comment on the document with an explicit request for readers to provide feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

1.3 Modifications Arising from Further Assessment

To ensure this environmental assessment remains contemporary, accurate, and reflects feedback from the regulator and relevant persons, this document will be updated from time-to-time. In particular, the CGG environmental assessment process requires consideration of whether further assessment was needed to verify, or dive deeper into a topic, to further improve the predictive quality

of the assessment. When this has occurred, reference to such changes will be communicated in the Recommendation section and identified at relevant points in the assessment.

2 Aspect – Underwater Sound

2.1 How the Aspect Occurs

Impulsive underwater acoustic emissions will result from the seismic source releasing compressed air (seismic pulse) that creates a sound wave that is directed downwards into the seabed.

2.2 Extent and Duration of the Aspect

Impulsive Sound

Duration: 60 days

Extent: Active Source Area and area of sound propagation within which the human health safety criterion will be exceeded as detailed in the impact assessment sections.

Seismic acquisition where the seismic source will be active will occur for up to 60 days within the Active Source area.

3 Cause-Effect Pathway

The PEIRA (Appendix B4) identified a cause-effect pathway for underwater sound for the following environmental components:

- Divers, surfers, and swimmers.

Potential environmental impacts to divers, surfers, and swimmers identified from the PEIRA are:

- Change in physical condition.

4 Description of the Existing Environment that may be Affected by the Activity

For a description of the baseline soundscape in the region relevant to the Regia MSS, refer to Section 1.1 of Appendix B8.

Via stakeholder consultation it was identified that diving, surfing, and swimming occurs along the coastal area adjacent to the Operational Area daily throughout all seasons. Access to Country, including coastal areas, is also a highly valued and key aspect of cultural maintenance for Indigenous peoples. Divers, swimmers, and surfers may be affected at the following popular diving sites are:

- Deen Maar (Lady Julia Percy Reserve)
- Port Campbell Harbour
- Port Fairy – South Beach, Pea Soup Beach, The Passage and Battery Point
- Merri Marine Sanctuary
- Portland Harbour
- Warrnambool Harbour

Popular beaches are:

- Bay of Islands
- Bowkers Beach
- Childers Cove
- Clifton Beach
- Gibsons steps/Gibson Beach
- Massacre Bay
- Newfield Beach
- Rivernook Beach

The JASCO modelling report included 13 representative coastal locations as well as Deen Maar where received sound levels were calculated. These locations were spatially spread out along the coastline adjacent to the Survey Acquisition Area providing considerable coverage for prediction of human health threshold exceedances.

5 Relevant Legislative Requirements

CGG has considered all the relevant legislative requirements, that apply to underwater sound and divers, surfers, and swimmers (see Appendix B2). Measures that must be adopted are as follows:

- Diving Medical Advisory Committee (DMAC 2020) requires that efforts are made to implement a SIMOPS plan in consultation with divers with an appropriate risk assessment undertaken.

6 Defining Acceptable Levels of Impact

Scuba divers, surfers and swimmers exposed to high levels of underwater sound can suffer from dizziness, hearing damage or other injuries to other sensitive (mainly air-filled) organs, depending on the frequency and intensity of the sound.

Underwater, the human ear is about 20 dB less sensitive than it is in air at low frequencies (20 Hz), increasing to 40 dB at mid-frequencies (less than 1 kHz), and increasing to 70–80 dB less sensitive at higher frequencies (Parvin 1998).

Information on studies in relation to seismic acoustic emission impacts and diving is provided Seismic Sound Studies Report (Appendix B8).

Seismic activity results in the transmission of acoustic waves through the water which divers or swimmers experience as vibration or a noise analogous to a piling hammer. Multiple reflections of this acoustic wave from the sea surface, seabed and other structures may result in this sounding like a low frequency rumble (DMAC 2020).

A safety criterion for recreational divers and swimmers of 145 dB re 1 µPa is conservatively used to assess potential adverse effects. This does not imply that this level is associated with the onset of injury, which has not been established due to ethical research protocols. Parvin (2005) reported vibration in forearms and thighs at the much higher level of 180 dB re 1 µPa but no physical injury.

CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that assessment specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, Table E8-1 shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding assessment specific defined acceptable levels established for this assessment. This sets the foundation for relevant and targeted demonstration later in this assessment. [1]

Table E8-1 - Defined acceptable levels of impact from underwater sound effects to fish

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	Sound exposure to coastal users is below the per-pulse safety criterion relating to amenity value of 145 dB re 1 µPa.	This level is based on internationally recognised guidance for human exposure to underwater noise, particularly in relation to comfort and

[1] Note: The acceptable levels related to demonstrating ALARP and the adoption of specific measures to ensure the effectiveness of control measures can be found in Appendix F2 and B3 respectively. As they are criteria integral to the acceptance of the Environment Plan, and they a documented elsewhere, these criteria are not discussed further in this assessment.

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		amenity values for recreational divers and coastal users. An SPL human health assessment (Parvin 2005) supports this threshold. Exceeding this threshold may result in aversion or perceived nuisance, undermining social licence.
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	Reflects Commonwealth and State policy objectives for sustainable resource use and protection of ecosystem services.
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	This level reflects the principle of maintaining cultural values and heritage as protected under national and state legislation. It ensures that activities do not interfere with traditional practices, spiritual connections, or ongoing access to culturally significant areas.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	This level reflects broader social licence to operate, ensuring that environmental activities do not lead to degradation of public amenity, loss of recreational use, or impacts to non-Indigenous heritage values. It aligns with Commonwealth policies promoting public access, well-being, and sustainable use of the marine environment.
	The views of public have been considered in the impact and risk assessment.		

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Specific)	Rationale
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic sound on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Impacts Through Activity Design

As part of planning and design of the activity, several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of impact could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In the context of underwater sound, elimination involves removing the source of underwater sound or preventing its generation in the first place. Two main options were considered:

No seismic acquisition within 17 km of Deen Maar / Lady Percy Julia Island

This option has been considered by CGG to eliminate the risk of exposing divers to sound pressure levels that may exceed safe thresholds in shallower waters where sound energy is more likely to reflect and concentrate, thereby increasing potential exposure and associated risks. By eliminating operations in shallower depths, the activity design ensures that risk to diving personnel is avoided in the most sensitive depth zones.

Excise areas of the acquisition area that have been identified to cause exceedances of safe diving thresholds

This approach eliminates potentially high-risk areas within the acquisition area. It ensures that seismic activities do not occur in locations where modelling or empirical data indicate the potential for unsafe sound exposure levels to divers. The limitation was accepted by CGG to prioritise diver safety and reduce the need for more complex mitigation measures during operations. By eliminating high-risk segments of this area, the project reduces the likelihood of adverse impacts while maintaining operational objectives.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the impact. No substitution-based limitations were required in this case, as the elimination measures applied were sufficient (when applied with other measure types) to reduce the identified impact to an acceptable level.

9 Predicted Levels of Impact

To arrive at the predicted levels of impact of underwater sound on divers at this stage in the process requires the reader to have assimilated all prior relevant information that has been assessed on birds. The EP documentation is coded alphabetically to guide the reader through what is a natural process of temporal accumulation and review of evidence. The following documentation forms the evidence lineage for predictions on birds as described here.

- Sound Modelling Reports - JASCO Applied Sciences (JASCO) and SLR performed a numerical modelling study of underwater sound levels associated with the planned Regia Marine Seismic Survey (MSS) to assist in understanding the potential acoustic impacts on key regional receptors including birds, marine mammals, fish, turtles, benthic invertebrates, plankton and recreational divers and swimmers. Acoustic thresholds derived from this document are used to guide assessments of impacts.
- B8 – Seismic Studies Report – This report provides a detailed assessment of the scientific literature related to sound (and specifically seismic) effects on birds and other fauna including divers and swimmers. This literature is the key evidence base from which impact levels are derived.

9.1 Change in physical condition

9.1.1 JASCO Modelling

Based on the second acoustic modelling report (Appendix B7b) there is the potential for received sound levels at coastal areas where diving, surfing, and swimming occurs to exceed the human health safety criterion. As this would not be acceptable, CGG will adapt the Regia MSS so that received level at coastal areas is below the safety criterion for recreational divers and swimmers. The area in which the sound source would operate at full capacity (Survey Acquisition Area) has therefore been further constrained to the area from where the human health safety criterion would not be exceeded at any coastal location assessed. This involves avoiding acquisition using the sound source at full power in the area in red in Figure E8-1.

The second iteration of acoustic modelling undertaken deliberately introduced an assessment of sound exposure at 14 relevant sites across the coastline adjacent to the Survey Acquisition Area. Guidance issued by the Diving Medical Advisory Committee (DMAC 2020) suggests that adverse effects to divers may be experienced at distances of up to 27 km from the seismic source, which is within the range of the modelling distance for the Regia MSS. Five of the coastal locations assessed were within 27 km.

A per-pulse safety criterion of 145 dB re 1 µPa was applied which the modelling indicated could be exceeded at:

- Killarney Beach (150.6 dB re 1 µPa)
- Port Fairy Lighthouse (154.6 dB re 1 µPa)
- Deen Maar / Lady Julia Percy Island (154.8 dB re 1 µPa)
- Merri Sanctuary (151.8 dB re 1 µPa)
- Middle Island (151.8 dB re 1 µPa)

The two closest coastal sites to the Active Source Area (Port Fairy Lighthouse & Deen Maar) at 20.7 and 16.6 km distance, respectively. Figure E8-1 illustrates the sound source location where the safety criterion would be exceeded at any of the coastal sites assessed. Received sound levels at the three

other coastal sites within 27 km of the sound source (Deen Maar, Middle Island and Merri Sanctuary) were below the safety criterion.

The activity design parameters have continued to evolve throughout the preparation of the Regia MSS EP. As such, the northern most lines of the survey area have been removed such that modelled sound impulse sites 1, 2, and 3 are no longer the drivers of the exceedance levels shown above. Analysis of the remaining relevant sound impulse sites (4 – 15) shows that all dive sites now have exposures below 140 dB re 1 µPa, except for waters around Deen Maar / Lady Julia Percy Island (Site 15).

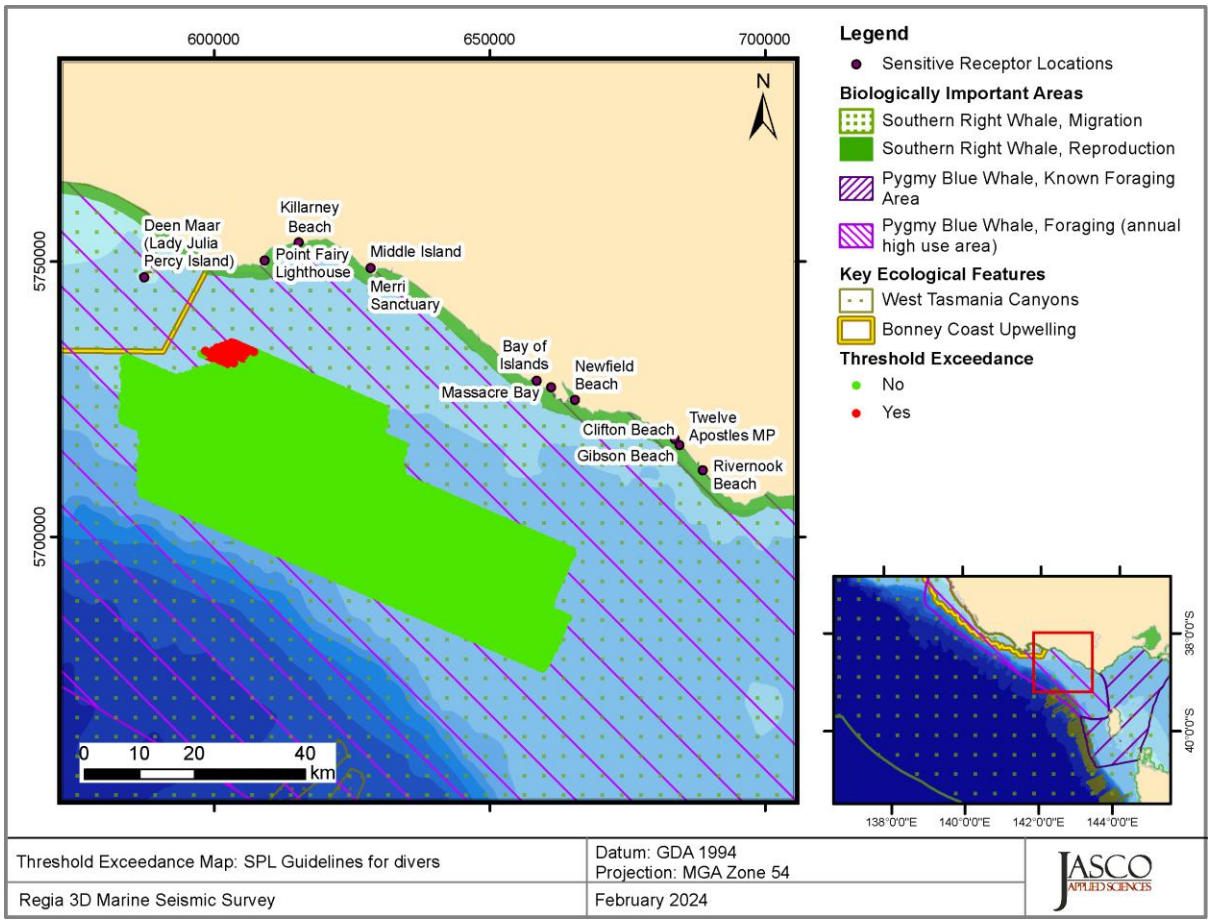

Figure E8-1 - Assessment of safety criterion exceedance at any coastal sites from within the proposed active source area. Area within the proposed active source area from where exceedance of the safety criterion may occur is indicated in red.

9.1.2 SLR Modelling

SLR was commissioned by CGG to conduct an underwater acoustic study using a lower sound source (see Appendix B7c). While SLR did not model received levels at specific receiver locations, this study modelled 3 sites from the JASCO report, sites 15, 10 and 7 (see Figure E8-2 below). A per-pulse safety criterion of 145 dB re 1 μ Pa was applied to each site. The maximum distance at which this threshold was exceeded was at 42.35km from the sound source.

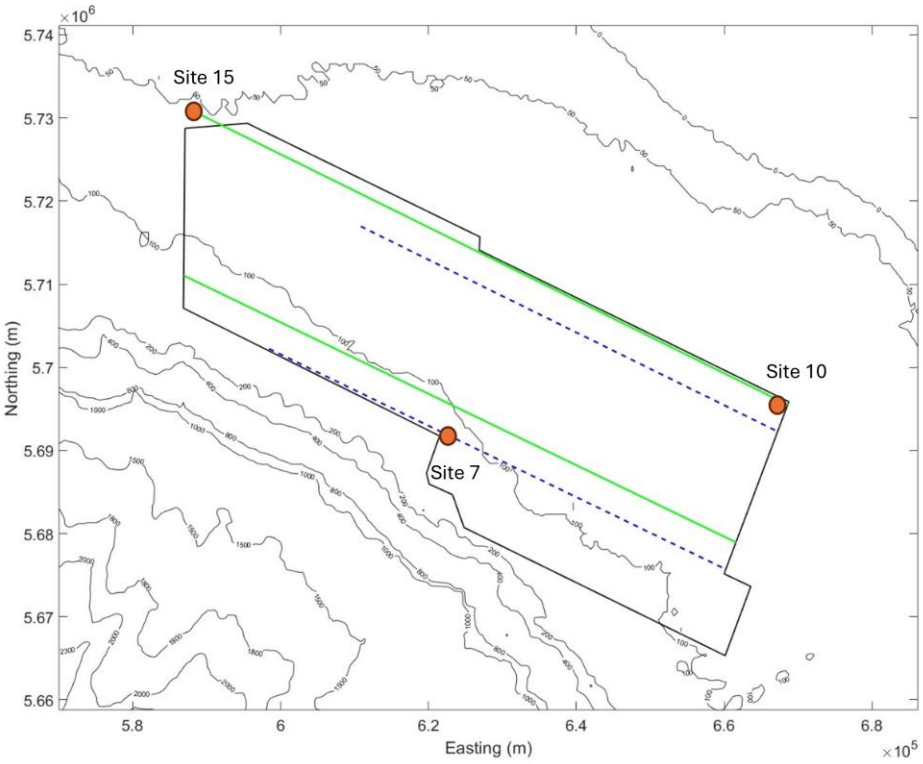

Figure E8-2: A map showing the modelled sites in the SLR underwater sound study.

The uncertainty level for impact to divers is assessed as low based on:

- The conservative human health safety criterion used to identify where potential adverse effects may be experienced (of 145 dB re 1 µPa).
- There were concerns raised throughout consultation with relevant person regarding sound levels at recreational dive sites close to the Operational Area (Event ID 2028).
- Following these concerns, CGG commissioned JASCO to undertake underwater sound modelling report that deliberately assessed received sound levels at 13 representative locations across the coastline adjacent to the proposed Active Source Area as well as Deen Maar.
- CGG also commissioned SLR to conduct underwater sound modelling and found the 145 dB re 1 μ Pa will be exceeded at 42.35km from the sound source.
- The Active Source Area has been further constrained to areas where the human health safety criterion is not exceeded anywhere on the adjacent coastline or at Deen Maar.

The predicted level of impact based on the effect (negligible) and uncertainty (low) levels is assessed as low. The predicted levels of impact are beneath levels of perception and/or within normal bounds of variation. Good industry practice (including legislation and standards) has been applied and therefore these impacts are of an acceptable level without further reduction measures being required.

9.2 Measures Adopted to Manage Environmental Impacts

The following measures have been adopted to ensure that the impacts associated with elevated levels of underwater sound from the survey and support vessels on divers, surfers, and swimmers will be of an acceptable level.

These measures have been taken through to the ALARP assessment in the next stage of the CGG assessment process. This assessment can be found in Appendix F2.

Measure	Measure Type	Details and Justification
Diving SIMOPs Plan	Resource	Best endeavours will be used to ensure this plan is developed with local divers and commercial divers that is consistent with DMAC guidelines.
Consultation Management System	System	Local newspapers will be used to notify the public of the SIMOPS Plan and the timing of the activity.
Sail Line Plan	Resource	This plan is used by all staff and vessels to align on the operational parameters, schedule, and conduct of the survey within the activity limitation required by this EP.

10 Demonstration Impacts will be of an Acceptable Level

10.1 Principles of ESD

Temporary, Reversible, and Small Scale

As described in the impact assessment, the Regia Marine Seismic Survey will generate impulsive underwater sound from an airgun array with a total volume of 2,630 in³, active over 60 days in a 90-day period. SLR modelling shows that the predicted distances at which regulatory thresholds for harm to divers may be exceeded are extremely small: Parvin (2005) and NATO (2006), 184 dB re 1µPa (rms) exposure limit which can cause physiological damage to divers is exceeded only within 520 m of the source, and the more conservative 170 dB re 1µPa (rms) limit for divers which is the tolerance limit is exceeded only within 2.72 km. Swimmers and surfers are not expected to be exposed to these levels given these distances are based on modelled site that are in water depths of more than 50m. . These distances are highly localised compared to the total survey area and survey vessel speed (4–6 knots), meaning any potentially affected area moves continuously and is of short duration. There are no planned survey operations in nearshore waters where these activities commonly occur. Therefore, any potential environmental harm from underwater sound exposure to people is predicted to be of low intensity, short duration, reversible, and confined to a very limited spatial scale. The predicted levels of impact are beneath levels of perception and/or within normal bounds of variation. There is however the potential for received sound levels at coastal areas where diving, surfing, and swimming occurs, but they should not exceed the safe diving criterion.

Based on sufficient information

The impact assessment used peer-reviewed literature, national standards (AS/NZS 2299.1:2015), international health guidance, and site-specific acoustic modelling to define thresholds for safe exposure. Sound propagation modelling was conducted using JASCO's and SLR's established methodology and considered average seasonal propagation conditions. Thresholds from the Australian Standard for occupational diving and conservative limits for recreational and public exposure were applied. There is no evidence of serious or irreversible harm at or beyond the modelled distances, and swimmer and diver hearing injury thresholds (e.g. 230 dB SEL) are not predicted to be exceeded at any distance. The assessment concluded that sufficient information was available to characterise impacts, and uncertainty was low. The precautionary principle was not triggered.

Activity not inconsistent with EPBC Act

Underwater sound exposure to humans is not regulated under the EPBC Act, which focuses on environmental and species conservation. However, the assessment reviewed and followed applicable occupational health standards and international marine planning guidance. The EPBC Act was also considered in relation to sensitive cultural values or protected areas that could coincide with recreational water use, and none were identified within the survey area. No recovery or management plans applicable under the EPBC Act address human use of the marine environment in relation to sound exposure. Accordingly, the activity is not inconsistent with the Act or any associated instruments.

10.2 Biological and Ecological Categories

Not applicable to this impact pathway, no marine fauna or biotic components are assessed in this section. The focus of this assessment is on potential harm to humans engaging in in-water activities. There are no pathways by which diver or swimmer exposure would generate damage to ecological features or ecosystem functioning.

10.3 Economic, Cultural and Social Categories

During consultation, relevant persons including recreational divers, coastal tourism operators, community groups, and marine safety agencies raised concerns about potential impacts on in-water

activities and public safety. Several requested exclusion zones or formal warnings in advance of survey operations. In response, CGG committed to implementing a public notification plan that includes regular updates to the Consultation Hub, coordination with marine safety advisories, and targeted outreach to recreational diving clubs and tourism operators. These measures ensure that water users can make informed decisions and avoid the limited zones where sound levels might exceed recreational or occupational exposure thresholds. The modelling demonstrated that no survey operations would occur near popular dive sites, beaches, or surf breaks. Indigenous harvesting of coastal resources such as torbos, pipis, abalone, limpets, mussels, elephant snails, crayfish/lobster, oysters, cockles, and crabs was identified as culturally significant, along with Native Title non-exclusive rights including access to and use of the land and waters, and the taking of resources from the land and water (Appendix F3 Section 3.16.1). As the activity is located 20km offshore, no disruption to access, use, or harvesting is anticipated, with diving, surfing and swimming not expected to be impeded. The consultation process confirmed that affected persons will not be materially worse off and that all relevant claims were appropriately addressed and incorporated into the final EP.

10.4 Consistency with Company Processes

The impact assessment followed the process set out in Appendix B3, using defined consequence criteria and uncertainty ratings. These ratings reflect the short duration, small spatial extent, and avoidance of exposure above regulatory thresholds. All adopted mitigation measures align with good practice and are within the titleholder's control. The final consequence rating remains within company limits.

This impact assessment has demonstrated that the effect of underwater sound to divers, surfers and swimmers has a:

- **Predicted level of effect of negligible.**
- **An uncertainty of low.**
- **Predicted level of impact of low.**

11 Environmental Performance Outcomes

Environmental Performance Outcomes (EPOs) are measurable and activity-specific outcomes that describe the environmental performance the titleholder must achieve to ensure impacts and risks are managed to acceptable levels. EPOs are critical to the structure of an Environment Plan because they form the clear link between the defined acceptable level of impact and the predicted level of environmental consequence. Each EPO must be measurable, achievable, and within the control of the titleholder to implement, providing a transparent and enforceable statement against which performance can be assessed.

Table E8-2 - Environmental Performance Outcomes and Justifications

Defined Acceptable Level (From Table E8-1)	Environmental Performance Outcome	Rationale
Sound exposure to coastal users is below the per-pulse safety criterion relating to amenity value of 145 dB re 1 µPa.	**Received sound levels at coastal areas accessible by coastal users will not exceed the human health safety criterion relating to amenity value.**	This EPO can be supported through acoustic modelling calibrated against real-world measurements and by verifying compliance with predicted exposure contours for coastal areas and dive sites. The predicted levels of impact are beneath levels of perception and/or within normal bounds of variation. There is however the potential for received sound levels at coastal areas where diving, surfing, and swimming occurs, but they should not exceed the safe diving criterion.
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	**Social, cultural, and economic features are protected, sustaining their value for people and communities.**	Predicted impacts to fish are low intensity damage at the population level and within currently accepted levels of impact to these species as applied by the commercial fishing industry. The Otway Adjustment Protocol will be implemented to ensure that affected fishers will not be worse off because of the activity.
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		The Budj Bim eel traps are protected under the World Heritage Area listing, the eels themselves are not. No impacts to the World Heritage Area are predicted. The predicted impacts to eels are low intensity at a population level and within current accepted levels of impact as applied to the commercial fishing industry. The Yarra Pygmy Perch occurs in lakes, ponds, and slow flowing rivers (Saddlier and Hammer 2010). Because of their freshwater affiliation no impact from underwater sound from offshore seismic is predicted.
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		Predicted impacts to fish are low intensity damage at the population level and within currently accepted levels of impact to these species as applied by the commercial fishing industry.

Defined Acceptable Level (From Table E8-1)	Environmental Performance Outcome	Rationale
Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	**The activity is conducted such that environmental impacts and risks remain within the range assessed as medium or lower, with mitigation measures in place and functioning as intended.**	This EPO enables ongoing assessment of effectiveness through internal reviews and operational audits. It provides a clear link between the risk assessment process and implementation strategy, supporting regulatory compliance and continuous improvement without requiring environmental outcome monitoring.

12 Recommendations

The impact assessment has adopted a conservative approach to estimation of the predicted level of impact. Good industry practice (including legislation and standards) has been applied and impacts are therefore considered to be of an acceptable level without further recommendations being required.

13 Document Control

Date	Revision	Update
6 June 2023	A	Draft prepared for initial comment
20 August 2023	B	Update based on comments and relevant person feedback
11 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA for public comment
14 May 2024	2	EP submission to NOPSEMA for assessment
24 October 2024	3	Updated following NOPSEMA assessment
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
6 December 2025	5	Updated following NOPSEMA OMR 2 Letter

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table E8-3 shows how this feedback has been incorporated into the environmental assessments.

Table E8-3 - Public comment input.

Matter	Matter ID	Changes made arising from public comment
Matter: Impacts on dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and Activity limitation, to reflect that the sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the human health safety criterion for recreational divers, surfers and swimmers along the coastline. CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F1 F3, and G1).

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table E8-4. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table E8-4 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4003	Risks to the wellbeing of the human population	The risks to divers, surfers, and swimmers have been thoroughly assessed in E8 and a SIMOPS plan will be developed to ensure the amenity value of the diving/swimming/surfing experience is unaffected.	5114
4226	The email expresses concern about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4357	The stakeholder raised an objection to seismic surveys as they negatively affect the fishing industry, local economy and environment.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of commercial fish species and sensitive species within the area of operation. The MSS will also not impact the local economy. Mitigation plans are in place to reduce any impacts to as low as practicable.	424
4007	A concern was raised regarding the potential exceedances of safe diving thresholds, highlighting the risks associated with seismic activities on divers.	The risks to divers, surfers, and swimmers have been thoroughly assessed in E8 and a SIMOPS plan will be developed to ensure the amenity value of the diving/swimming/surfing experience is unaffected.	2028

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4020	Any threat to the ocean, poses a threat to my health.	The effects on the amenity value of the diving, swimming, surfing experience have been assessed in E8 and limitations put in place to ensure the thresholds for human health are not exceeded.	2857
4022	Attendees voiced concerns about how seismic activities could impact the sustainability and fish-ability of the immediate and nearby areas.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1529
4030	CGG's email on September 14 indicated that the project's timing has changed to two separate 3-month windows: April-June and September-November. AMCS is concerned that the December sound speed profile may not accurately reflect the physical conditions during these new survey periods. Since acoustic propagation modelling is critical for subsequent analyses and for setting thresholds for mitigation measures required for NOPSEMA approval, AMCS requests an explanation of how the December sound speed profile differs from those in April-June and September-November.	We acknowledge this concern and agree that acoustic propagation modelling is the foundation of subsequent analysis. We will complete another modelling report prior to submission to cover the changed timeframes of the proposed survey.	3384
4033	Claim that seismic testing is proven to damage and kill marine life.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1024
4037	Commenter expresses concern that seismic surveys will severely damage the local area and pose significant risks to divers during testing.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. Activity Limitation plans are also in place to remove/ reduce any impacts to as low as practicable. There will be no significant impacts on divers from the Regia MSS.	1432
4049	Concern about the blasts going off while swimming and the harmful sound waves reaching the shores of Port Fairy.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. CGG has assessed impacts to divers and swimmers in E8. The MSS will be operating at >25km from the coast and beyond depths greater than 50m hence significant impacts are not expected. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1452
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation.	879

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	potential for further exploration by other companies, particularly regarding the sale of seismic data.	Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4073	Concerns about impacts both reputational and physical to the region if the activity is allowed.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1244
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4076	Concerns about potential disturbance to the marine environment, including marine parks and areas of Biological Importance.	The titleholder acknowledged this concern and noted that potential impacts to the marine environment including marine parks and biologically important areas as a result of the Regia MSS is assessed in E1 to E9 and F3 of the EP. There will be no activities with Australian Marine Parks. All areas of biologic importance have been identified and assessment in the respective impact and risk assessments.	2278
4077	Concerns about potential harm to zooplankton, whales, dolphins, sharks, seals, the Bonney Upwelling, rock lobster fishery and other local fishing industries.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	722
4078	Concerns about seismic testing and drilling rigs impacting marine life and fishing activities.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels	917

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		of harm that would endanger the population stability of any taxa.	
4082	Concerns about the noise and effects of seismic surveying on swimming, snorkelling, and observing marine life.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	1263
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825
4088	Condemns seismic testing, asserting that it is deadly to marine life and unacceptable for ocean ecosystems. Call for a total ban, citing the large number of marine animals harmed by the practice. Argument that the destruction of marine ecosystems and the fishing industry is unjustifiable and express frustration, telling the parties responsible to stop.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	422
4091	DMAC guidelines had been followed, meaning that the threshold used was one of aesthetic value of the experience rather than a physiological effect.	The titleholder acknowledged this claim and provided the project website which contains relevant information.	2282
4093	Doubted the effectiveness of mitigation measures and believed the reports/information provided were absent of action /intention.	The mitigations applied by CGG are industry standard and comply with government policy. They have been proven to be as effective as reasonably practical for a number of years. The measures adopted to protect species from the aspects of the activity are found in the respective impact and risk assessments.	2830
4100	Expresses concern that while the proposed exclusion zone for seismic testing is set at depths less than 40 meters, this may not be sufficient to protect abalone divers. Comment that a safer distance of 10.3 kilometres away from the 30-meter	The 40m exclusion was put in place for abalone and other shallow water molluscs/invertebrates, rather than only for commercial divers. Abalone belong to the phylum Mollusca and are considered a benthic invertebrate in the sound modelling study. The 10.3km buffer is the	1846

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	contour should be maintained to ensure that abalone are not exposed to damaging sound levels, similar to the protections applied around Deen Maar.	behavioural response distance for marine mammals. The appropriate distance for abalone is 52m at 40m water depth (Event ID 1846).	
4115	I live in Warrnambool and enjoy the marine life it offers - whale watching, swimming and snorkelling. All of which would be affected by this drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will be operating at >25km from the coast and beyond depths greater than 50m hence significant impacts are not expected. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1459
4117	Impact on enjoyment and overall experience at the beach.	Stakeholder interests were noted and used to inform the analysis and assessment of impacts arising from the Regia MSS. Multiple measures were taken to manage any potential impacts to users enjoyment	1263
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808
4136	Mention of considerable damage to marine life outweighing the benefits of mapping seafloors for gas drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1389
4145	Opposes seismic exploration claiming it is dangerous to all marine life. Cannot ensure zero risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	427
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high decibel	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS	537

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making them unacceptable in a whale sanctuary area.	will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	
4150	Outlined concern about any exceedances of safe diving thresholds.	Titleholder acknowledged this concern and noted that potential impacts to divers from the Regia MSS is assessed in E8 of the EP. To ensure divers are not exposed to noise levels above the human threshold for safety, CGG will implement the following measures: No seismic acquisition will be undertaken in water depths shallower than 50 m, Excise areas of the acquisition area that have been identified to cause exceedances of safe diving thresholds, Diving SIMOPs Plan, Consultation System and a sail line plan (see G1).	2282
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4155	Raised concerns about sound levels from the survey and associated effects on marine mammals and other species.	Acknowledged concerns and outlined the predicted effects of sound levels of different species of marine mammals including difference between high and low frequency cetaceans, sound propagation and modelling, and different effect level thresholds. Also outlined the whale management and mitigation measures in place for Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection technology trails, and citizen science program access. Also outlined the effects on zooplankton and the case for acceptability of these	3697
4157	Reference to CGG's acoustic modelling report and the predicted sound waves reaching 140-160db at Port Fairy.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will be operating at >25km from the coast and beyond depths greater than 50m hence significant impacts are not expected. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1452
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts	2830

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		on the marine environment are outlined in the EP in G1.	
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4179	Seismic sounds have far-reaching effects on the marine environment, causing damage and suffering to species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3237
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2963
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the	1653

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1659
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares	1662

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		those to the previously defined acceptable levels and is presented in the Environment Plan	
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1665
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined	1670

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		acceptable levels and is presented in the Environment Plan	
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments is covered below in response to concern 6.	2886
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049
4213	Stakeholder wanted to enjoy recreational activities without the disruption and destruction caused by the proposed activities.	Titleholder responded advising that displacement of recreational marine users is an assessed impact of the activity that is temporary and recoverable. The activity occurs no closer than 25km to the coastline at its closet point (south of Port Fairy) and lasts for no longer than 90 days.	820
4218	Strong opposition to seismic testing in the ocean due to its effects on both wildlife and the fishing industry. Individual firmly disapproves of the practice.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-	425

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	
4226	The email expresses concerns about the adverse effects of blasting the Southern Ocean and its creatures, particularly mentioning the geologically sensitive Bonney upwelling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2940
4230	The feedback asserts that seismic testing is harmful to oceans and marine life, highlighting detrimental effects on the ecosystem.	We acknowledge that the Regia MSS will have some short-term, localised and recoverable effects on some parts of the environment. We will try demonstrating to our independent regulator that these impacts are of an acceptable level and not as detrimental as you claim. We welcome any evidence you can share so that we can consider it fully prior to our submission.	2080
4232	The feedback expresses frustration over repeated seismic blasts in the same area, emphasising the significant environmental impacts associated with these activities. It calls for accountability from NOPSEMA to prevent future occurrences, highlighting the ongoing threat to the environment.	The Regia MSS is targeting areas that have not been surveyed before though we acknowledge there may be some overlap with previous surveys. We must show that the environmental impacts are short-term, localised, or recoverable and that they are controllable with appropriate measures in place.	2104
4257	The primary concern raised was regarding the safety of divers and effective management of simultaneous operations (SIMOPS).	Identified two measures that need further analysis to confirm exactly what to do next. The first was to remodel the sound propagation into shallower waters noting that CGG has made a commitment to offset from popular dive beaches already (Event ID 3367). The second measure was to develop a SIMOPS plan. Asked if abalone divers were likely to dive at night, which was confirmed as unlikely (Event ID 3367). Stated that CGG would do more work to understand the areas that it wanted to access, and the offset distances that would be required, to determine whether CGG needed to commit to certain lines being acquired at night-time only.	3367
4260	The protection of wildlife in the Otway Basin is directly affected by drilling and seismic surveying.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is	1901

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	
4268	The stakeholder argues that it is impossible to ensure zero risk from seismic activities, emphasising that only zero risk is acceptable. This position reflects a strong concern regarding the potential negative impacts of seismic exploration on the marine environment.	The legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4271	The stakeholder asserts that seismic blasts will have a direct negative impact on marine life, specifically mentioning that an "exclusion zone" will not effectively prevent the effects of the blasts from travelling through the ocean.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable. The titleholder is aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how to protect and preserve the values of this site.	2108
4272	The stakeholder asserts that the survey will have a harmful effect on millions of sea creatures.	It would be unacceptable to have long-term or permanent/unrecoverable impacts, fortunately, impacts from marine seismic surveys are short-term, temporary, and recoverable. (Event ID: 3419)	3343
4273	The stakeholder claimed that their leisure interests and activities would be affected by the issue as wildlife and coastal creatures will be scarce in the area affecting swimming, diving, whale watching and fishing.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E1. Measures to minimise adverse impacts on functions, interests and activities on swimming, diving, whale watching and fishing are outlined in the EP.	2060
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4278	The stakeholder expresses an active interest in the wellbeing of the coastline and its flora and fauna,	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation.	1325

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	indicating a general concern for environmental conservation.	Mitigation plans are in place to reduce any impacts to as low as practicable.	
4285	The stakeholder noted the following concerns as a resident of Port Fairy: Noise (land and sea), impact on marine life, potential impacts on the environment and the future potential if gas is found.	We are also concerned about the welfare of marine fauna. We have undertaken an impact assessment process that includes whale, seals, pelagic and shorebirds. As part of this assessment, we must show that impacts to these species will be of an acceptable level. We have determined that it is acceptable to have temporary behavioural changes, such as moving away from the survey vessel, and no injury or long-term impacts. Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We are also publishing environmental impact, risk and mitigation documents as they are completed, in the document library. We are publishing the entire documents in order to remain transparent, but I have also attached a summary document.	1747
4287	The stakeholder objected to the activities due to sound levels/acoustic trauma experienced by sea creatures	The scientific literature supports that marine fauna may potentially be displaced due to a seismic survey but that these impacts are typically short term with no impact to ecosystem function. Large scale studies undertaken in Australia that you may be interested in are: Australian Institute of Marine Science. North West Shoals to Shore Marine Noise Monitoring and Impacts https://www.aims.gov.au/research-topics/monitoring-and-discovery/north-west-shoals-shore Behavioural Response of Australian Humpback whales to Seismic Surveys https://www.brahss.org.au/ Assessing the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries https://www.frdc.com.au/project/2012-008 Marine Seismic Survey Impacts on Fish and Invertebrates: Final Report for Gippsland Marine Environmental Monitoring Study https://ecat.ga.gov.au/geonetwork/srv/api/records/2292f4a7-ba2e-3533-e053-12a3070aaf2c Maxima 3D Marine Seismic Survey at Scott Reef https://www.sciencedirect.com/science/article/abs/pii/S0025326X13006528 https://www.sciencedirect.com/science/a	2389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		rticle/abs/pii/S0025326X18300687 Regarding Marine Fauna Observer's (MFOs), companies that contract MFOs such as Blue Planet Marine and RPS Group provide training for MFOs. As part of contracting MFOs we will ensure that the persons provided meet the requirement of the Australian Government EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales, that requires MFOs to be trained and experienced in whale identification and behaviour, distance estimation, and be capable of making accurate identifications and observations of whales in Australian waters. The Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, details the competency requirements for MFOs and ongoing awareness (page 23 and 24). The Regia MSS Implementation Strategy is available on the Regia MSS Website Document Library see https://klarite.mysocialpinpoint.com.au/regiamss/document-library As detailed in the Regia MSS Implementation Strategy, which will form part of the environment plan to be submitted to NOPSEMA, CGG will only use appropriately experienced MFOs as determined by a review of their CVs (page 23). The Regia MSS Implementation Strategy also details how CGG will monitor the performance of the control measures during the activity (page 25). For example: Audits and Inspections Post acceptance of the EP, conformance will be monitored on an at least quarterly basis by the Client Site Representative, or delegate, via audits and inspections, as well as through the commitments under the Management of Risk, Management of Change, and Management of Knowledge parts of this Implementation Strategy. During the activity, conformance will be monitored on an at least fortnightly basis by the Client Site Representative, or delegate, via audits and inspections during the activity. Conformance auditing or inspection while the EP is in-force will be based on the Conformance Register and will target the following: · Conformance with regulatory requirements detailed in the accepted	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		EP. • Management strategies and procedures to ensure EPOs and EPSs are being implemented, monitored, measured, and evaluated. • Emissions and discharges are being monitored, measured, and documented As stated in the previous email, matters of national energy policy are not within the purview of CGG or the Regia MSS. We will however register claims related to the ongoing need for gas and provide those to NOPSEMA. Please find attached a brochure from NOPSEMA that describes this and may be of use to you.	
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4289	The Stakeholder outlined concern about any exceedances of safe diving thresholds.	The Regia team discussed the sound modelling that has been completed to date and that the DMAC guidelines had been followed meaning that the threshold used was one of aesthetic value of the experience rather than a physiological effect. (Event ID 2282)	2282
4300	The stakeholder stated that sound impacts to human health were unacceptable.	The titleholder acknowledged the feedback, noting that potential impacts of underwater sound to surfers, divers and swimmers is assessed in the Environmental Plan (EP) and can be found in E8. Measures to minimise adverse impacts on functions, interests and activities on humans are outlined in the EP.	1890
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined	1747

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		acceptable levels and is presented in the Environment Plan	
4304	The stakeholder stated that they were concerned about the correlation between the risk of shark attacks and sound caused as a result of a seismic activity.	CGG has completed an assessment of the impacts to divers from elevated levels of sound. Whilst preparing this document a literature review was complete to explore the claim that sharks may be more aggressive or predatory as a result of exposure to elevated levels of sound. No relevant literature was found.	1890
4310	The stakeholder was concerned about the sensitivity of different divers to sound exposure.	This has been thoroughly assessed in E8 and a SIMOPS Plan will be developed with local divers to ensure that the amenity value of the diving experience is maintained.	2282
4315	The statement suggests that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4329	This feedback highlights the uncertainty regarding the long-term impacts of seismic blasting on abalone populations, particularly emphasising that the effects may not be immediately observable and could depend on the juvenile stages at the time of blasting.	We have recently installed an exclusion zone down to the 40m bathymetry contour primarily as a result of discussions with abalone fishers who dive down to 30m. This will help protect early life-cycle stages of abalone. Further, seismic surveys have occurred in this region for many years and the two industries (fishing and petroleum) have successfully coexisted over time (Event ID 2095).	2095
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4355	Request for seismic blasting not to occur within 20km of specific beaches.	Titleholder acknowledged this concern and commissioned specialist underwater sound modelling to assess impacts to divers and swimmers (see E8). This was done to ensure sound exposure to coastal users is below the per-pulse safety criterion relating to amenity value of 145 dB re 1 µPa. CGG advised that control measures to reduce impacts to divers and swimmers as a result of the survey are outlined in the EP and include a sail line plan, a SIMOPS plan, an activity limitation where no acquisition will occur in in water depths shallower than 50 m, and the Regia MSS will avoid any areas	2831

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		where there are exceedances of safe diving thresholds.	
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4417	The relevant person was concerned that about the proposed seismic activity effecting the behaviours of certain species.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act.	6880

REGIA
Marine Seismic Survey

Impact Assessment
Light Emissions

Appendix E9: REG-EP-028-E9

Rev 4

December 2025

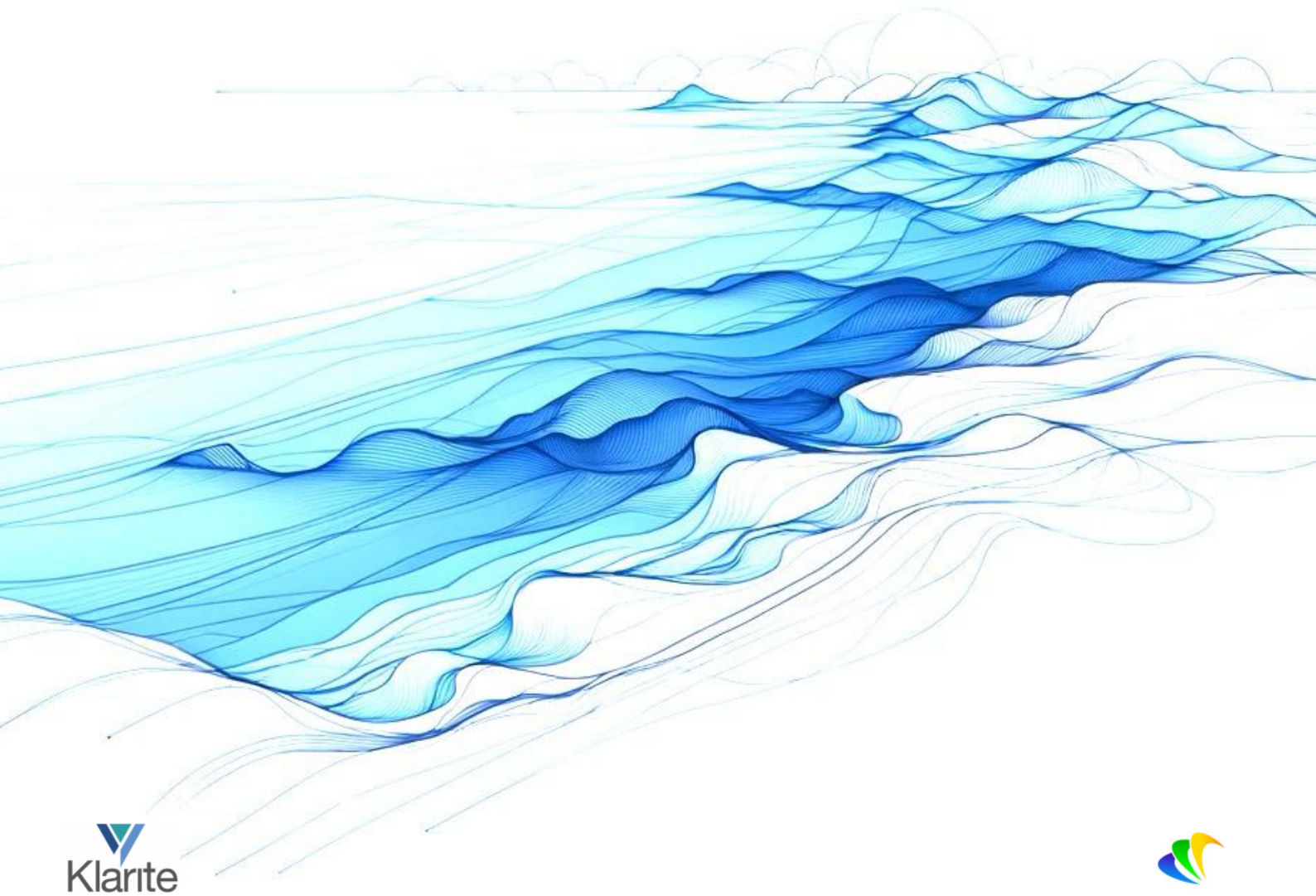

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Table of Contents

1 Introduction 4
1.1 Purpose and Scope 4
1.2 Consultation in Preparation of the EP 4
1.3 Modifications Arising from Further Assessment 4
2 Aspect – Light Emissions 5
2.1 How the Aspect Occurs 5
2.2 Extent and Duration of the Aspect 5
3 Cause-Effect Pathway 6
4 Description of the Existing Environment that may be Affected by the Activity 7
4.1 Zooplankton 7
4.2 Invertebrates 7
4.3 Fish 7
4.4 Birds 8
4.5 Turtles 13
4.6 People and Communities 13
5 Relevant Legislative Requirements 15
6 Defining Acceptable Levels of Impact 16
7 Consultation Input 18
8 Minimisation of Impacts Through Activity Design 19
8.1 Elimination 19
8.2 Substitution 19
9 Predicted Levels of Impact 21
9.1 Change in Fauna Behaviour 21
9.2 People and Communities 26
9.3 Measures Adopted to Manage Environmental Impacts 28
10 Demonstration Impacts will be of an Acceptable Level 29
10.1 Principles of ESD 29
10.2 Biological and Ecological Categories 29
10.3 Economic, Cultural and Social Categories 29
10.4 Consistency with Company Processes 30
11 Environmental Performance Outcomes 31
12 Recommendations 33
13 Document Control 34
14 References 35
Annex 1 39

Public Comment 39
Annex 2 40
Objections and Claims Raised from Consultation 40
Annex 3 56
Light Sensitive Species 56

1 Introduction

This document presents an assessment of an environmental aspect between the Regia Marine Seismic Survey (**Regia MSS**) and the existing environment that may be affected by that aspect. This environmental aspect was identified by the Preliminary Environmental Impact and Risk Assessment (**PEIRA**) (Appendix B4) for further assessment.

1.1 Purpose and Scope

This assessment is the second stage of the environmental assessment. Its purpose is to rank the impact according to the criteria set out in the Environmental Assessment Process found in Appendix B3. The purpose of this stage of the assessment is to demonstrate that the impact can be managed to an acceptable level through the adoption of mitigation measures and the setting of an appropriate environmental performance outcome.

The measures adopted because of consultation and because of the assessment will be carried through to the ALARP assessment which occurs in stage three of the overall assessment process. Recommendations will be made if there is any further assessment required in the third stage of the assessment.

1.2 Consultation in Preparation of the EP

This document presents analysis of an environmental aspect between the Regia Marine Seismic Survey (Regia MSS) and the existing environment that may be affected by that aspect. This environmental aspect was identified by the Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4) for further assessment.

This document was first published in draft form to the Document Library of the Regia MSS Consultation Hub on 11 September 2023. This was done to acknowledge that the final full Environment Plan (EP) can be a large document that is difficult for readers to digest in the 30-day public comment period. As such, the public and relevant persons were invited to comment on the document with an explicit request for readers to provide feedback on:

- The accuracy of the described environment that may be affected.
- Any omissions of environmental values and sensitivities relevant to the environmental aspect.
- Any errors or omissions of scientific/peer reviewed literature that should be considered.
- Any errors or omissions of relevant legislation or documents of standing that should be considered.
- Any further mitigation or management measures that should be considered.

1.3 Modifications Arising from Further Assessment

To ensure this environmental assessment remains contemporary, accurate, and reflects feedback from the regulator and relevant persons, this document will be updated from time-to-time. In particular, the CGG environmental assessment process requires consideration of whether further assessment was needed to verify, or dive deeper into a topic, to further improve the predictive quality of the assessment. When this has occurred, reference to such changes will be communicated in the Recommendation section and identified at relevant points in the assessment.

2 Aspect – Light Emissions

2.1 How the Aspect Occurs

Navigational and safety lighting on the seismic and support vessels emit light when operating at night.

2.2 Extent and Duration of the Aspect

Duration: 90 days

Vessel navigational and safety lighting will be required at night for the duration of the activity.

Extent: Operational Area +20 km

The National Light Pollution Guidelines for Wildlife (CoA 2023) detail that where there is important habitat for listed species that are known to be affected by artificial light within 20 km of a project, species specific impacts should be considered through an Environmental Impact Assessment.

The 20 km extent provides a precautionary limit based on observed effects of sky glow on marine turtle hatchlings demonstrated to occur at 15-18 km and fledgling seabirds grounded in response to artificial light 15 km away (CoA 2023). Seabird grounding, as described in Rodriguez et al. (2014), relates to impacts of onshore fixed light sources such as streetlights and buildings and the effect this can have on young fledgling birds making their first flight from their nests to the open ocean. Subsequently, 20 km is adopted as the extent of light emissions for the impact assessment.

For zooplankton, fish and invertebrates, the Guidelines detail that for vessel lights zooplankton and their vertebrate predators to descend away from the surface; these effects occurred at depths of up to 200 m, and up to 200 m horizontally from the light source. Experiments using light traps also detailed that some fish and zooplankton species are attracted to light sources (Meekan et al. 2001), with traps drawing catches from up to 90 m (Milicich et al. 1992). Thus, for zooplankton, invertebrates, and fish the extent of impact is within 200 m of the light source.

3 Cause-Effect Pathway

The Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4) identified a cause-effect pathway for light for the following environmental components and their social, cultural, and economic features:

- Plankton.
- Invertebrates.
- Fish.
- Birds.
- Marine reptiles.
- People and communities.
- Marine mammals.
- Coastal communities.

The PEIRA (Appendix B4) identified that the environmental impact of light to the following environment components was ranked as having a negligible level of effect and are not assessed further:

- Marine mammals.
- Coastal communities.

4 Description of the Existing Environment that may be Affected by the Activity

As detailed in the Section 2.2, the Operational Area plus 20 km has been adopted as the extent of light emissions for the impact assessment to light sensitive species such as marine turtles, seabirds, and migratory shorebirds, thus a Protected Matters Search to identify these species was undertaken for the Operational Area plus 20 km with the report available in Appendix B5.

As detailed in the Section 2.2, the Operational Area plus 200 m has been adopted as the extent of light emissions for the impact assessment to light sensitive species such as zooplankton, invertebrates, fish, thus a Protected Matters Search to identify these species was undertaken for the Operational Area with the report available in Appendix B5.

Annex 3 details those species that may be affected by light from the PMST report and identifies any biologically important areas and conservation advice or management plans.

4.1 Zooplankton

The PMST Report (Appendix B5) identified that the area potentially affected by light emissions out to 20 km overlaps the Bonney Coast Upwelling Key Ecological Feature (Appendix B12 MAP-REG-EPM-003) which is a seasonal upwelling that brings cold nutrient rich water to the sea surface and supports regionally high productivity. Krill and potentially other zooplankton productivity are a key feature of the upwelling providing a food source for several threatened species, including the blue whale, migrate into the area to forage (CoA 2015a).

Zooplankton is likely to be present throughout the Operational Area as in all marine environments.

4.2 Invertebrates

Studies by the Museum of Victoria found that invertebrate diversity was high in southern Australian waters although the distribution of species was patchy, with little evidence of any distinct biogeographic regions (Wilson and Poore 1987). This is supported by studies in the eastern part of the Operational Area undertaken by Beach Energy (2022) and Cooper Energy (2017) that found:

- In water depths from 20 – 70 m much of the seabed to ~ 60 m water depth was sand or fine gravel. No epifauna were observed and the biological component was likely to be primarily in-faunal or pelagic. Beyond 60 m water depth, this broad flat area has a sparse cover of filter-feeding epifauna dominated by sponges and also probably hydrozoans, bryozoans, and algae.
- In water depths from 70 to 104 m, samples percent cover of epifauna ranged from 0 to 80% but on average the percent cover was typically no more than 37%. Of the individual epibenthic organisms, Gastropoda sp. 2 (a cone shell) and crionids (featherstars) were the most abundant.

The Operational Area overlaps the Southern Squid Jig Fishery and Southern and Eastern Scalefish and Shark Fishery Commonwealth Trawl Sector where there has been low, medium and high levels of fishing intensity during 2010 to 2023. Details on these fisheries is provided in Appendix E1: Physical Presence. The Southern Squid Jig Fishery targets a single species, Gould's squid, using either hand operated or mechanically powered jigs. Squid jigging typically occurs midwater at depths between 50 and 100 m at night using large lights that illuminate the waters around a boat. Southern and Eastern Scalefish and Shark Fishery Commonwealth Trawl Sector can retain Gould' squid.

4.3 Fish

The PMST Report identified multiple fish species or species habitat within the area potentially affected by light emissions out to 200 m. Annex 3 provides a summary of the PMST Report. None of these fish species were identified to be undertaking biologically important behaviours or have BIAs or habitat critical to the survival of the fish species within the area potentially affected by light

emissions. Three threatened fish species were identified from the PMST Report and are discussed below.

Southern Bluefin Tuna (*Thunnus maccoyii*) has been removed from the February 2025 PMST Reports for all areas searched, as it is no longer listed as a threatened species under the EPBC Act (DCCEEW 2024k). This species is retained for assessment based on a precautionary approach remains appropriate to assess this species that was only recently delisted, the species known relevance to regional fisheries, and to accurately reflect the passage of time over which this EP has been constructed.

The Australian Grayling is a small to medium-sized, slender, silvery fish with soft-rayed fins lacking any spines. It is endemic to south-eastern Australia, including Victoria, Tasmania and New South Wales, and is a migratory species that inhabits estuarine waters and coastal seas as larvae/juveniles, and freshwater rivers and streams as adults (Backhouse et al. 2008).

The Blue Warehou is a medium-sized, deep-bodied fish, reaching a maximum total length of 90 cm and a maximum weight of 7 kg (TSSC 2015). Globally, the Blue Warehou is confined to Australian and New Zealand waters predominantly in coastal shelf, upper continental slope and seamount waters offshore from New South Wales, Tasmania, Victoria and South Australia (TSSC 2015). Blue Warehou is a target species for the Tasmania Scalefish Fishery.

The Orange Roughy is a demersal fish targeted by the Southern and Eastern Scalefish and Shark Fishery. They are widely distributed throughout the world and forms dense spawning and feeding aggregations on or near topographic features such as seamounts, canyons and plateaus (DCCEEW 2023). No spawning or feeding aggregation areas have been identified in the area that may be affected by light emissions.

Southern Bluefin Tuna can grow to 225 cm in length and 200 kg in weight (TSSC 2010). They are a highly migratory species that occurs globally in waters between 30°S and 50°S forming on single global population (TSSC 2010). In Australian waters, they range from northern Western Australia, around the southern region of the continent, to northern New South Wales (TSSC 2010). Southern Bluefin Tuna are a target species for the Southern Bluefin Tuna Fishery.

Most of the listed marine ray-finned fish species identified in the PMST report for the area affected by light emissions are syngnathids, which includes seahorses and their relatives (sea dragon, pipehorse and pipefish). Most of these species are associated with seagrass meadows, macroalgal seabed habitats, rocky reefs and sponge gardens located in shallow, inshore waters (e.g., protected coastal bays, harbours and jetties) less than 50 m deep (Fishes of Australia, 2015). They are sometimes recorded in deeper offshore waters, where they depend on the protection of sponges and rafts of floating seaweed such as sargassum.

4.4 Birds

The PMST Report identified multiple bird species or species habitat within the area potentially affected by light emissions. Annex 3 provides a summary of the PMST Report. Several of these bird species were identified to be undertaking biologically important behaviours and/or have BIAs that the area potentially affected by light emissions overlaps. Table E9-1 provides a summary of this information. No habitat critical to the survival of the bird species were identified within the area potentially affected by light emissions overlaps.

PMST searches were run again prior to resubmission (Rev 2) to ensure any changes to species or listings were identified to control for passage of time. Conservation Advice has also been updated for several species and subsequent changes have been made to Appendix B2 and Annex 3 relevant to the assessment of light emissions include:

- Changes to EPBC Act status of several species
    - Red Knot is listed as Vulnerable (previously Endangered)
    - Sharp-tailed Sandpiper is listed as Vulnerable (previously not listed as threatened)
    - Sooty Shearwater is listed as Vulnerable (previously not listed as threatened)
    - Western Alaskan Bar-tailed Godwit is listed as Endangered (previously Vulnerable)
    - Common Greenshank is listed as Endangered (previously not listed as threatened)

    - Ruddy Turnstone is listed as Vulnerable (previously not listed as threatened)
    - Latham's Snipe is listed as Vulnerable (previously not listed as threatened)
    - Blue-winged Parrot is listed as Vulnerable (previously not listed as threatened)
- Updates to conservation advice for several species
    - Conservation Advice for *Calidris canutus* (Red Knot) (DCCEEW 2024)
    - Conservation Advice for *Calidris acuminata* (Sharp-tailed Sandpiper) (DCCEEW 2024a)
    - Conservation Advice for *Ardenna grisea* (Sooty Shearwater) (DCCEEW 2023i)
    - Conservation Advice for *Limosa lapponica baueri* (Bar-tailed Godwit western Alaskan) (DCCEEW 2024b)
    - Conservation Advice for *Tringa nebularia* (Common Greenshank) (DCCEEW 2024e)
    - Conservation Advice for *Arenaria interpres* (Ruddy Turnstone) (DCCEEW 2024c)
    - Conservation Advice for *Gallinago hardwickii* (Latham's Snipe) (DCCEEW 2024d)
    - Conservation Advice for *Neophema chrysostoma* (Blue-winged Parrot) (DCCEEW 2023l)
    - Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DCCEEW 2023m)
    - Conservation Advice for *Numenius madagascariensis* (Far Eastern Curlew) (DCCEEW 2023n)
    - Conservation Advice for *Charadrius leschenaultii* (Greater Sand Plover) (DCCEEW 2023o)

All changes listed above remain relevant after the PMST searches were rerun prior to resubmission of Rev 3, with two additional changes also noted:

- Breeding BIA added for Short-tailed Shearwater within the area potentially affected by light emissions.
- Breeding BIA removed for Wedge-tailed shearwater from the area potentially affected by light emissions.

These changes have been incorporated throughout the EP and the impact assessment has been revised accordingly [Section added in response to Matters: I16 and I17].

4.4.1 Albatrosses and Petrels

Twelve albatross and two petrel species are identified as having foraging, feeding or related behaviour and/or BIAs within the area potentially affected by light emissions (Table E9-1). These BIAs cover either most or all the South-east Marine Region (CoA 2015a). It is likely these species will forage in the EMBA. In addition, the common diving-petrel breeds on Lady Julia Percy Island which is within the area potentially affected by light emissions.

Albatrosses and petrels are among the most oceanic of all seabirds and seldom come to land unless breeding (CoA 2021). Albatross and petrel species exhibit a broad range of diets and foraging behaviours, and hence at-sea distributions are diverse. Combined with their ability to cover vast oceanic distances, all waters within Australian jurisdiction can be considered foraging habitat, however the most critical foraging habitat is those waters south of 25° where many species spend much of their foraging time (CoA 2021).

Albatrosses have a widespread distribution throughout the southern hemisphere. They feed mainly on cephalopods, fish and crustaceans, using surface feeding or plunge diving to seize their prey (ACAP 2020). Albatrosses are colonial, usually nesting on isolated islands and foraging across oceans in the winter months with most observations along the edge of the continental shelf (CoA 2021).

Petrels are oceanic and have a widespread distribution throughout the southern hemisphere. They are colonial and breed on sub-Antarctic and Antarctic islands in a circumpolar band generally between 40°S and 60°S. Petrel species feed on small fish, cephalopods (octopus, squid and cuttlefish) and crustaceans along the edge of the continental shelf and open waters (CoA 2021).

Table E9-1 - Bird Species Biologically Important Behaviours and/or BIAs within the Area Potentially Affected by Light Emissions.

Receptor	Biologically Important Behaviour
Albatross	
Antipodean Albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA (Appendix B12 MAP-REG-EPM-059)
Black-browed Albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA (Appendix B12 MAP-REG-EPM-060)
Buller's Albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA (Appendix B12 MAP-REG-EPM-071)
Campbell Albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA (Appendix B12 MAP-REG-EPM-061)
Indian yellow-nosed Albatross	Species or species habitat likely to occur within area
	Foraging BIA (Appendix B12 MAP-REG-EPM-063)
Northern Buller's Albatross	Foraging, feeding or related behaviour likely to occur within area
Northern Royal Albatross	Foraging, feeding or related behaviour likely to occur within area
Salvin's Albatross	Foraging, feeding or related behaviour likely to occur within area
Shy Albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA (Appendix B12 MAP-REG-EPM-066)
Southern Royal Albatross	Foraging, feeding or related behaviour likely to occur within area
Wandering Albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA (Appendix B12 MAP-REG-EPM-072)
White-capped Albatross	Foraging, feeding or related behaviour likely to occur within area
Petrels	
Common Diving Petrel	Breeding known to occur within area
	Foraging, Breeding BIA (Appendix B12 MAP-REG-EPM-062)
Northern Giant Petrel	Foraging, feeding or related behaviour likely to occur within area
Other	
Australasian Gannet	Foraging, Aggregation BIA (Appendix B12 MAP-REG-EPM-073)
Black-faced Cormorant	Breeding known to occur within area
Cape Gannet	Breeding known to occur within area
Double-banded Plover	Roosting known to occur within area
Greater Crested Tern	Breeding known to occur within area
Grey-tailed Tattler	Roosting known to occur within area
Lesser Sand Plover	Roosting known to occur within area
Little Curlew	Roosting likely to occur within area
Little Penguin	Breeding known to occur within area
Marsh Sandpiper	Roosting known to occur within area
Orange-bellied Parrot	Migrating likely (Appendix B12 MAP-REG-EPM-058)
Pacific Golden Plover	Roosting known to occur within area
Pied Stilt	Roosting known to occur within area
Pin-tailed Snipe	Roosting likely to occur within area
Red-capped Plover	Roosting known to occur within area
Red-necked Avocet	Roosting known to occur within area
Red-necked Stint	Roosting known to occur within area

Receptor	Biologically Important Behaviour
Ruddy Turnstone	Roosting known to occur within area
Sanderling	Roosting known to occur within area
Satin Flycatcher	Breeding known to occur within area
Sharp-tailed Sandpiper	Roosting known to occur within area
Silver Gull	Breeding known to occur within area
Short-tailed Shearwater	Breeding known to occur within area
	Foraging, Breeding BIA (Appendix B12 MAP-REG-EPM-065)
Swinhoe's Snipe	Roosting likely to occur within area
Wedge-tailed Shearwater	Foraging BIA (Appendix B12 MAP-REG-EPM-067)
Whimbrel	Roosting known to occur within area
White-bellied Sea-eagle	Breeding known to occur within area
White-fronted Tern	Foraging, feeding or related behaviour likely to occur within area
Wood Sandpiper	Roosting known to occur within area

4.4.2 Shearwaters

The Short-tailed Shearwater was identified as breeding known to occur (Lady Julia Percy Island) and a foraging and breeding BIA to be present within the area potentially affected by light emissions (Table E9-1). The Short-tailed Shearwater migrates to the Northern hemisphere for the austral winter and generally only present in Australian waters from September to May. They are common in the South-east Marine Region and largely found on numerous islands off Victoria and Tasmania during breeding (Baker and Hamilton 2013, Skira et al. 1996). During breeding they conducts a bimodal feeding strategy, alternating short foraging trips to local waters with long foraging trips (up to 17 days) to the Polar Frontal Zone. Short trips allow greater chick provisioning at the sacrifice of body condition, which is then recovered in richer subantarctic waters. Diet includes fish particularly myctophids, crustaceans and squid (Weimerskirch and Cherel 1998).

The Wedge-tailed Shearwater was identified as having a foraging BIA within the area potentially affected by light emissions (Table E9-1). The foraging BIA is associated with Muttonbird Island, however, a review of the DCCEEW Species Profile and Threats Database (SPRAT), Atlas of Living Australia and South-east Marine Region Profile did not provide any information on the Victorian Muttonbird Island Wedge-tailed Shearwater colony. The DCCEEW SPRAT profile does not show any locations for the Wedge-tailed Shearwater in Victoria, and Beaver (2018) details Montague Island in NSW was the southernmost known colony, however, in 2017 breeding individuals of Wedge-tail Shearwaters were discovered a couple of hundred kilometres further south on Gabo Island Lighthouse Reserve, Victoria near the NSW border.

Movement patterns of the Wedge-tailed Shearwater are poorly known but populations at the northern and southern extremities of the known range are migratory, departing nests in early April to early May and spending the nonbreeding season in the tropics (DCCEEW 2023a). In Australia, Wedge-tailed Shearwaters have been observed feeding along the junction between inshore and offshore water masses. There is no detailed analysis of the diet of Australian adult Wedge-tailed Shearwater's, however tropical residing Wedge-tailed Shearwater birds are known to mostly consume fish, some cephalopods, insects, jellyfish and prawns (DCCEEW 2023a). Food is taken by contact-dipping, dipping, surface-seizing and, rarely, deep-plunging up to 2 m deep (DCCEEW 2023a).

4.4.3 Australasian Gannet

The Australasian Gannet was identified as having foraging and aggregation BIAs within the area potentially affected by light emissions (Table E9-1). The BIA is a 40 km buffer around Portland where the Australasian Gannet breeds between July and March.

The Australasian Gannet generally feeds over the continental shelf or inshore waters. Their diet is comprised mainly of pelagic fish, but also squid and garfish. Prey is caught mainly by plunge-diving, but it is also seen regularly attending trawlers (CoA 2015a).

4.4.4 Orange-bellied Parrot

The Orange-bellied Parrot was identified as migrating likely within the area potentially affected by light emissions (Table E9-51). The Orange-bellied Parrot breeds in Tasmania during summer, migrates north across Bass Strait in autumn and spends winters on the mainland. The migration route includes the west coast of Tasmania and King Island (Appendix B12 MAP-REG-EPM-058).

Birds depart the mainland for Tasmania from September to November (Green 1969). The southward migration is rapid (Stephenson 1991), so there are few migration records. The northward migration across western Bass Strait is more prolonged (Higgins & Davies 1996). The parrot's breeding habitat is restricted to south-west Tasmania, where breeding occurs from November to mid-January mainly within 30 km of the coast. The species forage on the ground or in low vegetation (Loyn et al. 1986). During winter, on mainland Australia, Orange-bellied Parrots are found mostly within 3 km of the coast. In Victoria, they mostly occur in sheltered coastal habitats, such as bays, lagoons and estuaries. The orange bellied parrot may overfly the coastal waters of the area potentially affected by light emissions, however, parrots do not alight or forage out at sea.

4.4.5 Little Penguin

The Little Penguin was identified as breeding known to occur within the area potentially affected by light emissions (Table E9-1). However, no breeding biologically important areas (BIAs) were identified with the area potentially affected by light emissions and the nearest breeding BIA is at King Island and is ~ 30 km from the area potentially affected by light emissions.

During consultation breeding colonies were also identified on Lady Julia Percy Island / Deen Maar, and Middle Island [Event ID 2023]. It is understood that even though these colonies do not represent breeding or foraging BIAs, they are of significant value to local communities. Breeding typically occurs from September to February. [Paragraph added in response to Matter: B02]

The Little Penguin is the smallest penguin species and is endemic to Australia and New Zealand. In Australia, the species occurs from Western Australia (Carnac Island) to New South Wales (Broughton Island) and Tasmania. The distribution is not continuous, with sections of the southern coast of Australia without occurrence of breeding colonies (CoA 2020a).

The Little Penguin breeds during the austral autumn to summer months, however, the breeding season can vary between individuals, locations and years. They are the only truly nocturnal penguin species on land and during this period, adults always arrive after dusk and leave before dawn (CoA 2020a). Following nesting the adults go out to sea to feed prior to the moulting season which occurs between December and February. During this period the feathers are not waterproof, and the birds need to stay on land. At these times they are particularly vulnerable to land predators and interference. Moulting is followed by another feeding period prior to commencing breeding again. [Paragraph added in response to Matter: B02].

This species is a generalist feeder, with large variability in diet amongst colonies and even between years at the same colony. They feed mainly on clupeids, such as anchovy *Engraulis austalis* and sardines *Sardinops sagax*, when feeding chicks, but they may also feed on krill *Nyctiphanes australis* and several species of cephalopods at all stages of breeding (CoA 2020a).

4.4.6 Shorebirds

Twenty-four shorebirds were identified as breeding or roosting within the area potentially affected by light emissions (Table E9-1). These species are commonly found on coastal shores including beaches and rocky shores and either feed at low tide on worms, crustaceans and molluscs or fish species or feed on aquatic biota. Many of the wader species are migratory travelling from the Northern Hemisphere in non-breeding months. Most inhabit intertidal mudflats, rocky islets, sand beaches, mangroves, rocky coastline and coral reefs. Roosting occurs in similar habitats and species

are found feeding on fish, crustaceans, aquatic insects, as well as plants and seeds (Higgins & Davies 1996).

4.5 Turtles

The PMST Report identified three turtle species within the area potentially affected by light emissions, green, leatherback and loggerhead turtle. Annex 3 provides a summary of the PMST Report. No BIAs or habitat critical to the survival of the species were identified.

The PMST Report identifies leatherback and loggerhead turtles breeding likely to occur within the area potentially affected by light emissions. However, this is not supported by other information sources:

- South-east Marine Region Profile (DSEWPaC 2012): The region is an important feeding area for the leatherback turtle which is a pelagic feeder that is regularly found in the high latitudes of all oceans. No major nesting has been recorded in Australia, but the species is regularly seen and known to forage in the waters of the South-east Marine Region. Loggerhead turtle species or species habitat known to occur with South-east Marine Region.
- Recovery Plan for Marine Turtles in Australia (DoEE 2017): Does not identify breeding grounds for leatherback or loggerhead turtles in Victoria or waters off Victoria.
- Species Profile and Threats Database: Details that loggerhead turtles show fidelity to both their feeding and breeding areas but does not identify any breeding area in Victoria or waters off Victoria.
- Species Profile and Threats Database: Details that leatherback turtles are regularly found in waters offshore from Victoria with feeding recorded in the coastal waters of all Australian States, however no breeding or nesting sites are detailed in Victoria.

Green turtles' nest, forage and migrate across tropical northern Australia. Green turtles spend their first 5-10 years drifting on ocean currents. Green turtles are predominantly found in Australian waters off the Northern Territory, Queensland, and Western Australian coastlines, with limited numbers in NSW, Victoria and South Australia (DoEE 2017).

Small numbers of leatherback turtles' nest on the Cobourg Peninsula (NT) and there are unconfirmed accounts of leatherback turtles nesting in Western Australia. Leatherback turtles are more commonly found foraging in Australian waters along the east coast and in Bass Strait. The southern waters of Australia are one of five identified foraging sites (where area restricted behaviour occurs) for Leatherback turtles (DoEE 2017).

There are two genetically distinct stocks of loggerhead turtles nesting in Australia, one in Queensland (known as the south-west Pacific stock) and one in Western Australia. Loggerhead turtles forage in all coastal states and the Northern Territory, but are uncommon in South Australia, Victoria and Tasmania (DoEE 2017)

4.6 People and Communities

4.6.1 Social and Economic Features

During consultation, as presented in Annex 2, objections and claims were raised regarding concerns of impacts on the ecosystem, including commercially fished squid and coastal birds, which may impact tourism and local enjoyment of the area. These species are described in Sections 4.2 and 4.4, respectively.

As detailed in Section 3, the PEIRA (Appendix B4) identified that the environmental impact of light to coastal communities was ranked as having a negligible level of effect and is not assessed further.

4.6.2 Cultural Features

Several invertebrate species including torbos, pipis, abalone, limpets, mussels, elephant snails, crayfish/lobster, crabs and squid are identified as culturally significant to the Gunditjmara People as both a resource and in harvesting as a cultural practice (GMTOAC, 2023). Barnabeel (oyster), murrabal

(mussel), bam bam (crayfish), abalone and pipi are also culturally important resources to the Wadawurrung People (WTOAC, 2020). Invertebrate species are an important traditional, social and economic resource for the Eastern Maar People. Abalone, cockles and crayfish are collected as tucker along the coast (EMAC, 2015) (Appendix F3, Section 3.16.1).

Short-tailed shearwaters (mutton birds) are identified as being culturally significant to the Gunditjmara People and are used in harvesting practice (GMTOAC, 2023). Shearwaters are also identified as culturally significant species to the Eastern Maar people, along with gannets and Little Penguins (Appendix F3, Section 3.16.1).

Two Native Title determinations were identified as being within the area potentially affected by light emissions, Eastern Maar and Gunditjmara (Appendix B12 MAP-REG-EPM-092), including the currently under consultation Nyamat Mirring (GMTOAC, 2023). The respective Native Title determinations encompass cultural obligations and responsibilities which arise from Country and law and ensure that customs and beliefs are upheld (GMTOAC, 2023). They also recognise Traditional Owner rights to land, waters and other resources – rights to access, use and manage these resources for economic as well as cultural benefits (EMAC, 2015). For the Gunditjmara people, Native Title also includes culturally significant sites such as the 'Convincing Ground' (Appendix F3, Section 3.16.1).

Point Nepean, and the Mornington Peninsula, was identified as an area of high cultural importance (Appendix F3, section 3.16). However, the area is not with the area potentially affected by light emissions.

Access to Country is described as highly valued and a key aspect of cultural maintenance (Woods, 2020) and Country represents a deep, intrinsic connection to the land, a source of identity, nurturing individuals and communities through shared knowledge, stories, values, and traditions passed down through generations. For those who live away, the bond remains strong, with frequent returns to reconnect with both the land and the community, reinforcing their role in caring for and preserving Country (EMAC, 2015).

5 Relevant Legislative Requirements

CGG has considered all the relevant legislative requirements, conservation management and recovery plans for all species that may be affected (see Appendix B2). Measures that will be adopted to demonstrate how these requirements will be meet are as follows:

- Marine Assurance System ensure compliance of contracted vessels with the Navigation Act and relevant marine orders related to the management of light.
- It is standard practice for CGG to conduct OVID-Style inspections which will ensure that all vessels have and implement a Vessel Lighting Management Plan.

These measures will ensure that light emissions will be reduced to a level where wildlife will not be disrupted within, nor displaced from, important habitat; and will be able to undertake critical behaviours such as foraging, reproduction and dispersal. Recovery objectives of all relevant conservation advice have been considered in Appendix B2 and impacts to recovery are not predicted to any bird species.

6 Defining Acceptable Levels of Impact

CGG defined acceptable levels of impact and risk as part of its decision-making processes and published them as part of its consultation efforts, inviting relevant persons to comment on their appropriateness. During the preparation of the EP, it became clear that aspect specific statements would be necessary to create a stronger link between the defined acceptable level and the predictions of impacts and risks.

As such, Table E9-2 shows the general acceptable level statements which cover the whole of the activity (which are consistent across all environmental impacts and risks), and the corresponding aspect specific defined acceptable levels established for this assessment. The defined acceptable levels found in this section are subsequently carried through the prediction of impacts in this document, to the demonstration found in Section 10.[1]

Table E9-2 - Defined acceptable levels of impact from artificial light

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.	**Birds** Artificial light will be managed so wildlife is not disrupted within, nor displaced from important habitat, and is able to undertake critical behaviours such as foraging, reproduction and dispersal. **Turtles** Turtles continue to utilise the area without disruption to critical life-cycle behaviours. **Fish, Invertebrates, and Zooplankton** Artificial light exposure to fish, invertebrates, and zooplankton will not exceed those produced by other marine users during nighttime operations in the region and will not cause impacts at a population level.	Artificial light is known to disorient seabirds and other wildlife, altering their flight patterns, increasing collision risk, and disrupting critical behaviours such as nocturnal foraging or resting. Light pollution is identified as a high-risk threat in the Recovery Plan for Marine Turtles in Australia (DoEE 2017). This acceptable level aligns with Commonwealth marine wildlife protection guidelines and supports ecosystem integrity. It is consistent with the aims of the National Light Pollution Guidelines for Wildlife (CoA 2023) for the management of artificial light and aligns with the Recovery Plan for Marine Turtles in Australia (DoEE 2017).
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.		
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.		
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.		

[1] Note: The acceptable levels related to demonstrating ALARP and the adoption of specific measures to ensure the effectiveness of control measures can be found in Appendix F2 and B3 respectively. As they are criteria integral to the acceptance of the Environment Plan, and they a documented elsewhere, these criteria are not discussed further in this assessment.

Category	Defined Acceptable Levels (General)	Defined Acceptable Levels (Aspect Specific)	Rationale
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.		
Economic	Affected persons will not be worse off because of the activity.	Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	For species and sensitivities with social, cultural and/or economic values, if the potential ecological impact or risk is deemed acceptable, it is likely that the corresponding impact on social, cultural and/or economic values will also be considered acceptable, as the physical presence and health of these species are key for maintaining their social, economic and cultural roles. Therefore, predicted levels of impact for social, cultural and economic values for species will be assessed on a receptor level.
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.	Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.	
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons. The views of public have been considered in the impact and risk assessment.	People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.	
Company	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	As per the general levels.	CGG is a company familiar with managing the effects of seismic surveys, including light, on the marine environment, and its global operational history supports the reliability of its internal assessment process. The use of CGG's impact and risk matrix, when consistently applied, has not resulted in unacceptable environmental outcomes, which indicates the process produces conservative and realistic assessment outcomes.

7 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

8 Minimisation of Impacts Through Activity Design

As part of planning and design of the activity several activity limitations were considered in accordance with the hierarchy of controls and through the consultation process (see Annex 2). These limitations were evaluated to determine whether the source of impact could be eliminated or substituted through changes in the timing, technology, or design of the activity. As described in Appendix F3, section 3.16.2, due to the interconnection between the tangible and intangible cultural values, all activity limitations are relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas.

8.1 Elimination

Elimination involves removing the source of an impact or risk entirely through changes to the activity design. In some cases, this may reduce one impact while introducing others, requiring careful consideration of environmental trade-offs. One main option was considered:

Elimination of Light Emissions from the Regia MSS

Eliminating light emissions from the Regia MSS would require removing all non-essential lighting, including navigational lights. While this could reduce exposure for light-sensitive fauna, doing so would increase the risk of vessel collisions, compromise crew safety, and breach international maritime safety obligations. These outcomes carry significantly higher environmental and operational risks, such as marine fuel spills or emergency response failures, which outweigh the potential benefit of reduced light emissions.

In this case, the trade-off clearly supports retaining navigational lighting, with impact reduction instead achieved through vessel lighting management practices that minimise unnecessary illumination. As a result of this analysis, there are no viable elimination options available for managing light emissions. The impact pathway remains and requires further consideration through substitution.

8.2 Substitution

Where elimination is not viable, substitution involves altering the timing, location, or sequencing of the activity to reduce the likelihood or consequence of the impact. Two main options were considered:

Seasonal Avoidance of Light-Sensitive Species

One option considered was avoiding survey operations during periods when light sensitive species are most likely to be present in the region. While this could reduce light exposure for certain individuals, implementing this option would have required the survey to be delayed or staged in multiple non-continuous phases. This would have significantly extended the total duration of the activity, increasing vessel presence and compounding impacts such as underwater noise, fuel use, and light emissions. In addition, the broad distribution and mobile nature of light-sensitive species in the area meant that any marginal benefit gained from this timing change would have been uncertain and limited. The trade-off between potential benefit and the increase in duration and cumulative environmental impact was not justified, and this option was rejected.

Daylight-Only Operations

A second substitution option considered was restricting operations to daylight hours only, thereby removing artificial light emissions at night. While this would effectively remove the light-related impact pathway for nocturnally active light sensitive species, it would also double the number of operational days required to complete the survey. This extended duration would result in increased impacts to a range of other environmental values, all of which are affected by the presence and duration of the survey. Again, the environmental trade-off of protecting one group of species at the expense of broader and potentially more sensitive receptors was not considered acceptable, and this option was also rejected.

These considerations demonstrate that reasonable substitution options were explored during the planning and environmental assessment process. However, none were adopted, as each would have introduced greater environmental impacts overall or resulted in unacceptable trade-offs. The residual light emissions associated with the activity are therefore not avoidable through substitution, and their impacts are addressed through assessment and management.

9 Predicted Levels of Impact

Ambient light is defined as the light that is already present within an environment. Any additional emission of light will result in a change in the ambient light. Natural ambient light sources offshore are dominated by solar and lunar luminescence but can also include bioluminescence emission from some marine organisms and incandescence emissions from electromagnetic radiation expressed as lighting.

The primary sources of artificial lighting in the offshore marine environment during the Regia MSS will result from the deck and navigational lights onboard the survey vessels. Deck areas need to be always lit for personnel safety, with deck lighting typically consisting of bright white lights focused on working areas. Spot lighting may be required for in-sea inspection, deployment, and retrieval of survey equipment. Navigational lights are typically elevated on the vessel, outwards facing, and of lesser intensity than deck lighting.

The impacts of the changes in ambient light from the vessel are discussed below.

9.1 Change in Fauna Behaviour

For the light impact assessment, the process outlined in the National Light Pollution Guidelines for Wildlife (CoA 2020) is used. The aim of the guidelines is that artificial light will be managed so wildlife is:

1. Not disrupted within, nor displaced from, important habitat.
2. Able to undertake critical behaviours such as foraging, reproduction and dispersal.

The Wildlife Conservation Plan for Seabirds (CoA 2020a) details that all species of seabird are vulnerable to impacts from lighting. The National Light Pollution Guidelines for Wildlife (CoA 2023) details those seabirds active at night while migrating, foraging or returning to colonies are most at risk. Fledglings are more affected by artificial lighting than adults due to the synchronised mass exodus of fledglings from their nesting sites. They can be affected by lights up to 15 km away.

The National Light Pollution Guidelines for Wildlife (CoA 2023) details that there is evidence that night-time lighting of migratory shorebird foraging areas may benefit the birds by allowing greater visual foraging opportunities. However, where nocturnal roosts are artificially illuminated, shorebirds may be displaced, potentially reducing their local abundance if the energetic cost to travel between suitable nocturnal roosts and foraging sites is too great. Artificial lighting could also act as an ecological trap by drawing migratory shorebirds to foraging areas with increased predation risk.

The National Light Pollution Guidelines for Wildlife (CoA 2023) details that artificial light can interfere with daily and seasonal light cues for zooplankton, invertebrates and fish resulting in changes in behaviour.

The Recovery Plan for Marine Turtles (DoEE 2017) details that artificial light poses a threat to marine turtles because it disrupts critical behaviours as they use light as an orientation cue. Artificial light can inhibit nesting by females (Salmon 2003) and can disrupt hatchling orientation and sea finding behaviour (Philibosian 1976; Witherington and Bjorndal 1991).

9.1.1 Birds

Twelve albatross and two petrel species are identified as having foraging, feeding or related behaviour and/or BIAs within the area potentially affected by light emissions (Table E9-1). These BIAs cover either most or all the South-east Marine Region (CoA 2015a). It is likely these species will forage in the EMBA. In addition, the common diving-petrel breeds on Lady Julia Percy Island which is within the area potentially affected by light emissions.

The National Recovery Plan for Albatrosses and Petrels (CoA 2022) identifies that seabirds are at risk of disorientation at night from artificial light sources and that seabird interactions have been reported across the marine infrastructure sectors including vessels. The paper cited (Black 2005) detailed that the species involved in the incidents were consistently small burrow nesting petrels with events

occurring in conditions of reduced visibility and in the vicinity of major burrowing petrel breeding sites. The use of ice-lights or other deck lighting was a key factor in all three incidents recorded.

No breeding sites for albatrosses or petrels are present within the area potentially affected by light emissions.

Albatrosses forage most actively during daylight and are less active at night because their ability to see and capture prey from the air is reduced (Phalan et al. 2007). Petrels seem more likely to forage during both that day and night (Brooke (2004) cited on Animal Diversity Web (2020), DCCEEW 2023a).

Though the National Recovery Plan for Albatrosses and Petrels (CoA 2022) identifies marine lighting as a threat to albatrosses and petrels it does not provide a risk category as the number of species affected in or outside Australian jurisdiction as nil.

Two shearwater species were identified within the area potentially affected by light emissions. The Wedge-tailed Shearwater was not identified in the PMST Report for the area potentially affected by light emissions (Appendix B5) though a foraging BIA was. The foraging BIA is a buffer around Muttonbird Island, Victoria but there is not data to support that this species breeds on the Victorian Mutton Island but there is data to support that they breed on Muttonbird Island in NSW. This species is listed as marine and migratory and does not have a recovery plan or conservation advice. Light has not been identified as a threat to this species in the SPRAT profile (DCCEEW 2023a) or the Wildlife Conservation Plan for Seabirds (CoA 2020a).

The Short-tailed Shearwater breeds on Lady Julia Percy Island which is within the area potentially affected by light emissions. This species is listed as marine and migratory and does not have a recovery plan or conservation advice. The Wildlife Conservation Plan for Seabirds (CoA 2020a) details that light pollution represents a potential threat to this species in parts of its range. A number much higher than anticipated, of (predominantly juvenile) shearwaters were found dead or injured as a result of being attracted to lights and grounded over a 15-year period of patrols on Phillip Island, Victoria (1999-2013).

During consultation breeding colonies of Little Penguin were also identified on Lady Julia Percy Island / Deen Maar, and Middle Island [Event ID 2023]. Breeding typically occurs from September to February. Studies suggest that penguins were habituated to artificial lights and were unaffected by low level (15 lux) increase in artificial illumination (Rodriguez et al. 2016). [Paragraph added in response to Matter: B02]

The Orange-bellied Parrot migration route overlaps the area potentially affected by light emissions. The Orange-bellied Parrot is classed as critically endangered and there are about 50 remaining in the wild (DELWP 2016a). Survey activities may overlap the period when Orange-bellied Parrot migrates between Tasmania and Victoria between late February to early April (Australian Museum 2020). The Orange-bellied Parrot Recovery Plan identifies illuminated structures and illuminated boats as a potential barrier to migration and movement (DELWP 2016).

Of the other bird species identified from the PMST Report (Appendix B5) that may occur within the area potentially affected by light emissions, the following had conservation advice that identified that disturbance can result from night lighting or that light pollution has indirect impacts on habitat critical to survival; Bar-tailed Godwit (western Alaskan) (DCCEEW 2024b), Common Greenshank (DCCEEW 2024e), Curlew Sandpiper (DCCEEW 2023m), Far Eastern Curlew (DCCEEW 2023n),Greater Sand Plover (DCCEEW 2023o) Latham's Snipe (DCCEEW 2024d), Lesser Sand Plover (TSSC 2016), Ruddy Turnstone (DCCEEW 2024c) and Sharp-tailed Sandpiper (DCCEEW 2024a). These species are migratory wetland species.

The predicted effect level to birds from light emissions is assessed as minor (some affect but not considered significant or long lasting, no overall threat to populations) based on:

- The presence of birds within the area potentially affected by light emissions is expected to be representative of their wide distribution in southern Australian waters during the survey period.
- The increase in light level intersecting the coastline at Warrnambool, Middle Island and Lady Julia Percy Island would be comparable to that associated with light emissions from typical

marine traffic and short-duration, minor changes in ambient light in these locations is unlikely to cause behavioural changes or result in injury/mortality to the Little Penguin. [Paragraph added in response to Matter: B02]

- As the area potentially affected by light emissions overlaps a number of foraging and breeding BIAs, the migratory route for the critically endangered, Orange-bellied Parrot and areas where birds are likely or known to be foraging, breeding or roosting all vessels will have a Vessel Lighting Management Plan to minimise external light emissions as required by the National Light Pollution Guidelines.
- As all survey vessels will have a Vessel Lighting Management Plan such that effects to birds from light emissions are predicted to be temporary and not result in significant or lasting effects.

The uncertainty level for impact to birds from light emissions is assessed as low based on:

- Peer review literature and studies have been used to inform the impact assessment.
- A conservative 20 km area has been used for assessment of impacts for birds as recommended by the National Light Pollution Guidelines for Wildlife (CoA 2023) which details that the 20 km is a precautionary limit based on observed effects of sky glow on marine turtle hatchlings demonstrated to occur at 15-18 km and fledgling seabirds grounded in response to artificial light 15 km away.
- The 20 km area has been used for assessment of impacts for birds does not consider that survey vessels will have a Vessel Lighting Management Plan to minimise external light emissions, thus the area of potential impact will be significantly less than 20 km.
- The impact assessment has been undertaken as per the National Light Pollution Guidelines for Wildlife (CoA 2023).
- Mitigation and management measures recommended by the National Light Pollution Guidelines for Wildlife (CoA 2023) relevant to vessels have been assessed and all survey vessels will have a Vessel Lighting Management Plan to minimise external light emissions as required by the National Light Pollution Guidelines.

The predicted level of impact based on the effect (minor) and uncertainty (low) is assessed as low. For birds the predicted levels of impact are clearly below the pre-defined acceptable levels of impact and the mitigation and management measures in place provide sufficient confidence in the predicted effect levels.

9.1.2 Fish, Invertebrates and Zooplankton

Normal working lights on marine research vessels—and, by implication, lights from other sources including fishing boats, cargo vessels, recreational watercraft, jetties and oil and gas platforms—have been shown to cause zooplankton and their vertebrate predators to descend away from the surface; these effects occurred at depths of up to 200 m, and up to 200 m horizontally from the light source (Berge et al. 2020 in DCCEEW 2022). Since most zooplankton need to ascend to forage on phytoplankton near the water's surface, light pollution may lead to an overall reduction in zooplankton, with cascading effects on their predators, and so on up the food chain (DCCEEW 2022).

Phototactic behaviour (the attraction to artificial light) has been observed both in fish and squids with some species known to have a positive phototaxis by moving towards and aggregating in the illuminated zone of artificial lights (Ibrahim and Hajisamae 1999). Hence fishing with artificial lights (surface light) is one of the most advanced and successful methods to increase the catch rate of squid and pelagic fish (Nguyen and Winger 2019).

Experiments using light traps have found that some fish and zooplankton species are attracted to light sources (Meekan et al., 2001), with traps drawing catches from up to 90 m (Milicich et al., 1992). Lindquist et al (2005) concluded from a study of larval fish populations around an oil and gas platform in the Gulf of Mexico that an enhanced abundance of clupeids (herring and sardines) and engraulids (anchovies), both of which are highly photopositive, was caused by the platforms' light fields. The concentration of organisms attracted to light results in an increase in food source for predatory species and marine predators are known to aggregate at the edges of artificial light halos. Hernandez

& Shaw (2002), in a similar light trap study, noted that juvenile tunas (Scombridae) and jacks (Carangidae), which are highly predatory, may have been preying upon concentrations of zooplankton attracted to the light field of the platforms. This could potentially lead to increased predation rates compared to unlit areas.

The predicted effect level to fish, invertebrates and zooplankton from light emissions is assessed as minor (some affect but not considered significant or long lasting, no overall threat to populations) based on:

- There are no biologically important areas or habitat critical to the survival of fish or invertebrate species within or adjacent to the area potentially affected by light emissions.
- For threatened or listed fish species identified in the PMST Report, none of the recovery plans, conservation advice or conservation listings identify light emissions as a threat.
- No fish spawning or aggregation areas were identified within the area potentially affected by light emissions.
- The presence of fish and invertebrates within the area potentially affected by light emissions is expected to be representative of their wide distribution in southern Australian waters during the survey period.
- The area potentially affected by light emissions relevant to zooplankton, invertebrates, and fish (200 m) overlaps a small portion of the Bonney Coast Upwelling Key Ecological Feature which during November to April results in increased productivity, consisting of krill and other zooplankton, within the area. Thus, all vessels will have a Vessel Lighting Management Plan to minimise external light emissions as required by the National Light Pollution Guidelines. This will ensure that krill and other zooplankton associated with the Bonney Coast Upwelling Key Ecological Feature are not affected by light emissions associated with the survey vessels.
- Several threatened species including the blue whale migrate into the Operational Area and area that may be affect by light, to forage. As the Regia MSS will occur during the November to April season, when foraging typically occurs, all vessels will have a Vessel Lighting Management Plan to minimise external light emissions as required by the National Light Pollution Guidelines. This will ensure that krill and other zooplankton are not affected by light emissions associated with the survey vessels.
- As all survey vessels will have a Vessel Lighting Management Plan to minimise external light emissions, light emissions will be significantly less and not aimed into the water as per squid fishing vessels, thus attraction of squid to the moving survey vessels is unlikely.
- Effects to fish, invertebrates and zooplankton that may be present in the area potentially affected by light emissions are predicted to be temporary and not result in lasting effects.

The uncertainty level for impact to fish, invertebrates and zooplankton from light emissions is assessed as low based on:

- Peer review literature and studies have been used to inform the impact assessment.
- The impact assessment has been undertaken as per the National Light Pollution Guidelines for Wildlife (CoA 2023).
- Mitigation and management measures recommended by the National Light Pollution Guidelines for Wildlife (CoA 2023) relevant to vessels have been assessed and all survey vessels will have a Vessel Lighting Management Plan to minimise external light emissions as required by the National Light Pollution Guidelines.

The predicted level of impact based on the effect (minor) and uncertainty (low) is assessed as low. For fish the predicted levels of impact are clearly below the pre-defined acceptable levels of impact and the mitigation and management measures in place provide sufficient confidence in the predicted effect levels.

9.1.3 Turtles

Light pollution is identified as a high-risk threat in the Recovery Plan for Marine Turtles in Australia (DoEE 2017) with the action of: *Artificial light within or adjacent to habitat critical to the survival of marine turtles will be managed such that marine turtles are not displaced from these habitats.*

No habitat critical to the survival of marine turtles or biologically important areas have been identified within or adjacent to the area potentially affected by light emissions, from the Recovery Plan for Marine Turtles in Australia (DoEE 2017) or PMST Report (Appendix B5).

The PMST Report (Appendix B5) identifies leatherback and loggerhead turtles breeding likely to occur within the area potentially affected by light emissions. However, as detailed in the Section 4.5 this is not supported by other information sources. Thus, it is likely that the three marine turtle species identified in the PMST Report (green, leatherback and loggerhead) may be present within the area potentially affected by light emissions and may undertake critical behaviours such as foraging, but it is unlikely that they are undertaking breeding.

As there are no habitat critical to the survival of marine turtles within or adjacent to the area potentially affected by light emissions, thus displacement of turtles by artificial light from these areas is not predicted.

Marine turtles use light as an orientation cue, and therefore artificial light has the potential to inhibit nesting by adult females and disrupt the orientation and sea-finding behaviour of hatchlings (CoA 2023; DoEE 2017). The general guidance is that turtles require naturally illuminated beaches for successful nesting and sea-finding behaviour (DoEE 2017a; Limpus et al. 2015; Robertson et al. 2016).

Artificial lighting may adversely affect hatchling sea-finding behaviour in two ways: disorientation – where hatchlings crawl on circuitous paths; or misorientation – where they move in the wrong direction, possibly attracted to artificial lights (CoA 2023). Hatchlings have been observed to respond to artificial light up to 18 km away during sea finding (CoA 2023).

No nesting beaches are present within the area potentially affected by light emissions so disruption to turtle nesting, hatchling orientation, sea-finding and dispersal behaviour is not predicted.

The predicted effect level to marine turtles from light emissions is minor (some affect but not considered significant or long lasting, no overall threat to populations) based on:

- There is no habitat critical to the survival of marine turtles within or adjacent to the area potentially affected by light emissions, thus displacement of turtles by artificial light from these areas is not predicted.
- No nesting beaches are present within the area potentially affected by light emissions so disruption to turtle nesting, hatchling orientation, sea-finding and dispersal behaviour is not predicted.
- The Recovery Plan for Marine Turtles in Australia (DoEE 2017) identifies light pollution as a threat to nesting turtles and hatchlings. Light emissions have not been identified as a threat to turtles away from nesting beaches (i.e. there is no inhibition of orientation cues noted in open waters). There are no nesting beaches within the area potentially affected by light emissions.
- The area potentially affected by light emissions does not represent key foraging, breeding, migration, or aggregation areas for marine turtles; and marine turtle presence is expected to be representative of their wide distribution in southern Australian waters during the survey period.
- Changes to biologically important behaviours (such as nesting, hatchling orientation, sea-finding and dispersal behaviour) for marine turtles is not predicted.
- Effects to turtles that may be present in the area potentially affected by light emissions are predicted to be minor or insignificant and are unlikely to result in lasting effects.

The uncertainty level for impact to turtles from light emissions is assessed as low based on:

- There are long-term tagging studies of sea turtles in Australia, and there are no nesting habitats are BIAs identified within or adjacent to the area that may be affected by may be affected by light emissions.
- The Recovery Plan for Marine Turtles in Australia (DoEE 2017) identifies light pollution as a threat to nesting turtles and hatchlings. Light emissions have not been identified as a threat to turtles away from nesting beaches (i.e. there is no inhibition of orientation cues noted in open waters). There are no nesting beaches within the area potentially affected by light emissions.
- Peer review literature and studies have been used to inform the impact assessment.
- The impact assessment has been undertaken as per the National Light Pollution Guidelines for Wildlife (CoA 2023).
- Mitigation and management measures recommended by the National Light Pollution Guidelines for Wildlife (CoA 2023) relevant to vessels have been assessed and all contracted vessels will have a Vessel Lighting Management Plan to minimise external light emissions as required by the National Light Pollution Guidelines.

The predicted level of impact based on the effect (minor) and uncertainty (low) is assessed as low. For turtles the predicted levels of impact are clearly below the pre-defined acceptable levels of impact and the mitigation and management measures in place provide sufficient confidence in the predicted effect levels.

9.2 People and Communities

9.2.1 Cultural Features

The presence of lighting associated with the activity has potential to impact cultural features and heritage values through the following ways:

- Cultural obligations to care for Country: Environmental impacts may be assumed to impact rights and obligations to care for Sea Country.
- Knowledge of Country/customary law and transfer of knowledge: Indirect impacts to communities practicing these skills will inherently occur when threats to Sea Country values are felt.
- Connection to Country: Where people are displaced or disrupted (e.g., during colonisation) or where there is a loss of technical skills or environmental knowledge this may damage connection to Country (McDonald and Phillips, 2021).
- Access to Country: Impacts to access to Country can occur in areas that were traditionally accessed by First Nations peoples.

Deen Maar and two Native Title determinations were identified as being within the area potentially affected by light emissions, Eastern Maar and Gunditjmara (Appendix B12 MAP-REG-EPM-092), including the currently under consultation Nyamat Mirring (GMTOAC, 2023).

Consultation and literature review indicated the importance of connection to coastal and marine areas for indigenous culture.

The predicted effect level to cultural features from light emissions is minor (some affect but not considered significant or long lasting) based on:

- Commercial shipping companies and commercial fishing vessels transit adjacent to and within the Operational Area and the Southeast Marine Region is one of the busiest shipping regions in Australia and Bass Strait is one of Australia's busiest shipping routes. Vessel lighting may be seen at night from Deen Maar and Native Title areas, however, they would not be distinguishable from any other vessel that may be in the area. Survey vessels will become less distinguishable as they move further away from the coast as the survey is undertaken. Over the 90 day survey the vessels will spend the majority of the time undertaking acquisition within the Active Source Area which is at its closest point >20.7 km from the mainland and >17 km from Deen Maar (adhering to activity limitation: no discharge of sound source within 17km of Deen Maar), at these distances it is unlikely that the vessels would be noticeable at night.

- Light emissions will not exclude Traditional Owners from Country including Sea Country.
- Light emissions will not obstruct access to resources or locations that have been or may continue to be used for traditional practices such as harvesting, hunting, gathering, or camping.
- There is no threat or impediment from the activity on the transmission of knowledge of Country/customary law and transfer of knowledge by light emissions. This is particularly true when there are no predicted effects to light sensitive species of cultural significance at populations levels, to ecosystem integrity, or biodiversity preservation.

The uncertainty level for impact to cultural features from light emissions is assessed as low based on:

- No cause-effect pathway has been identified for light emissions affecting access to Country, including Sea Country, knowledge of Country/customary law and transfer of knowledge or connection to Country.
- Peer review literature and studies have been used to inform the impact assessment, and the impact assessment has been undertaken as per the National Light Pollution Guidelines for Wildlife (CoA 2023) for light sensitive species of cultural significance.
- Mitigation and management measures recommended by the National Light Pollution Guidelines for Wildlife (CoA 2023) relevant to vessels have been assessed and all contracted vessels will have a Vessel Lighting Management Plan to minimise external light emissions.

The predicted level of impact based on the effect (minor) and uncertainty (low) is assessed as low. For cultural features the predicted levels of impact are clearly below the pre-defined acceptable levels of impact and the mitigation and management measures in place provide sufficient confidence in the predicted effect levels.

9.3 Measures Adopted to Manage Environmental Impacts

Measures adopted to ensure environmental impacts will be of an acceptable level and ALARP.

Measure	Measure Type	Details and Justification
Vessel Lighting Management Plan	Resource	Contracted vessels are required to have a Vessel Lighting Management Plan to minimise light emissions while meeting vessel navigational light requirements. The Lighting Management Plan will also cover the process for handling of birds, releasing of birds and reporting to DCCEEW in the case of protected species.
Light Minimisation	Responsibility	Vessel crew to be aware of their requirement to minimise non-essential light emissions.
Minimise non-essential lighting	Practice	For all survey vessels, the following will be implemented where it does not contravene vessel lighting requirement for safe navigation: – Non-essential lights switched off when not in use. – Window blinds closed at night. – Shield lights and contain light spill on the deck unless required for safe operations. – Use of suitable light types recommended in the National Light Pollution Guidelines.
CGG Marine Assurance System	System	The CGG Marine Assurance System ensure compliance of contract vessels with legislative requirements including the Navigation Act, MARPOL, COLREGS and Marine Orders.
Survey Environment Advisor	Person	This person is the primary environmental authority on the vessel and has a role related to environmental management and performance on the vessel, along with specific responsibilities for the management of fauna interactions.
Sail Line Plan	Resource	Ensures that the survey vessel will remain within the scope and boundaries of the EP and reflects the activity limitations.
OVID-Style Inspection	Practice	The pre-survey inspections of all contracted vessels will confirm that the light management plan is in place and that the crews are aware of their responsibilities to minimise non-essential lighting.
Activity Specific Induction	Practice	All vessel crew will undertake an activity specific induction, which will include information about the requirements for management of light.

10 Demonstration Impacts will be of an Acceptable Level

10.1 Principles of ESD

Temporary, Reversible, Small Scale and Natural Variation

As discussed in the impact assessment, the activity is expected to result in short-term and reversible impacts from artificial light, primarily associated with vessel navigation and safety lighting during night operations. These impacts are limited to the duration of the activity, which is less than 90 days, and are geographically confined to the Operational Area plus a precautionary 20 km buffer for birds and turtles, and 200 m for fish, zooplankton, and invertebrates. The predicted changes in fauna behaviour are minor in effect, with no long-term or population-level consequences anticipated. Peer-reviewed literature, field studies, and adherence to national guidelines support the conclusion that the activity will not cause lasting changes to the environment.

Based on sufficient information

The assessment was informed by a range of peer-reviewed scientific literature, national guidelines (e.g. the National Light Pollution Guidelines for Wildlife), field data from previous studies in the region, and expert input. The quality and sufficiency of this information enabled robust conclusions about the potential impacts. Where uncertainty existed, precautionary buffer distances were applied (e.g. 20 km for birds and turtles), and conservative assumptions were used in the absence of local data. No serious or irreversible impacts were predicted, and the precautionary principle was not triggered.

Activity not inconsistent with EPBC Act

The environmental management measures adopted for the activity are not inconsistent with the EPBC Act, including relevant Management and Recovery Plans. Species considered include listed marine turtles, seabirds, and migratory shorebirds. The Recovery Plan for Marine Turtles (DoEE 2017), Wildlife Conservation Plan for Seabirds (CoA 2020a), Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) and species recovery plans were reviewed, with vessel lighting measures aligned to their recommendations. All contracted vessels will implement Vessel Lighting Management Plans to avoid disruption to critical behaviours such as foraging, reproduction and dispersal. No habitat critical to the survival of listed species is present within the area potentially affected by light emissions.

10.2 Biological and Ecological Categories

Biological features assessed are fish, zooplankton, invertebrates, birds, and turtles that are identified as light sensitive in the National Light Pollution Guidelines for Wildlife (CoA 2023). Impacts are predicted to be minor and reversible, confined to localised areas near the vessels (within 200 m for aquatic species, and up to 20 km for avian and turtle species). There are no population-level consequences predicted, and no critical habitats or aggregation areas overlap the affected area. Phototactic behaviour in squid and fish may cause localised effects, but these are common in the region due to existing fishing activity. The implementation of light management measures ensures impacts remain low in intensity and scale.

The activity is predicted to cause only minor and temporary changes in the behaviour of individual species without affecting ecosystem structure or function. The Bonney Coast Upwelling, a Key Ecological Feature, slightly overlaps with the area affected by light emissions, but no disruption to ecological processes is predicted. Vessel lighting is not expected to significantly alter food webs, and all emissions will be minimised through a structured lighting management approach. No impacts are predicted at an ecosystem level.

10.3 Economic, Cultural and Social Categories

The cultural heritage review, desktop research and consultation with relevant persons confirmed that light emissions from the activity are not expected to result in material disadvantage. The activity occurs more than 17 km offshore and is of short duration. No disruption to fishing grounds,

recreational use, or tourism was identified because of artificial light. Measures such as minimising non-essential lighting help avoid interference with amenity values or access to key resources.

Cultural values assessed included the significance of invertebrates, seabirds, and connection to Country for Traditional Owners. No direct disturbance to cultural sites or practices will occur. The presence of lighting from vessels may be visible from Native Title areas, as per any other vessels in the area, but will not disrupt cultural access or obligations. The short duration and offshore distance of the activity, coupled with mitigation measures, ensure that cultural connections and practices can continue without interruption.

Consultation identified concerns related to impacts on birds, squid, and ecosystem integrity. These were considered in the assessment, and several design and management measures were adopted in response. These include requiring all vessels to implement Vessel Lighting Management Plans and undertaking pre-survey inspections to ensure compliance. As these values are closely tied to the physical presence and health of the species, the corresponding social, cultural and economic impacts are likewise considered acceptable. The measures directly address objections by reducing impacts to culturally significant species, commercial species, and biodiversity values.

10.4 Consistency with Company Processes

The impact assessment followed the methodology in Appendix B3 and applied the impact assessment process as per the National Light Pollution Guidelines for Wildlife (CoA 2023) and was informed through consultation input and relevant persons feedback. The predicted level of effect to light sensitive fauna and people and communities was assessed as minor, with a low level of uncertainty, resulting in a low predicted impact level. The predicted spatial extent of light emissions was compared against known distributions, behavioural sensitivities, and key ecological features. This confirmed that potential impacts are localised and temporary, confined to the vicinity of the light source. All mitigation measures consistent with regulatory guidance and good industry practice were incorporated. As no threshold exceedances or high-consequence outcomes were identified, the final consequence ratings remain within company-defined limits.

The impact assessment has demonstrated that the effect of light emissions to light sensitive fauna (birds, fish, invertebrates, zooplankton, and turtles) and people and communities, has a:

- Predicted level of effect of minor (2).
- An uncertainty level of low (2).
- Predicted level of impact of low (4).

11 Environmental Performance Outcomes

Environmental Performance Outcomes (EPOs) are measurable and activity-specific outcomes that describe the environmental performance the titleholder must achieve to ensure impacts and risks are managed to acceptable levels. EPOs are critical to the structure of an Environment Plan because they form the clear link between the defined acceptable level of impact and the predicted level of environmental consequence. Each EPO must be measurable, achievable, and within the control of the titleholder to implement, providing a transparent and enforceable statement against which performance can be assessed.

Table E9-3 - Environmental Performance Outcomes and Justifications

Defined Acceptable Level (From Table E9-2)	Environmental Performance Outcome	Rationale
Artificial light will be managed so wildlife is not disrupted within, nor displaced from, important habitat, and is able to undertake critical behaviours such as foraging, reproduction and dispersal.	**Biologically important behaviours within a BIA or outside a BIA can continue while the activity is being undertaken.**	These EPOs are supported through adherence to the Vessel Light Management Plan, which includes documented procedures for minimising light intensity and optimising directional control. Evidence of performance may include lighting audits, crew training records, absence of wildlife disturbance incidents and verification that lighting is consistent with safe navigational standards while minimising ecological risk.
Artificial light exposure to fish, invertebrates, and zooplankton will not exceed those produced by other marine users during nighttime operations in the region and will not cause impacts at a population level.	**Light emissions will be reduced to minimum levels for safe operations and navigation in accordance with the Vessel Management Plan**	
Turtles continue to utilise the area without disruption to critical life-cycle behaviours.	**Light emissions are managed to avoid displacing turtles or disrupting nesting, foraging, or migratory behaviours within or near biologically important areas.**	
Industries, livelihoods, and ecosystem services remain viable, with no sustained financial or operational consequences resulting from changes in species behaviour, abundance, or access to resources.	**Social, cultural, and economic features are protected, sustaining their value for people and communities.**	Predicted impacts to economic receptors (e.g. squid) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation, thus commercial squid fishers will not be worse off because of the activity.
Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability.		Predicted impacts to biological receptors (fish, invertebrates, birds, turtles) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation. Vessel lighting associated with petroleum activity may be visible from Native Title areas, but due to distance and duration, it is not predicted to impact associated cultural values.

Defined Acceptable Level (From Table E9-2)	Environmental Performance Outcome	Rationale
People and communities can continue engaging with the natural environment, recreational activities, and heritage values without experiencing long-term or irreversible disruption.		Predicted impacts to biological receptors (fish, invertebrates, birds, turtles) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation.
Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.	**The activity is conducted such that environmental impacts and risks remain within the range assessed as medium or lower, with mitigation measures in place and functioning as intended.**	This EPO enables ongoing assessment of effectiveness through internal reviews and operational audits. It provides a clear link between the risk assessment process and implementation strategy, supporting regulatory compliance and continuous improvement without requiring environmental outcome monitoring.

12 Recommendations

The predicted level of impact is low for all light sensitive fauna and people and communities, and below pre-defined acceptable levels. Good industry practice (including legislation and standards) has been applied; therefore, impacts are of an acceptable level to all species. The orange-bellied parrots migratory path has a small overlap with the Operational Area and due to the conservation status of this species it should be assessed for cumulative impact pathways with light from other reasonably foreseeable projects or activities. This can be found in Appendix F1.

13 Document Control

Date	Revision	Update
6 June 2023	A	Draft prepared for initial comment
20 August 2023	B	Update based on comments and relevant person feedback
11 Sept 2023	0	Approved for release on Regia MSS website
20 Dec 2023	1	EP submission to NOPSEMA
23 October 2024	2	Updated following NOPSEMA assessment
16 April 2025	3	Updated following NOPSEMA OMR 1 Letter
6 December 2025	4	Updated following NOPSEMA OMR 2 Letter

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TSSC. 2010. Commonwealth Listing Advice on *Thunnus maccoyii* (Southern Bluefin Tuna). Threatened Species Scientific Committee.

TSSC. 2014. Commonwealth Listing Advice on *Ardenna carneipes* (flesh-footed shearwater). Threatened Species Scientific Committee.

TSCC. 2015. Conservation Advice *Halobaena caerulea* blue petrel. Threatened Species Scientific Committee.

TSCC. 2015a. Conservation Advice *Pterodroma Mollis* soft-plumaged petrel. Threatened Species Scientific Committee.

TSSC. 2015b. Conservation Advice *Balaenoptera physalus* fin whale. Threatened Species Scientific Committee.

TSSC. 2015c. Conservation Advice *Balaenoptera borealis* sei whale. Threatened Species Scientific Committee.

TSSC. 2015d. Commonwealth Listing Advice *Seriolella brama* blue Warehou. Threatened Species Scientific Committee.

TSSC. 2016. Conservation Advice *Charadrius mongolus* Lesser Sand Plover. Threatened Species Scientific Committee.

TSSC. 2016a. Conservation Advice *Lathamus discolor* Swift Parrot. Threatened Species Scientific Committee.

TSSC. 2019. Conservation Advice *Hirundapus caudacutus* White-throated Needletail. Threatened Species Scientific Committee.

TSSC. 2019a. Conservation Advice *Botaurus poiciloptilus* Australasian Bittern. Threatened Species Scientific Committee.

TSSC. 2002. Commonwealth Listing Advice on *Sterna albifrons sinensis* (Little Tern (western Pacific)). Threatened Species Scientific Committee.

TSSC. 2020. Conservation Advice *Thalassarche cauta* Shy Albatross. Threatened Species Scientific Committee.

TSSC. 2020a. Conservation Advice *Falco hypoleucos* Grey Falcon. Threatened Species Scientific Committee.

TSSC. 2021. Conservation Advice *Prototroctes maraena* Australian Grayling. Threatened Species Scientific Committee.

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Annex 1

Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. Table E9-4 shows how this feedback has been incorporated into the environmental assessments.

Table E9-4 - Public comment input.

Matter	Matter ID	Changes made arising from public comment
Matter: Acknowledgement of breeding colonies	B02	CGG has included additional detail in EP Appendix E9 to assess impacts to breeding colonies at Middle Island and Deen Maar and other coastal locations in response to these claims.
Matter: Geographic range and all species need to be defined and considered	I16	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has considered these claims and has rerun the PMST reports to ensure that all information on the likely/known presence of relevant species within the area, as well as information on their protection status, Biologically Important Areas (BIAs) and behaviours is up to date. The updated PMST reports are provided in full in EP Appendix B5.

Annex 2

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table E9-5. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table E9-5 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4033	Claim that seismic testing is proven to damage and kill marine life.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1024
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4357	The stakeholder raised an objection to seismic surveys as they negatively affect the fishing industry, local economy and environment.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of commercial fish species and sensitive species within the area of operation. The MSS will also not impact the local economy. Mitigation plans are in place to reduce any impacts to as low as practicable.	424
4050	Concern about the destruction of smaller sealife and the wounding of larger marine animals due to seismic blasting.	Regia EP has conducted thorough assessments of the literature for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and	1669

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		relevant mitigation measures are outlined in the EP.	
4051	Concern about the detrimental impacts on marine animals.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1452
4063	Concern for various birds and little penguins and the effects of sound and light.	Impacts from underwater sound and artificial light on birds, including little penguins, are assessed in the Environmental Plan (EP) and can be found in E5 and E9. Further assessment of little penguins was also undertaken by CGG to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level. Measures to minimise adverse impacts on birds in the region are also outlined in the EP.	1783
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration by other companies, particularly regarding the sale of seismic data.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	879
4068	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4073	Concerns about impacts both reputational and physical to the region if the activity is allowed.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population	1244

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117
4076	Concerns about potential disturbance to the marine environment, including marine parks and areas of Biological Importance.	The titleholder acknowledged this concern and noted that potential impacts to the marine environment including marine parks and biologically important areas as a result of the Regia MSS is assessed in E1 to E9 and F3 of the EP. There will be no activities with Australian Marine Parks. All areas of biologic importance have been identified and assessment in the respective impact and risk assessments.	2278
4077	Concerns about potential harm to zooplankton, whales, dolphins, sharks, seals, the Bonney Upwelling, rock lobster fishery and other local fishing industries.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	722
4078	Concerns about seismic testing and drilling rigs impacting marine life and fishing activities.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	917
4081	Concerns about the impact on whale habitat, endangered marine life, and commercial fisheries	Titleholder acknowledged this concern and noted that potential impacts to whales and relevant endangered marine species is assessed in the EP Chapters on underwater sound and light (E2-E7, and E9). Any interactions with seismic are mitigated and managed through spatial boundaries and a comprehensive fauna management plan. Advised that control measures to reduce impacts to commercial fishers as a result of displacement are outlined in the EP and include Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the	4551

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		commercial fishers that fish within the Operational Area.	
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825
4088	Condemns seismic testing, asserting that it is deadly to marine life and unacceptable for ocean ecosystems. Call for a total ban, citing the large number of marine animals harmed by the practice. Argument that the destruction of marine ecosystems and the fishing industry is unjustifiable and express frustration, telling the parties responsible to stop.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	422
4093	Doubted the effectiveness of mitigation measures and believed the reports/information provided were absent of action /intention.	The mitigations applied by CGG are industry standard and comply with government policy. They have been proven to be as effective as reasonably practical for a number of years. The measures adopted to protect species from the aspects of the activity are found in the respective impact and risk assessments.	2830
4096	Environmental Risk: Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artificial light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to	2766

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures are outlined in the EP.	
4118	Impact on marine animals, which are the livelihood of the community.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4123	Insufficient information about potential damage from seismic testing.	The titleholder is confident that sufficient relevant and available information has been used to inform this this EP and to complete a comprehensive assessment of relevant aspects of the activity. Information used based around sound, peer reviewed scientific literature.	4190
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808
4131	Light pollution concerns related to the activity.	Title holder has undertaken a thorough analysis and assessment of all relevant literature related to light impacts on the environment. Impacts are assessed as low and there are multiple measures in place to minimise impacts.	1247
4133	Mass destruction of marine populations through the blasting process.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2274
4136	Mention of considerable damage to marine life outweighing the benefits of mapping seafloors for gas drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in	1389

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		place to reduce any impacts to as low as practicable.	
4145	Opposes seismic exploration claiming it is dangerous to all marine life. Cannot ensure zero risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	427
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high decibel blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making them unacceptable in a whale sanctuary area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	537
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	3343
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2963
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation	1653

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1659
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels.	1662

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1665
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4198	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1672
4199	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2586
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk	2886

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments is covered below in response to concern 6.	
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049
4217	Strong objection to the proposal for 3D seismic blast in the Otway Basin due to harm to oceans and unacceptable environmental impact or risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1656
4218	Strong opposition to seismic testing in the ocean due to its effects on both wildlife and the fishing industry. Individual firmly disapproves of the practice.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	425

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4253	The possible effects to marine life and ecosystems are my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4260	The protection of wildlife in the Otway Basin is directly affected by drilling and seismic surveying.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1901
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would	Acceptable levels of impact are established based on relevant up-to-	2064

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	impact every marine creature and sea bird.	date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	
4270	The stakeholder asserts seismic surveying has been proven to be harmful and disruptive to marine life of many species.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	3343
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publicly responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255
4278	The stakeholder expresses an active interest in the wellbeing of the coastline and its flora and fauna, indicating a general concern for environmental conservation.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of	1325

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	
4285	The stakeholder noted the following concerns as a resident of Port Fairy: Noise (land and sea), impact on marine life, potential impacts on the environment and the future potential if gas is found.	We are also concerned about the welfare of marine fauna. We have undertaken an impact assessment process that includes whale, seals, pelagic and shorebirds. As part of this assessment, we must show that impacts to these species will be of an acceptable level. We have determined that it is acceptable to have temporary behavioural changes, such as moving away from the survey vessel, and no injury or long-term impacts. Our Preliminary Environmental Impact and Risk Assessment document has been published on the project website and is available here. We are also publishing environmental impact, risk and mitigation documents as they are completed, in the document library. We are publishing the entire documents in order to remain transparent, but I have also attached a summary document.	1747
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747
4306	The stakeholder was concerned about potential negative impacts of gas exploration and development on Country, the marine and coastal environment, the local economy, Traditional Owners, and local communities.	The titleholder acknowledged the feedback, noting that all relevant impacts are assessed in the Environmental Plan (EP) and can be found in E1-E9. Measures to minimise adverse impacts on functions, interests and activities on relevant receptors are also adopted and can be found in G1.	3152
4309	The stakeholder was concerned about the impact on marine life sensibilities and populations.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2273

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4315	The statement suggests that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4319	There are concerns regarding the potential impacts of seismic surveys on penguins, diving birds, and other marine fauna. Stakeholders are particularly worried about how the noise and disturbance from these surveys could affect the breeding and foraging behaviours of these species.	This effects of sound on birds were initially assessed in E4 and further assessments for penguins can be found in F3. Birds can also be affected by artificial light, which has been assessed in E9. The conclusion is that the measures adopted to protect foraging birds will mean that impacts are of an acceptable level.	2006
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4004	Seismic blasting in our ocean so close to our beautiful home is deeply concerning given the toll will inevitably take on sea life and further unknown impacts.	The titleholder acknowledged the feedback, noting that impacts and risks to sea life are assessed in the Environmental Plan (EP) and can be found in Appendices E1 to E9 and F3. Measures to minimise adverse impacts to sea life are outlined in the EP in G1.	2757
4057	Concern about the long-lasting impacts of the proposed activity on marine life and coastlines, highlighting ecological and cultural repercussions.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation nor interfere with cultural practices or values. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1022
4061	Concern about the welfare of whales, seals, and birds due to the activity.	The titleholder acknowledged concerns outlined in email regarding welfare of whales, seals and birds due to the activity.	4061
4417	The relevant person was concerned that about the proposed seismic activity effecting the behaviours of certain species.	Event ID 6880 - The Regia team responded in-meeting that the first half of the EP is associated with assessment work undertaken prior to commencing the activity. First and foremost, because there are so many different species, they explained that they had grouped species together from a physiological perspective. Secondly, the Regia team explained that their focus is on the mega-fauna and species which have protection under the EPBC act.	6880

Annex 3

Light Sensitive Species

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Fish							
Australian Grayling	Species or species habitat may occur within area	Vulnerable				None identified	Conservation Advice *Prototroctes maraena* Australian Grayling (TSSC 2021)
Blue Warehou	Species or species habitat known to occur within area	Conservation Dependent				None identified	Commonwealth Listing Advice *Seriolella brama* Blue Warehou (TSSC 2015)
Orange Roughy, Deep-sea Perch, Red Roughy	Species or species habitat likely to occur within area	Conservation Dependent				None identified	None identified
Australian Smooth Pipefish, Smooth Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse	Species or species habitat may occur within area				Listed	None identified	None identified
Brushtail Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Common Seadragon, Weedy Seadragon	Species or species habitat may occur within area				Listed	None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Deepbody Pipefish, Deep-bodied Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Hairy Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Halfbanded Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Javelin Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Knifesnout Pipefish, Knife-snouted Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Leafy Seadragon	Species or species habitat may occur within area				Listed	None identified	None identified
Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Mother-of-pearl Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Port Phillip Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Pugnose Pipefish, Pug-nosed Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Red Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Ringback Pipefish, Ring-backed Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Robust Pipehorse, Robust Spiny Pipehorse	Species or species habitat may occur within area				Listed	None identified	None identified
Sawtooth Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Short-head Seahorse, Short-snouted Seahorse	Species or species habitat may occur within area				Listed	None identified	None identified
Spiny Pipehorse, Australian Spiny Pipehorse	Species or species habitat may occur within area				Listed	None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Spotted Pipefish, Gulf Pipefish, Peacock Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Tucker's Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish	Species or species habitat may occur within area				Listed	None identified	None identified
Seabird							
Antipodean Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Australasian Gannet					Listed	Foraging: year round 40 km buffer around coast off Portland	None identified
Black-browed Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on Black-browed Albatross (Thalassarche melanopris) (TSSC 2005)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Blue Petrel	Species or species habitat may occur within area	Vulnerable			Listed	None identified	Conservation Advice Halobaena caerulea Blue Petrel (TSS 2015)
Buller's Albatross, Pacific Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Campbell Albatross, Campbell Black-browed Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Common Diving-Petrel	Breeding known to occur within area				Listed	Foraging: year round Breeding: July – January Buffer around Tasmania and Victoria	None identified
Fairy Prion	Species or species habitat known to occur within area				Listed	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a)
Flesh-footed Shearwater, Fleshy-footed Shearwater	Species or species habitat known to occur within area		Migratory	Migratory Marine Birds	Listed (as Puffinus carneipes)	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a) Commonwealth Listing Advice on Ardenna carneipes (Flesh-footed Shearwater) (TSSC 2014)
Gould's Petrel, Australian Gould's Petrel	Species or species habitat may occur within area	Endangered				None identified	Gould's Petrel (Pterodroma leucoptera leucoptera) Recovery Plan (DEC NSW 2006)
Greater Crested Tern	Breeding known to occur within area		Migratory	Migratory Wetlands Species	Listed (as Sterna bergii)	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Grey-headed Albatross	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Approved Conservation Advice for Thalassarche chrysostoma (Grey-headed Albatross) (DEWHA 2009)
Little Penguin	Breeding known to occur within area				Listed	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a)
Indian Yellow-nosed Albatross	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Foraging Most of the South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Northern Buller's Albatross, Pacific Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable			Listed (as Thalassarche sp. nov.)	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Northern Giant Petrel	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Commonwealth Listing Advice on Macronectes halli (Northern Giant-Petrel) (TSSC 2001)
Northern Royal Albatross	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Salvin's Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Short-tailed Shearwater	Breeding known to occur within area		Migratory	Migratory Marine Birds	Listed (as Puffinus tenuirostris)	Foraging Buffer around Tasmania	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
						including Bass Strait Breeding	
Shy Albatross	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	Foraging Whole South-east Marine Region	National Recovery Plan for Albatrosses and Petrels (CoA 2022) Conservation Advice Thalassarche cauta Shy Albatross (TSS 2020)
Soft-plumaged Petrel	Species or species habitat may occur within area	Vulnerable			Listed	None identified	Conservation Advice Pterodroma Mollis Soft-plumaged Petrel (TSS 2015a)
Sooty Albatross	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Sooty Shearwater	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed (as *Puffinus griseus*)	None identified	Wildlife Conservation Plan for Seabirds (CoA 2020a) Conservation Advice for *Ardenna grisea* (Sooty Shearwater) (DCCEEW 2023i)
Southern Giant-Petrel, Southern Giant Petrel	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Southern Royal Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Wandering Albatross	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Wedge-tailed Shearwater			Migratory Marine Birds	Migratory Marine Birds	Listed	Foraging	Wildlife Conservation Plan for Seabirds (CoA 2020a)
White-capped Albatross	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed	None identified	National Recovery Plan for Albatrosses and Petrels (CoA 2022)
Shorebird							
Australasian Bittern	Species or species habitat known to occur within area	Endangered				None identified	Conservation Advice *Botaurus poiciloptilus* Australasian Bittern. Threatened Species Scientific Committee (TSSC 2019a)
Australian Fairy Tern	Species or species habitat known to occur within area	Vulnerable				None identified	Approved Conservation Advice for *Sternula nereis nereis* (Fairy Tern) (DSEWPaC. 2011) National Recovery Plan for the Australian Fairy Tern (*Sternula nereis nereis*) (DAWE 2020)
Australian Painted Snipe	Species or species habitat known to occur within area	Endangered			Listed - overfly marine area (as *Rostratula benghalensis (sensu lato)*)	None identified	Approved Conservation Advice for *Rostratula australis* (Australian Painted Snipe) (DSEWPaC 2013) National Recovery Plan for the Australian Painted Snipe (*Rostratula australis*) (CoA 2022a)
Bar-tailed Godwit	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Black-eared Cuckoo	Species or species habitat known to occur within area				Listed - overfly marine area (as *Chrysococcyx osculans*)	None identified	None identified
Black-faced Cormorant	Breeding known to occur within area				Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Black-faced Monarch	Species or species habitat may occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	None identified
Blue-winged Parrot	Species or species habitat known to occur within area	Vulnerable			Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Neophema chrysostoma* (Blue-winged Parrot) (DCCEEW 2023l)
Cattle Egret	Species or species habitat may occur within area				Listed - overfly marine area (as *Ardea ibis*)	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Common Greenshank, Greenshank	Species or species habitat known to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Tringa nebularia* (Common Greenshank). (DCCEEW 2024e)
Common Sandpiper	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Curlew Sandpiper	Species or species habitat known to occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice for *Calidris ferruginea* Curlew Sandpiper (DCCEEW 2023m)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Double-banded Plover	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Eastern Curlew, Far Eastern Curlew	Species or species habitat known to occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed	None identified	Conservation Advice for *Numenius madagascariensis* (Far Eastern Curlew) (DCCEEW 2023n)
Eastern Hooded Plover, Eastern Hooded Plover	Species or species habitat known to occur within area	Vulnerable			Listed - overfly marine area (as *Thinornis rubricollis rubricollis*)	None identified	Conservation Advice *Thinornis rubricollis rubricollis* Hooded Plover (eastern) (DoE 2014)
Fork-tailed Swift	Species or species habitat likely to occur within area		Migratory	Migratory Marine Birds	Listed - overfly marine area	None identified	None identified
Brown Skua	Species or species habitat may occur within area				Listed (as *Catharacta skua*)	None identified	None identified
Gang-gang Cockatoo	Species or species habitat known to occur within area	Endangered				None identified	Conservation Advice for *Callocephalon fimbriatum* (Gang-gang Cockatoo) (DAWE 2022)
Greater Sand Plover, Large Sand Plover	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed	None identified	Conservation Advice for *Charadrius leschenaultia* (Greater Sand Plover) (DCCEEW 2023o) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Grey Falcon	Species or species habitat likely to occur within area	Vulnerable				None identified	Conservation Advice *Falco hypoleucos* Grey Falcon (TSSC 2020a)
Grey-tailed Tattler	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed (as *Heteroscelus brevipes*)	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Hooded Plover, Hooded Dotterel	Species or species habitat known to occur within area				Listed - overfly marine area (as *Thinornis rubricollis)*	None identified	None identified
Latham's Snipe, Japanese Snipe	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Gallinago hardwickii* (Latham's Snipe) (DCCEEW 2024d)
Lesser Sand Plover, Mongolian Plover	Roosting known to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed	None identified	Conservation Advice *Charadrius mongolus* Lesser Sand Plover (TSSC 2016) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Little Curlew, Little Whimbrel	Roosting likely to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Little Tern	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed (as *Sterna albifrons*)	None identified	Commonwealth Listing Advice on *Sterna albifrons sinensis* (Little Tern (Western Pacific)) (TSSC 2002) Conservation Advice for *Sternula albifrons* (Little Tern) (DCCEEW 2025) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Magpie Goose	Species or species habitat may occur within area				Listed - overfly marine area	None identified	None identified
Marsh Sandpiper, Little Greenshank	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	Species or species habitat known to occur within area	Endangered				None identified	Conservation Advice for *Limosa lapponica baueri* Bar-tailed Godwit (western Alaskan) (DCCEEW 2024b)
Orange-bellied Parrot	Species or species habitat known to occur within area	Critically Endangered			Listed - overfly marine area	None identified	Commonwealth Listing Advice on *Neophema chrysogaster* (TSSC 2006). National Recovery Plan for the Orange-bellied Parrot, *Neophema chrysogaster* (DEWLP 2016)
Osprey	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Pacific Golden Plover	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Painted Honeyeater	Species or species habitat may occur within area	Vulnerable				None identified	Conservation Advice *Grantiella picta* Painted Honeyeater (DoE 2015b) National Recovery Plan for the Painted Honeyeater (*Grantiella picta*) (DAWE 2021)
Plains-wanderer	Species or species habitat likely to occur within area	Critically Endangered				None identified	Conservation Advice *Pedionomus torquatus* Plains-wanderer (DoE 2015a) National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*) (DoE and SA DEWNR 2016)
Pectoral Sandpiper	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Pied Stilt, Black-winged Stilt	Roosting known to occur within area				Listed - overfly marine area	None identified	None identified

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Pin-tailed Snipe	Roosting likely to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Rainbow Bee-eater	Species or species habitat may occur within area				Listed - overfly marine area	None identified	None identified
Red Knot, Knot	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Conservation Advice for *Calidris canutus* Red Knot (DCCEEW 2024) Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Red-capped Plover	Roosting known to occur within area				Listed - overfly marine area	None identified	None identified
Red-necked Avocet	Roosting known to occur within area				Listed - overfly marine area	None identified	None identified
Red-necked Stint	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Regent Honeyeater	Species or species habitat may occur within area	Critically Endangered				None identified	Conservation Advice *Anthochaera Phrygia* Regent Honeyeater (DoE 2015) National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) (DoE 2016)
Ruddy Turnstone	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Arenaria interpres* (Ruddy Turnstone) (DCCEEW 2024c)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
Rufous Fantail	Species or species habitat known to occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	None identified
Sanderling	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	None identified
Satin Flycatcher	Breeding known to occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Sharp-tailed Sandpiper	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) Conservation Advice for *Calidris acuminata* (Sharp-tailed Sandpiper) (DCCEEW 2024a)
Silver Gull	Breeding known to occur within area				Listed (as *Larus novaehollandiae*)	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Swift Parrot	Species or species habitat likely to occur within area	Critically Endangered			Listed - overfly marine area	None identified	National Recovery Plan for the Swift Parrot (*Lathamus discolor*) (Saunders & Tzaros 2011) Conservation Advice *Lathamus discolor* Swift Parrot (TSSC 2016a)
Swinhoe's Snipe	Roosting likely to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Whimbrel	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
White-bellied Sea-Eagle	Breeding known to occur within area				Listed	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)

Common Name	Presence	Threatened Category	Migratory Status	Migratory Category	Marine Status	Biologically Important Area	Management Plan Conservation Advice Listing Advice
White-throated Needletail	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	Conservation Advice *Hirundapus caudacutus* White-throated Needletail (TSSC 2019)
Wood Sandpiper	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area	None identified	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
Yellow Wagtail	Species or species habitat may occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area	None identified	None identified
Turtles							
Green Turtle	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017)
Leatherback Turtle, Leathery Turtle	Breeding likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017) Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle*)* (DEWHA 2008)
Loggerhead Turtle	Breeding likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed	None identified	Recovery Plan for Marine Turtles (DoEE 2017)

REGIA
Marine Seismic Survey

Otway Cumulative Impact Assessment

Appendix F1: REG-EP-029-F1

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December 2025

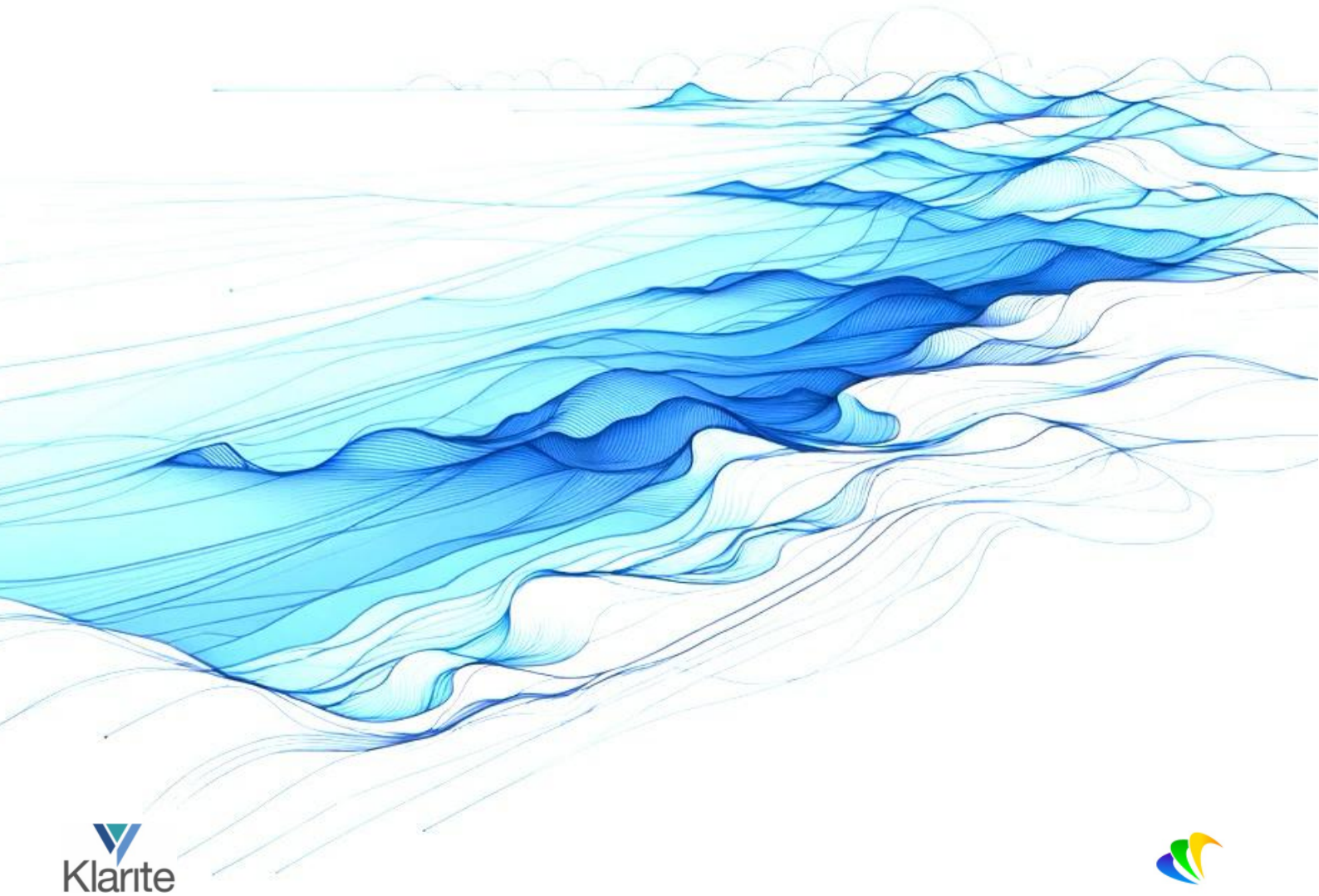

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Table of Contents

1 Introduction 3
2 Consultation Input 3
3 Methodology 4
3.1 Scoping the Assessment 4
3.2 Identifying Reasonably Foreseeable Future Projects and Activities 5
4 Assessment Process for Cumulative Impacts 8
5 Cumulative Impact Assessments 10
5.1 Interference with Commercial Fishers 10
5.2 Effects of Elevated Levels of Artificial Light to Albatross, Petrels and Shearwaters 12
5.3 Effects of Elevated Levels of Artificial Light to Orange-bellied Parrot 14
5.4 Effects of Elevated Levels of Sound to Blue Whales 15
5.5 Effects of Elevated Levels of Sound to Southern Right Whales 16
5.6 Effects of Elevated Levels of Sound to Fin, Sei Whales, and Pygmy Right Whales 18
5.7 Industry Standard Control Measures 19
5.8 Identification of Additional Control Measures 19
6 Outcome of CIA 21
6.1 CIA Outcome on Conservation Values and Sensitivities 21
6.2 Cumulative Impacts Reduced to ALARP 21
6.3 Cumulative Impacts Reduced to Acceptable Levels 21
7 References 22
8 Document Control 22
Annex 1 23
Objections and Claims Raised from Consultation 23
Annex 2 27
Spatial overlap analysis 27
Annex 3 29
CIA Scoping Tool 29

1 Introduction

The National Offshore Petroleum Safety and Environmental Management Authority (**NOPSEMA**) defines cumulative environmental impacts in the context of offshore petroleum activities, as successive, additive, or synergistic impacts of collectively significant activities or projects with material impacts on the environment that have the potential to accumulate over temporal and spatial scales (NOPSEMA Environment Plan Decision Making Guideline, N-04750-GL1721).

The focus of this Cumulative Impact Assessment (**CIA**) is to further build on these assessments by considering the impacts of the proposed activity on key environmental values and sensitivities in conjunction with the impacts from other reasonably foreseeable future projects.

The types of activities and projects typically considered in CIA are large in scale and are of relevance in terms of potentially contributing to or compounding material impacts in the operational area of the Regia MSS.

2 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 1.

3 Methodology

Cumulative impacts were inherently considered in Stage 2 of the environmental assessments by virtue of considering the existing environment as a dynamic place inclusive of other natural and anthropogenic pressures. Specifically, the effects of past projects and activities, and currently operating projects, are captured when describing the existing condition of environmental values and sensitivities, inclusive of any pressure or threats affecting that value or sensitivity.

This baseline condition and understanding of the capacity of the receiving environment and receptors to accommodate changes, considering existing pressures and threats, informs the environmental impact assessments conducted in the Preliminary Environmental Impact and Risk Assessment (**PEIRA**) (Appendix B4) and more extensively in Appendices E1 – E9.

However, during consultation in preparation of the Environment Plan (EP), explicit consideration of future activities in the context of cumulative impacts was requested.

There are many ways of considering cumulative impacts and the following guidelines have been used as the basis of this assessment:

- United Kingdom National Infrastructure Planning Advice Note Seventeen: Cumulative effect assessment relevant to nationally significant infrastructure programs (UK Gov 2019)
- New South Wales Cumulative Impact Assessment (CIA) Guidelines for State Significant Projects (NSW 2022).

Both guidelines are intended to apply to large-scale national and state significant projects, respectively which have a greater potential for long term cumulative impacts than the Regia MSS. The guidelines are rigorous and have merit for application to the shorter-term, smaller scale, Regia MSS.

3.1 Scoping the Assessment

Scoping considerations identified for CIAs include:

- Successive, additive, or synergistic material impacts.
- Effects on key environmental matters within the relevant spatial extent.
- The pathways for impacts to accumulate over the relevant temporal extent.

Material impacts are impacts of the project and other reasonably foreseeable future projects and activities that may not align with the defined acceptable levels, for example, threats of wide-scale, serious or irreversible damage due to cumulative impacts.

Successive impacts are those that occur one after the other.

Additive impacts are those where the combined impact is the sum of the separate impacts.

Synergistic impacts are those where the combined impact is greater than the sum of the separate impacts.

Key environmental matters are features of the environment (ecological, socio-economic, and cultural values and sensitivities) that are valued because of their rarity or importance, including the critical role they play in supporting systems which are essential for the environment, people and / or the economy (NSW 2022), for example, commercial fisheries and threatened species undertaking biologically important behaviours.

The relevant **spatial extent** depends on the key matter. For example, for ecological impacts the spatial extent may be based on the range and distribution of a listed threatened species when undertaking biologically important behaviour. The NSW guideline recommends that while the study area chosen for each matter must be broad enough to capture all relevant cumulative impacts, it should not be unnecessarily large or include areas where the cumulative impacts are likely to be negligible relative to the baseline condition of the relevant matter.

Temporal extent is dependent on the key matter and the scale and nature of potential impacts on the matter (NSW 2022). For example, for commercial fishers the temporal extent may be based on a part of a season or several seasons depending on how long the impact may occur. For this CIA the

temporal extent selected has been aligned to reasonably foreseeable timeframes associated with the project and other reasonably foreseeable projects and activities within the Otway Basin.

3.2 Identifying Reasonably Foreseeable Future Projects and Activities

Table F1-1 shows the projects and activities that are reasonably foreseeable within the spatial and temporal extent of the assessment. The activities for which CGG were able to obtain shapefiles are shown in Appendix B12 MAP-REG-EPM-169_A, along with the Regia Operational Area and Acquisition Area.

Table F1-1 - Reasonably foreseeable ongoing and future projects and activities in the offshore Otway region.

Titleholder	Activity Type	Sound Sources and Exposures for Each Activity	Status	Window (Activity)
Beach Energy	Production - Thylacine	Geophysical surveys (10 days once a year though more likely to be between two and five years) Platform resupply via helicopter (2 days every 3 months ~6 hrs per day) Standby vessel at platform when working over water (Twice per year ~ 6 hrs per day) Geographe and Thylacine subsea infrastructure and wells (Choke valve operation, ~1- 2 hours if required) Maintenance and Repair (Subsea tree choke replacement, ~1- 2 hours if required) IMR campaigns	Ongoing	Ongoing
Beach Energy	Production - Geographe		Ongoing	Ongoing
(Previously Cooper Energy) Amplitude Energy	Production – CHN	Geophysical surveys (MBES, Sidescan sonar, or Sub bottom profiler, 4 – 6 hrs per structure and 1 – 2 days for pipelines, totalling circa 2 – 4 weeks at sea for an entire inspection program) Platform resupply Helicopter Operations (1-2 times per week during IMP activities) Inspections (4 – 6 hrs per structure and 1 – 2 days for pipelines, totalling circa 2 – 4 weeks at sea for an	Ongoing	Ongoing

Titleholder	Activity Type	Sound Sources and Exposures for Each Activity	Status	Window (Activity)
		entire inspection program)		
ConocoPhillips Australia	Otway Drilling	Geophysical surveys (maximum of 9 surveys with each survey taking one week) and Vertical Seismic Profiling (VSP) (three 250 cubic inch air gun configuration, 12 hours per well for a maximum of 2 wells), with up to 130 shots) Anchor prelay and collection 24-46 days Mooring the MODU (connection and disconnection) (15 days) Drilling with vessel on standby (180-540 days) Drilling with vessel on standby and resupply (30 days)	Ongoing	2024-2028 (Typically, 30-40 days per well, max 6 wells)
(Previously Cooper Energy) Amplitude Energy	Production Drilling and tie-in	Geophysical survey: ~ 7 days (No VSP) Well construction activities- logging Pre-lay moorings: ~ 7 – 14 days Well drilling and suspension or P&A: ~ 60 days Well Integrity Monitoring: ~ 2 days per inspection	Proposed	2024-2026 1 January 2025 and be completed no later than 1 January 2030. Each drilling campaign is expected to take up to 60 days excluding environmental and operational delays.
Woodside Energy	Minerva Decommissioning	Generation of underwater noise from project vessel, ROV, subsea cutting and infrastructure deburial activities (45 to 60 days), noise from helicopter operations, and underwater noise from acoustic survey equipment within operational area.	Proposed	2024-2025 three to five months,)
Beach Energy	Drilling and tie-in	Drilling: 300 days for the full drilling and P&A activities Resupply: 3 hours per day	Accepted	2024-2027 Drilling: 30 - 40 days per well. Plug and abandonment: 15 – 20 days per well.

Titleholder	Activity Type	Sound Sources and Exposures for Each Activity	Status	Window (Activity)
		Helicopter Operations: 11 seconds on take-off and landing at the drill rig up to 7 times per week. Wellhead Cutting: ~1 - 2 hours though may take up to 6 hours for more complex wells		
CGG	Seismic Survey (Regia MSS)	2630 cubic inches over 60 days	Proposed	2023-2028 (60 days)
Beach Energy	Seismic Survey (Calico MSS)	Between 250 and 750 cubic inches	Proposed	2025 (Between February and May)

This defines the boundaries of the assessment by including projects and activities that have a realistic likelihood of occurring and could contribute to cumulative impacts.

To identify these projects and activities a search was conducted of the NOPSEMA and DEECA (Vic) Environment Plan website to identify any relevant projects and activities. In addition, titleholders within the Otway Basin have been meeting regularly to discuss environmental management in the region, including processes for improved CIA. This has provided a more accurate representation of projects and activities and the potential for cumulative impacts, ensuring these are appropriately assessed and managed.

The NOPSEMA, DECCA (Vic), and DCCEW Environmental Plan websites were checked again on the 10/03/2025 and there are no new proposed activities scheduled in the Otway region. It should be noted the Beach Energy Seismic Survey was due to commence in February 2025, CGG understand this did not happen and its current start date is unknown. Projects and activities that are not reasonably foreseeable or speculative have been excluded from the assessment scope to maintain practicality and relevance in decision-making processes. These included an offshore wind declared area that is unlikely to be developed within 24 months of the end of operation of the Regia MSS EP.

Further, there was another seismic survey proposed in the region that was withdrawn from NOPSEMA's assessment process in September 2024. CGG understands that this activity will not progress. This activity has been removed from this assessment.

Information on projects and activities is typically accessible once consultation commences and relevant technical supporting information is submitted for public comment or assessment. Information relevant to this CIA has been discussed at the ongoing Otway Basin Petroleum Titleholder meetings. Where project/activity-specific data is not yet available, data from similar projects has been used as a proxy prior to technical information being made available. Given the similarity of impacts, there is a high level of certainty in the prediction of cumulative impacts in most cases.

Assumptions around specific timings for projects or activities have been made as there is some level of flexibility in schedules and timing of approvals. Consequently, a conservative approach has been adopted whereby credible worst-case scenarios (e.g. concurrent activities with overlapping environments that may be affected (EMBAs)) are assessed.

3.2.1 Temporal Overlap

For proposed activities that are reasonably foreseeable, and following consultation between the titleholders in this region, there is:

- A high likelihood of consecutive drilling (exploration, appraisal, or plug and abandonment (P&A)) activities given the titleholders are all planning on using the same rig.

- A very low likelihood that there will be concurrent drilling activities.
- Some likelihood that there will be concurrent seismic survey and drilling activities.
- A very low likelihood that there will be concurrent seismic operations.
- A slightly higher likelihood that seismic surveys may be consecutive.

3.2.2 Spatial Overlap

Annex 2 shows a matrix of the ongoing and reasonably foreseeable activities in the region. This analysis was completed considering the spatial extent of impacts from the projects and activities rather than just an overlap of activity locations. This analysis revealed that there is:

- An extremely remote likelihood of direct spatial overlap of seismic survey areas.
- An extremely remote likelihood of direct spatial overlap of drilling/P&A areas.
- A possible overlap of a drilling activity over petroleum title VIC/P79.
- A possible likelihood of overlap of light EMBAs associated with drilling/P&A at a single location.
- An extremely remote likelihood of overlap of sound EMBAs associated with concurrent drilling/P&A at a single location.

3.2.3 Identified Aspects and Extents

During the environmental assessment process, components of the environment and aspects of the ongoing and reasonably foreseeable projects and activities were identified where there was the potential for successive, additive, or synergistic impacts to reasonably accumulate over temporal and spatial scales, when considered in the context of ongoing and reasonably foreseeable future projects or activities. There were some terminology differences between titleholders. These have been assessed and are not material to this CIA.

The CIA Scoping Tool (Annex 3) details the assessment undertaken of the components of the environment and aspects of the reasonably foreseeable projects and activities to identify where a potential cumulative cause-effect pathways may occur and, if it may occur, was likely to have a material impact. Where a potential cumulative cause-effect pathway and material impact was identified further assessment was undertaken.

The components of the environment and aspects identified during the CIA scoping process requiring further assessment include:

- Light – impacts on light-sensitive bird species.
- Underwater sound – impacts on noise-sensitive species.
- Birds – nocturnal behaviours of species such as the common diving petrel which has a breeding biologically important area (BIA)on Lady Julia Percy Island, and the orange-bellied parrot which may overfly the light EMBAs on migration.
- Marine Mammals – biologically important behaviours of species such as the blue whale and southern right whale within relevant BIAs that overlap underwater sound EMBAs.
- Commercial Fisheries – displacement from within relevant fishery management zones.

It was also identified that the conservation values and sensitivities of the Zeehan Marine Park and the First Nations cultural heritage values associated with the above environmental components could be affected by cumulative impacts.

4 Assessment Process for Cumulative Impacts

For those components of the environment and aspects where a potential cumulative cause-effect pathway and material impact was identified, a CIA process was applied in general alignment with the activity-specific methodologies of titleholders, in accordance with NOPSEMA guidelines and the cumulative impact assessment guidelines previously referenced.

The CIA process applied to each aspect and component of the environment is provided below which includes a discussion that identifies other reasonably foreseeable ongoing future projects where the environmental aspect has both a temporal and spatial overlap. Then each identified area of potential cumulative impact is assessed by looking at the:

- Conservation (or other) values or sensitivity.
- Management Plans or legislation that applies to the value or sensitivity.
- Threatening processes to the value or sensitivity.
- Relevant spatial and temporal extent of cumulative impact.
- Recovery (or other) actions that apply.
- Baseline environment condition.
- Defined acceptable level of impact.
- Predictive certainty of the assessment.

Once the assessment of cumulative impacts had been completed and the titleholders with ongoing and future activities in the Otway Basin have discussed the outcome and agreed to adopt control measures (individually and collectively) for effects to commercial fishers, light sensitive birds, low frequency hearing whales, and cultural heritage values of First Nations peoples.

5 Cumulative Impact Assessments

5.1 Interference with Commercial Fishers

Cumulative impacts could occur from the occurrence of one seismic survey occurring concurrently with a drilling activity, and/or consecutive drilling activities with operational exclusion boundaries overlapping fishery management zones.

Commercial fishers with fishing activity in the Regia MSS operational area may be displaced within their Fishery Management Zones in the offshore Otway Basin. This may lead to multiple applications for compensation to be lodged with a range of titleholders and a reduction in the area available to be fished.

The Regia MSS operational area overlaps with:

- Commonwealth fisheries:
    - Bass Strait Central Zone Scallop Fishery (0.29% overlap with this fishery)
    - Eastern Tuna and Billfish Fishery (0.22% overlap with the fishery)
    - Southern and Eastern Scalefish and Shark Fishery SSKK (1.28% overlap with the fishery)
    - Southern and Eastern Scalefish and Shark Fishery SSKN (1.12% overlap with the fishery)
    - Southern and Eastern Scalefish and Shark Fishery SCTR (1.15% overlap with the fishery)
    - Southern and Eastern Scalefish and Shark Fishery SCDS (2.32% overlap with the fishery)
    - Southern and Eastern Scalefish and Shark Fishery SSCK (0.95% overlap with the fishery)
    - Southern Squid Jig Fishery SSJF (1.99% overlap with the fishery)
    - Southern and Eastern Scalefish and Shark Fishery SCSQ (1.31% overlap with the fishery)
    - Small Pelagic Fishery (0.12% overlap with the fishery)
    - Western Tuna and Billfish Fishery (0.04% overlap with the fishery)
- Victorian fisheries:
    - Wrasse (Ocean) Fishery (Victorian) (1.33% overlap with the fishery)
    - Giant Crab (39.85% overlap with the fishery)
    - Rock Lobster (14.81% overlap with the fishery)
    - Octopus (3.69% overlap with the fishery)
    - Ocean General (5.62% overlap with the fishery).

Cumulative impacts could occur from the occurrence of two successive seismic surveys, one seismic survey occurring concurrently with drilling/P&A activities and/or consecutive drilling/P&A activities with operational exclusions zones overlapping fishery management areas, in addition to existing pressures.

Table F1-2 - Assessment of cumulative impacts for interference with commercial fishers.

Conservation (or other) value	Socio-economic value to local communities and the national economy. Some operational areas overlap moderate or high fishing intensity areas.
Management Plans	Southern and Eastern Scalefish and Shark Fishery (SESSF) Species Summaries (AFMA 2023). Western Victorian rock lobster zone RLAG annual assessment,
Threatening Processes	Nil, other than unintentional fishing pressure on school shark.
Relevant Spatial and Temporal Extent	Fishery management zones focusing on fisheries with evidence of activity in the operational areas.
Recovery (or other) Action	Compensation for evidence-based claims for loss of gear, reduced catch or increased costs due to displacement.
Baseline Environment Condition	Some fisheries overlap with the existing shipping channel and areas with existing oil and gas activity. The fisheries with historical activities in the operational areas have sustainable stock status. However, school sharks are listed as Conservation Dependent (fishing pressure) in the SESSF – Shark Gillnet Sector. The fisheries are "Quota" managed and harvesting is limited to a set amount of "Total Allowable Catch" (TAC) annually.
Acceptable Level	That commercial fishers are not worse off because of petroleum activities in the offshore Otway Basin.
Comparison of Predicted Level of Impact with Defined Acceptable Levels	Predicted impacts are temporary and in most cases avoidable. A compensation process will be implemented in the event that interference with commercial fishers cannot be avoided, and claimants provide supporting evidence.
Predictability/ Certainty of Assessment	Given the intensity of fishing in the area, and the overlap of fishery management zones with the proposed activities of multiple titleholders, the assessment of cumulative impacts is made with a high level of predictability and certainty.

5.2 Effects of Elevated Levels of Artificial Light to Albatross, Petrels and Shearwaters

There is a potential cumulative impact for birds with foraging BIAs, and it is identified that there is a potential for overlap when considering a single seismic survey and a single drilling operation, as well as with sequential drilling activities. However, when examining the breeding BIAs for the short-tailed shearwater, predictions indicate no significant overlap from multiple projects. The only exception is for drilling within the T/49P area, where the activity impact assessment has forecasted no behavioural impacts or injury/mortality to the species. Consequently, no cumulative impact pathway has been identified.

For the wedge-tailed shearwater breeding BIA, the overlap is anticipated only with flaring from exploration drilling and light from other consecutive drilling activities. Concurrent activities do not contribute to this overlap. With respect to the Common diving-petrel, a species particularly sensitive to coastal light impacts, disturbances to adult nest attendance are a concern when these birds are returning to or leaving their nesting colony. The Regia MSS and ConocoPhillips Australia Otway Drilling Program in the north of VIC/P79 are scheduled in such a way that they do not coincide, thereby minimising potential impacts. These operations are also planned to be more than 18 months apart in this area, and no cumulative impact pathway has been identified for them.

In evaluating the potential for cumulative impacts, it is important to consider the limited spatial extent of effects in comparison to the available area for foraging. Most species conduct foraging activities during daylight hours. The National Recovery Plan for Albatrosses and Petrels has classified interactions with marine infrastructure, including those associated with artificial light, as posing no risk priority, and affecting no species within the Australian jurisdiction.

Specifically for the breeding BIA of the wedge-tailed shearwater, overlap is only by flaring from ConocoPhillips Australia's Otway Exploration Drilling activity, which is restricted to 120 hours per well. Since this species is not listed as threatened and since periodic changes in ambient light within the area affected are unlikely to induce behavioural changes or result in injury/mortality, the effect is low.

Overall, the cumulative impact of light emissions from petroleum activities in the Otway area is assessed to be low, especially when compared to the light emissions from existing shipping and fishing operations. It is also noted that most of these vessels do not follow a Light Management Plan.

Table F1-3 - Assessment of cumulative impacts for elevated levels of artificial light to Albatross, Petrels and Shearwaters.

Conservation (or other) value	Antipodean, southern royal, wandering, northern royal, Sooty, Buller's, shy, grey-headed, Campbell, black-browed, Salvin's, Indian yellow-nosed, and white-capped albatrosses; southern and northern giant, common diving and white-faced storm-petrels; short-tailed and wedge-tailed shearwaters. Endangered, Vulnerable, not listed, some with foraging BIAs, common diving petrel (nocturnal), short-tailed shearwater and wedge-tailed shearwater with breeding BIAs within EMBAs. Short-tailed shearwater also identified cultural value.
Management Plans	National Recovery Plan for Albatrosses and Petrels (DCCEEW 2022e). Wildlife Conservation Plan for Seabirds (DCCEEW 2020). National Light Pollution Guidelines for Wildlife (CoA 2023).
Threatening Processes	Light emissions are identified as a threat in the National Recovery Plan for Albatrosses and Petrels but marine infrastructure interactions, including those associated with artificial light, are classified as having no risk category priority and affecting 'Nil' species in Australian jurisdiction. The National Recovery Plan for Albatrosses and Petrels also states that light associated with coastal developments at or adjacent to breeding sites represents a moderate threat to short-tailed shearwater. Light pollution, including from gas flaring, is listed as a threat to seabirds in the Wildlife Conservation Plan for Seabirds, with potential for consequences affecting individuals but not whole populations.

Relevant Spatial and Temporal Extent	Foraging BIAs for Antipodean, black-browed, Buller's, Campbell, Indian yellow-nosed, shy and wandering albatross, white-faced storm petrel, short-tailed shearwater and common diving-petrel within operational light and flaring EMBAs. Only common diving-petrel identified as foraging at night. Breeding BIAs for short-tailed shearwater and wedge-tailed shearwater within flaring EMBA. Breeding BIA for common diving petrel within operational light and flaring EMBAs.
Recovery (or other) Action	National Recovery Plan for Albatrosses and Petrels: no relevant actions. Wildlife Conservation Plan for Seabirds: Mitigate against impacts of light pollution around breeding colonies. National Light Pollution Guidelines for Wildlife recommend: Always using Best Practice Lighting Design to reduce light pollution and minimise the effect on wildlife. Undertaking an Environmental Impact Assessment for effects of artificial light on listed species for which artificial light has been demonstrated to affect behaviour, survivorship or reproduction.
First Nations Cultural Heritage	Short-tailed shearwaters (mutton birds) are identified as being culturally significant to the Gunditjmara People and are used in harvesting practice (GMTOAC, 2023). It is considered that the potential for cumulative impacts to short-tailed shearwater) may prevent First Nations people's obligations to maintain spiritual connections and care for culturally significant species. Where a potential impact to culturally important species has been identified and assessed as acceptable from an ecological impact point of view – the corresponding impact to cultural heritage is likely to be the same. Impacts to culturally important species of birds, including shearwaters have been assessed acceptable from an ecological perspective, as detailed in EP Appendix E9. Cumulative impacts from drilling and P&A activities resulting in elevated light levels to birds species that are identified as cultural values are at a very small scale, which is not predicted to be material to contribute to cumulative impacts. Cumulative impacts to culturally significant bird species arising from seismic surveys is not expected as the only other seismic survey scheduled to occur in close proximity to the Regia MSS has not received approval yet and it's status is unknown.
Baseline Environment Condition	Existing lighting in the area includes fishing vessels, shipping traffic, existing offshore oil and gas platform and coastal developments. The shipping channel for vessels coming from Melbourne to Tasmania is one of the busiest shipping routes in offshore Australia.
Acceptable Level	Cumulative light does not impact breeding colonies of short-tailed shearwaters, wedge-tailed shearwaters or the common diving petrel, or populations of other species that forage in the area.
Comparison of Predicted Level of Impact with Defined Acceptable Levels	Cumulative light impacts to breeding colonies of short-tailed shearwaters, wedge-tailed shearwaters or the common diving petrel, or populations of other species that forage in the area are not predicted based on the rig and vessels will have a Light Management Plan to reduce light emission to as low as reasonably practicable for safe navigation and work and that flaring will be for short durations.
Predictability/ Certainty of Assessment	The overlap of light affected areas with foraging and breeding BIAs is predicted to be limited to only two concurrent activities at a time (e.g. seismic survey and drilling/P&A at one location – Lady Julia Percy Island) and then only consecutively from individual drilling activities. This assessment of cumulative impacts is made with a high level of predictability and certainty.

5.3 Effects of Elevated Levels of Artificial Light to Orange-bellied Parrot

The only interaction between the Otway projects is with light affected areas, rather than any illuminated structures or vessels. Spatially, there's a potential one-season overlap of the Regia MSS and a single drilling operation within light affected areas along the likely migration path. This overlap is temporal as well, with consecutive drilling operations potentially creating light affected areas over this migration route for several years.

The seismic-related cumulative impact of light emissions on the migration path would be brief, occurring only at night when work is carried out on the eastern side, in conjunction with a single drilling operation. The seismic program is confined to a maximum of 90 days, with active acquisition for 60 of those days.

Over the years, a single drilling rig may emit light that intermittently overlaps with various portions of the migration route. However, there has been no evidence of the orange-bellied parrot offshore during Beach Energy's 18-month drilling campaign in the region, nor in the last decade of Beach Otway Operations. Despite continuous petroleum activities in the Otway Basin, the parrot populations are on the rise.

Overall, the cumulative impact of light emissions from petroleum activities in the Otway area is assessed to be very low, especially when compared to the light emissions from existing shipping and fishing operations along the migration route. It is also noted that most of these vessels do not follow a Light Management Plan.

Table F1-4 - Assessment of cumulative impacts for elevated levels of artificial light to Orange-bellied Parrot.

Conservation (or other) value	Listed as Critically Endangered and Marine under the EPBC Act and noted as a species of cultural significance.
Management Plans	National Recovery Plan for the Orange-bellied Parrot (DoE 2016)
Threatening Processes	Illuminated boats and structures within the migration route as a barrier to migration (weak evidence for impact, moderate risk rating) when overflying the light affected areas.
Relevant Spatial and Temporal Extent	Probable Migration Route September-November (Southward); February-mid-March (northwards). The light affected areas of the reasonably foreseeable activities do not overlap with the Migration Route.
Recovery (or other) Action	Assess the risk of barriers, being illuminated structures or boats, on the probable migration route. Manage threat if the risk rating warrants action. National Light Pollution Guidelines for Wildlife recommends: Always using Best Practice Lighting Design to reduce light pollution and minimise the effect on wildlife. Undertaking an Environmental Impact Assessment for effects of artificial light on listed species for which artificial light has been demonstrated to affect behaviour, survivorship or reproduction.
Baseline Environment Condition	The orange-bellied parrot probable migration route is within the shipping channel for vessels coming from Melbourne to Tasmania - one of the busiest shipping routes in offshore Australia.
Acceptable Level	Light from cumulative sources does not affect migration of the orange-bellied parrot at a population level.
Comparison of Predicted Level of Impact with Defined Acceptable Levels	Cumulative light impacts are not predicted to affect the migration of the orange-bellied parrot at a population level based on the rig and vessels will have a Light Management Plan to reduce light emission to as low as reasonably practicable for safe navigation and work and that flaring will be for short durations.

Predictability/ Certainty of Assessment	There is no published information available on the sensitivity of the orange-bellied parrot to light, and only anecdotal evidence exists regarding the impact of barriers to migration (DELWP 2016). This introduces some uncertainty into the assessment of cumulative impacts.

5.4 Effects of Elevated Levels of Sound to Blue Whales

With the current uncertainty on the timing of some other projects and the distance of underwater sound affected areas, there is the potential for cumulative impact if the following occur within the migration BIA during the biologically relevant periods (nominally November to May):

- Overlap between one drilling activity for one season.
- Consecutive drilling/P&A activities over several seasons.
- Consecutive seismic surveys in one season or over several seasons.

Without appropriate detection and actions in place there is the potential that blue whales could be exposed to underwater sound from two sources (seismic and drilling) within the foraging BIA that could result in them expending more energy to move away from the sound source to forage or restrict the area of foraging. This could also occur for consecutive years whilst drilling activities are undertaken within the Otway Basin.

Cumulative impacts resulting in an increase in the likelihood of PTS and TTS for foraging blue whales are not predicted due to the distances to the PTS and TTS noise criteria for activities.

Table F1-5 - Assessment of cumulative impacts for elevated levels of sound on Blue Whales.

Conservation (or other) value	Listed as Endangered under the EPBC Act.
Management Plans	Conservation Management Plan for the Blue Whale (DoE 2015c) Guidance on key terms within the Blue Whale Conservation Management Plan (DAWE 2021a)
Threatening Processes	Conservation Management Plan for the Blue Whale identifies anthropogenic noise interference as a threat.
Relevant Spatial and Temporal Extent	Underwater sound affected areas overlap Foraging and Annual High Use Foraging BIAs. Blue whales are typically present within the BIAs between November to June, peaking in February and March.
Recovery (or other) Action	Conservation Management Plan for the Blue Whale states that anthropogenic noise in BIAs must be managed so that blue whales can continue to utilise the area without injury and [are] not displaced from a foraging area. DAWE (2021a) details that underwater anthropogenic noise should not: Stop or prevent any blue whale from foraging Cause any blue whale to move on when foraging, or Stop or prevent any blue whale from entering a foraging area

First Nations Cultural Heritage	Although there is the potential for foraging blue whales to be present in the sound EMBA, the proposed activity is not inconsistent with the Conservation Management Plan for the blue whale, which recognises the cultural values of cetaceans for the people of the South Pacific. EP Appendix E7 stated underwater sound emissions will be managed in a manner to not impact on the recovery of the blue whales and will ensure impacts are of an acceptable level. Cumulative impacts from drilling and P&A activities resulting in elevated sound levels to blue whales are at a very small scale, which is not predicted to be material to contribute to cumulative impacts. Cumulative impacts to blue whales arising from seismic surveys is not expected as the only other seismic survey scheduled to occur in close proximity to the Regia MSS has not received approval yet and it's status is unknown
Baseline Environment Condition	The BIAs overlap existing shipping channel, area of high commercial fishing effort, and existing oil and gas activity.
Acceptable Level	Each activity will be carried out in a manner that will not be inconsistent with the Conservation Management Plan for the Blue Whale such that blue whales can continue to utilise the area without injury and [are] not displaced from a foraging area.
Comparison of Predicted Level of Impact with Defined Acceptable Levels	Cumulative impact to Blue Whale's are not predicted as each titleholder will be required to undertake their activity in a manner that will not be inconsistent with the Conservation Management Plan for the Blue Whale such that blue whales can continue to utilise the area without injury and [are] not displaced from a foraging area.
Predictability/ Certainty of Assessment	There is a high level of predictability and certainty in the limited potential for cumulative impacts, given the requirements in place for each activity to prevent impacts.

5.5 Effects of Elevated Levels of Sound to Southern Right Whales

Cumulative impacts from current and reasonably foreseeable activities to the SRW migration and reproductive BIA are not predicted as the sound affected areas do not simultaneously overlap with these areas.

With the current uncertainty on the timing of some other projects and the distance of underwater sound affected areas, there is the potential for cumulative impact if the following occur within the migration BIA during the biologically relevant periods (nominally April and October):

- Overlap between one drilling activity for one season.
- Consecutive drilling/P&A activities over several seasons.

Without appropriate detection and actions in place there is the potential that SRWs could be exposed to underwater sound from two sources (seismic and drilling) within the migration BIA that could result in them expending more energy to move away from the sound source when migrating to and from coastal breeding areas. This could also occur for consecutive years whilst drilling activities are undertaken within the Otway Basin.

Cumulative impacts resulting in an increase in the likelihood of PTS and TTS for a migrating SRW is not predicted due to the small distances to the PTS and TTS noise criteria for drilling activities.

Table F1-6 - Assessment of cumulative impacts for elevated levels of sound on Southern Right Whales.

Conservation (or other) value	Listed as Endangered under the EPBC Act and noted as a species of cultural significance in the National Recovery Plan for the Southern Right Whale (DCCEEW 2024).
Management Plans	Conservation Management Plan for Southern Right Whale (DSEWPaC 2012b) National Recovery Plan for the Southern Right Whale (DCCEEW 2024)
Threatening Processes	Conservation Management Plan for the Southern Right Whale and National Recovery Plan for the Southern Right Whale identify noise interference as a threat.
Relevant Spatial and Temporal Extent	Overlap of underwater sound affected areas with migration and reproductive BIAs. Southern right whales are typically within the migration BIA from April to October.
Recovery (or other) Action	National Recovery Plan for the Southern Right Whale: " Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment"," and "Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that the risk of behavioural disturbance is minimised".
First Nations Cultural Heritage	Although there is the potential for migrating southern right whales to be present in the sound EMBA, the proposed activity is not inconsistent with the with the Recovery Plan for southern right whales which recognises the cultural significance of this species as totemic ancestors to some groups, the importance of coastal bays, known resting/feeding sites for mothers and calves and the importance of the arrival of southern right whales to communities and people following a songline or ancient memory code, and will not affect the ability of locals to gather on Gunditjmara Sea Country to welcome koontapool back to her traditional birthing waters. EP Appendix E7 stated underwater sound emissions will be managed in a manner to not impact on the recovery of southern right whales and will ensure impacts are of an acceptable level. Cumulative impacts from drilling and P&A activities resulting in elevated sound levels to southern right whales are at a very small scale, which is not predicted to be material to contribute to cumulative impacts. Cumulative impacts to southern right whales arising from seismic surveys is not expected as the only other seismic survey scheduled to occur in close proximity to the Regia MSS has not received approval yet and it's status is unknown
Baseline Environment Condition	The BIAs overlap existing shipping channel, area of high commercial fishing effort, and existing oil and gas activity.
Acceptable Level	The activity will be carried out in a manner that will not be inconsistent with the National Recovery Plan for the Southern Right Whale (DCCEEW 2024) such that Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment, and ensure the risk of behavourial impacts are minimised.
Comparison of Predicted Level of Impact with Defined Acceptable Levels	Cumulative impact to Southern Right Whales are not predicted as each titleholder will be required to undertake their activity in a manner in a manner that will not be inconsistent with the National Recovery Plan for the Southern Right Whale (DCCEEW 2024) such that Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment and and ensure the risk of behavourial impacts are minimised. .

Predictability/ Certainty of Assessment	There is a high level of predictability and certainty in the limited potential for cumulative impacts, given the requirements in place for each activity to prevent impacts.

Notes:
1. Legal definition of 'Should' means expected course of action or policy to be followed unless inappropriate for a particular circumstance. No habitat critical to the survival of SRWs have been identified.

5.6 Effects of Elevated Levels of Sound to Fin, Sei Whales, and Pygmy Right Whales.

While there are no BIAs for Fin, Sei and Pygmy Right Whales within Australian waters, Fin, Sei, and Pygmy Right Whales are considered likely to be foraging in the area that may be affected by underwater sound at a similar time as Blue Whales, i.e. predominately between January and April. While the Regia MSS will not take place during this period, with the current uncertainty on the timing of some other projects and the distance of underwater sound affected areas, there is the potential for cumulative impact if the following occur during the biologically relevant periods (nominally November to May):

- Overlap between one drilling activity for one season.
- Consecutive drilling/P&A activities over several seasons.
- Consecutive seismic surveys in one season or over several seasons.

Without appropriate detection and actions in place there is the potential that fin, sei, and pygmy right whales could be exposed to underwater sound from two sources (seismic and drilling) within the foraging BIA that could result in them expending more energy to move away from the sound source to forage or restrict the area of foraging. This could also occur for consecutive years whilst drilling activities are undertaken within the Otway Basin.

Cumulative impacts resulting in an increase in the likelihood of PTS and TTS for foraging fin, sei, and pygmy right whales are not predicted due to the distances to the PTS and TTS noise criteria for activities.

Table F1-7: - Assessment of cumulative impacts for elevated levels of sound on Fin, Sei, and Pygmy Right Whales.

Conservation (or other) value	Fin and Sei Whales are listed as Vulnerable under the EPBC Act, the Pygmy right whale (PRW) not listed as threatened under the EPBC Act.
Management Plans	Conservation Advice Balaenoptera physalus (fin whale) (TSSC 2015a). Conservation Advice Balaenoptera borealis (sei whale) (TSSC 2015b). There are no management plans or conservation advice for the PRW.
Threatening Processes	Conservation advice *Balaenoptera physalus* (fin whale) identifies anthropogenic noise and acoustic disturbance as a minor threat. Conservation *advice Balaenoptera borealis* (sei whale) identifies anthropogenic noise and acoustic disturbance as a minor threat. There are no threats identified for the PRW.
Relevant Spatial and Temporal Extent	There are no BIAs or habitat critical to the survival of the fin whale and sei whale were identified within the underwater sound EMBAs. Presence within EMBAs for fin and sei whales is listed as known to occur within the area and may be undertaking foraging or feeding-related behaviour, PRW is listed as likely to occur within the EMBA and may be undertaking foraging or feeding-related behaviour
Recovery (or other) Action	The Conservation Advices for Balaenoptera physalus (fin whale) and for Balaenoptera borealis (sei whale) identify anthropogenic noise and acoustic disturbance as a minor threat. There are no management plans, conervation advice, or recovery plans listed for PRW.
Baseline Environment Condition	The areas of use by fin, sei and pygnmy right whales overlap existing shipping channel, area of high commercial fishing effort, and existing oil and gas activity.

Acceptable Level	Fin, Sei and Pygmy Right Whales can continue to the area, with the risk of injury and disturbance minimised.
Comparison of Predicted Level of Impact with Defined Acceptable Levels	Cumulative impact to Fin, Sei and Pygmy Right Whales are not predicted as each titleholder will be required to undertake their activity in a manner in which the risk of injury and disturbance minimised.
Predictability/ Certainty of Assessment	There is a high level of predictability and certainty in the limited potential for cumulative impacts, given the requirements in place for each activity to prevent impacts.

5.7 Industry Standard Control Measures

The following sections outline the standard measures which any titleholder relying on this CIA would adopt, with environmental performance suitable for their activities and management systems specified in their Environment Plan. Titleholders may choose to collaborate with one another on any of the measures noting the likely need to specify environmental performance on their own terms.

5.7.1 On-Water Communication Protocol

All titleholders in the region will likely apply the industry standard of adopting communication protocol (or similar) to manage interactions with commercial fishing activities.

5.7.2 Petroleum SIMOPS Plan

Titleholders with ongoing or planned activities in the Otway region are in regular consultation with each other and are working collaboratively to manage potential cumulative impacts. Details about this plan can be found in Appendix B3.

5.7.3 Compensation/Adjustment Protocol

Each titleholder will adopt a compensation/adjustment protocol to manage cumulative impacts to commercial fishers. Titleholders may collaborate to reduce the burden on affected fishers and standardise the processes for making evidence-based claims.

5.7.4 Light Management Plan

Titleholders predicting elevated levels of artificial light overlapping or adjacent to bird foraging or breeding BIAs, or the orange-bellied parrot migration routes are required to have a light management plan that meets the requirements of the National Light Pollution Guidelines. It is likely that all titleholders will have some form of assurance processes associated with the contracting of rigs and vessels to ensure this control measure in adopted and project rigs and vessels comply with all maritime laws.

5.7.5 Fauna Management Plans

It is expected that each titleholder will carry out observations, report incidents, and share opportunities for improvement with other petroleum titleholders in the Otway Basin regarding underwater sound management and whale interactions. Titleholders in the region are all individually responsible for ensuring the acceptable level of impact for Blue Whales and Southern Right Whales is not exceeded and titleholders have agreed to collaborate with the aim of minimising the potential for cumulative impacts associated with underwater sound, should activity timings overlap biologically important periods for Blue Whales and or Southern Right Whales.

5.8 Identification of Additional Control Measures

Additional measures have been considered because of this CIA to support titleholders in the Otway region to demonstrate cumulative impacts have been reduced to as low as reasonably practical (**ALARP**) and meet acceptable levels for cumulative impacts.

Additional measures may include a review and strengthening of existing measures, investigating the feasibility of additional mitigation measures or adaptive management processes, refining the activity description to reduce impact, and working with the proponents of other relevant reasonably foreseeable future projects to develop holistic mitigation strategies that consistently improve outcomes.

6 Outcome of CIA

The potential for cumulative impacts is considered low, with lower-order effects, given:

- The contracting of a single rig to conduct drilling related activities in the region which has eliminated the potential for concurrent cumulative impacts associated with multiple rig and support vessel operations.
- The physical overlap of a drilling activity within a seismic acquisition area has not been predicted and would make one, or the other activity unworkable.

6.1 CIA Outcome on Conservation Values and Sensitivities

Based on the outcome of the CIA, it is considered that cumulative impacts associated with the each of the projects and activities in this CIA both individual and collectively will not affect the representativeness of the South-east Commonwealth Marine Reserves Network, nor the conservation values of the Zeehan Marine Park associated with seabirds, the white shark and marine mammals, or sea-floor features.

6.2 Cumulative Impacts Reduced to ALARP

The residual cumulative impacts are considered to be of lower order because the cause effect pathways to impact have been identified and can be reduced with the adoption of industry standard control measures specified in Section 5.7, plus the additional measures in Section 5.8.

6.3 Cumulative Impacts Reduced to Acceptable Levels

Following completion of the CIA process, the residual cumulative impacts are of lower order because good practice controls are defined and will be implemented and each of the activities will be managed in accordance with relevant company, Commonwealth, international, and Industry standards, guidelines, and requirements.

7 References

TSSC. 2015a. Conservation Advice Balaenoptera physalus Fin Whale. Threatened Species Scientific Committee.
TSSC. 2015b. Conservation Advice Balaenoptera borealis Sei Whale. Threatened Species Scientific Committee.

8 Document Control

Date	Revision	Update
5 January 2024	1	EP submission to NOPSEMA
14 May 2024	2	Reviewed and update following public comment and rerun of the PSMT searches.
30 October 2024	3	Updated following NOPSEMA's assessment.
16 April 2025	4	Updated following NOPSEMA OMR 1 Letter
9 December 2025	5	Updated following NOPSEMA OMR 2 Letter

Annex 1

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table F1-8. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table F1-8 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration by other companies, particularly regarding the sale of seismic data.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	879
4151	Potential cumulative impacts upon species are addressed.	The titleholder responded by informing the stakeholder that the Regia MSS team were currently undertaking the cumulative impact assessment and will ensure that it covers previous and planned seismic surveys within the area and assesses impacts to cetaceans (behaviour, PTS, TTS) and their food source (krill).	653
4152	Potential harm to marine species like dolphins and whales due to disorientation caused by intense noise.	The Regia EP has conducted a thorough assessment of the literature which is both aspect-focused and also receptor- focused for those taxa of increased public concerns. Marine mammals, Blue Whale and Southern Right Whale in particular, have been subject to increased levels of assessment which have been used to decide outcomes.	1263
4173	Seismic blasting has adverse effects on the marine environment, with critical gaps in understanding the effects on individual species and the marine environment as a whole.	The titleholder responded with an explanation of the information sources used to inform the Regia MSS impact and risk assessments, and explained how these information sources and resulting measures are specific to the potential impact. The titleholder also referred to documents relevant to this claim within the environment plan (Event ID 4092).	4091
4489	Claims that CGG cannot determine what constitutes an “acceptable” level of impact or risk to Gunditjmara cultural values in Nyamat Mirring. States the April 2025 Environment Plan contains flawed cumulative impact assessments due to this lack of consultation.	CGG rejects GMTOAC’s claim that inadequate consultation prevents CGG from determining “acceptable” levels of cultural impact, asserting that it fully met its consultation obligations. CGG argues that the legal test is whether the Environment Plan demonstrates impacts and risks are reduced to ALARP and to an acceptable level. It maintains that GMTOAC’s critiques conflate subjective opinion with the regulatory standard under Regulation 34	EVT352

	GMTOAC identifies several shortcomings: CGG's interpretation of potential impacts to Gunditjmara and other First Nations cultural heritage is too narrow; CGG wrongly assumes that acceptable ecological impacts equate to acceptable cultural impacts; and CGG's cumulative impact assessment for Karntubul (Southern Right Whale), previously criticised by NOPSEMA in its February OMR, remains unchanged.	and emphasises that the law does not grant stakeholders a veto over design decisions. In response to the assertion that its interpretation of cultural heritage is too narrow, CGG maintains that GMTOAC has already articulated its cultural values clearly and extensively through published materials and received during consultation. These values, encompassing ceremony, obligations, kinship systems, spiritual relationships, and ecological connections are thoroughly integrated across the EP. The EP references the Nyamat Mirring Plan 2023–2033, incorporates cultural values and sensitivities into Appendix F3, and identifies culturally significant species and places as sensitive receptors with tailored management measures, for example, timing restrictions to avoid birthing seasons. CGG states that it has incorporated analysis of cumulative effects on Sea Country, including those arising from the survey in combination with other activities. It confirms that Karntubul is included in cumulative risk assessments with corresponding mitigation commitments.	
4491	Claims about the SRW and BW BIAs. States proposed activity will cause unacceptable impacts to all Karntubul species, including temporary & permanent hearing loss, displacement from BIAs, vessel strike, prey depletion during peak feeding/migration period, calving interruption, and impact to ecosystems and cultural landscapes as a result of the cumulative impact of these.	CGG has identified all Biologically Important Areas (BIAs) relevant to blue whales (BWs) and southern right whales (SRWs) and incorporated seasonal BIA use into the survey design through substantial temporal and spatial restrictions detailed in the EP. Predicted underwater-sound impacts on these Karntubul species, along with mitigation measures presented in Appendices E7 and F3, demonstrate impacts will remain acceptable and will avoid auditory impairment or displacement from BIAs or Habitats Critical to Survival (HCTS). CGG further notes that vessel-strike risk is already extremely low during seismic surveys and that additional controls in Appendix D2 ensure this risk is prevented and acceptable. It concludes that no changes to ecosystem structure, diversity, or function are expected from the one-off survey, with sound exposure too limited in extent and duration to affect prey, food webs, or predator–prey relationships. A cumulative impact assessment found residual cumulative effects to be low, reduced to ALARP, and acceptable, with no impacts predicted for regional marine parks. CGG also asserts consistency with the National Recovery Plan for Southern Right Whales and the Blue Whale Conservation Management Plan, stating that their objectives and recommended measures have been incorporated. Finally, CGG maintains that all marine mammal species likely to occur in the region have been adequately assessed using up-to-date EPBC Protected Matters data, and that mitigation measures ensure impacts to all listed species	EVT352

		will remain acceptable and not inconsistent with EPBC Act protection provisions.	
4492	Claims that the eastern population of the Southern Right Whale, estimated at only 200–300 individuals, is at particularly high risk because its migration and reproduction Biologically Important Areas (BIAs) overlap directly with CGG's Operational Area and sound propagation footprint. According to the Southern Right Whale Recovery Plan, these whales use the affected region for reproduction between May and September and for migration between April and October. The Recovery Plan also notes that Southern Right Whales do not feed in coastal waters but are expected to feed, and possibly conceive, within the Australian Whale Sanctuary—an area entirely overlapped by the proposed Regia MSS activity. As a result, the seismic survey could occur within, or affect, conceiving, calving, and feeding grounds for this critically endangered sub-population. The species is particularly vulnerable to human impacts due to its low reproductive rate, long lifespan, and strong site fidelity to key habitats. The submission therefore emphasises the relevance of underwater noise, habitat degradation, and vessel-strike risks in the context of the proposed seismic activities.	The Recovery Plan explains that BIAs can be designated for key behaviours such as reproduction, foraging, migration, and resting. While Southern Right Whale BIAs in the Plan cover reproduction and migration, the Plan notes that foraging occurs across a much broader offshore latitudinal range (30°S–65°S) and is not linked to these BIAs. Because the Regia MSS is not located in Antarctic waters, it will not affect cetaceans that forage there. CGG states the survey will avoid peak SRW abundance in the mapped BIA and apply mitigation measures to ensure no SRWs are harmed, injured, or interfered with.	EVT352
4496	GMTOAC objects to CGG removing a previous control measure limiting seismic discharge in the Pygmy Blue Whale foraging BIA during periods of low whale presence, replacing it with a vague condition requiring CGG to determine whether whale presence is "compatible" with proceeding. GMTOAC argues this new measure lacks detail on how whale presence or "unacceptable disturbance" will be	CGG has further reduced the likelihood of interactions with marine mammals by excluding the April–June period and commencing the survey only after 15 September. Because blue whales typically do not arrive from Western Australia until November, CGG argues that most of the survey will occur when blue whales are absent from the area. It adds that sighting data show very few blue whales in November and December, with peak abundance occurring later, from January to March during the Bonney Upwelling.	EVT352

	assessed, and that it fails to reference Recovery Plans which define unacceptable impacts. GMTOAC warns that the proposed survey timing (April–June 2026) coincides with peak Pygmy Blue Whale foraging season and Southern Right Whale migration and calving periods, meaning the seismic survey is likely to occur when both species are using their BIAs. Preventing whales from accessing these areas, or exposing them to injury while they remain, would constitute unacceptable impacts inconsistent with Recovery Plan objectives.		

Annex 2

Spatial overlap analysis

	Thylacine (Beach)	**Geographe (Beach)**	**CHN (Cooper/Amplitude)**	**Otway Drilling (Conoco)**	**Production Drilling (Cooper/Amplitude)**	**Minerva Decom**	**Production Drilling (Beach)**	~~**Seismic Survey (Otway 3D MSS)**~~	**Seismic Survey (Regia MSS)**	**Seismi Survey (Calico – Beach)**
Thylacine (Beach)		None	None	Light[1]	None	None	None	~~None~~	Sound[3]	None
Geographe (Beach)	None		None	Light[1]	None	None	Light, Sound[2, 3]	~~None~~	Sound	None
CHN (Cooper/Amplitude)	None	None		None	Light, Sound[2, 3]	None	None	~~None~~	None	None
Otway Drilling (ConocoPhillips)	Light[1]	Light[1]	None		None	None	Light, Sound[2, 3]	~~None~~	Light, Sound[2, 3]	None
Production Drilling (Cooper/Amplitude)	None	None	Light, Sound[2, 3]	None		None	None	~~None~~	Sound[3]	Sound[3]
Minerva Decommissioning	None	None	None	None	None		None	~~None~~	Sound[3]	Sound[3]
Production Drilling (Beach)	None	Light, Sound[2, 3]	None	Light, Sound[6]	None	None		~~None~~	Sound[3]	None
~~**Seismic Survey (Otway 3D MSS)**~~	~~None~~	~~None~~	~~None~~	~~None~~	~~None~~	~~None~~	~~None~~		~~Sound[3]~~	~~None~~
Seismic Survey (Regia MSS)	None	Sound[3]	None	Light, Sound[2, 3]	Sound[3]	Sound[3]	Sound[3]	~~Sound[3]~~		None
Seismi Survey (Calico – Beach)	None	None	None	None	Sound[3]	Sound[3]	None	~~None~~	None	

1. This overlap is based on a 20 km area of effect from these activities noting that ConocoPhillips Australia have not identified final drilling locations.
2. This overlap is from the activities being proximate to the production facilities.

3. The overlap in sound is taking from a conservative estimate of 50 km between sound sources noting that distance is an inadequate but conservative measure to determine spatial overlap between projects and activities.

Annex 3

CIA Scoping Tool

Environmental Component	Sub-Component	Environmental Aspect (yellow = drilling specific)									CIA Scoping					
		Physical Presence	Seabed Disturbance	Artificial Light - Operational	Artificial Light - Flaring	Atmospheric Emissions	Underwater Sound - Continuous	Underwater Sound - Impulsive	Routine Discharges	Drilling Discharges	Acceptable Levels (Effect) Ecological integrity and biodiversity conservation (Temporary/reversible/recoverable, small scale and/or low intensity) Assessing scale and nature	Potential for Cumulative Impact - Spatial Extent	Potential for Cumulative Impact - Temporal Extent	Predictability and Certainty	Scoping Assessment Outcome	Cumulative Cause-effect Pathway
Physical Environment	Water Quality		✓						✓	✓	Temporary, small-scale, and recoverable impacts.	N - Limited to individual activity discharge location	N - Limited to duration of individual activity	High for individual and cumulative impacts.	No cumulative impact cause-effect pathway identified. Impacts to water quality from activities are predicted to rapidly disperse given the open ocean environment and prevailing currently within 500 m to 2 km of the discharge, thus there is no potential to accumulate over spatial or temporal scales.	None identified
	Sediment Quality		✓							✓	Temporary, small-scale, and recoverable impacts.	N - Limited to individual activity discharge location	N - Limited to months - year after individual activity	High for individual and cumulative impacts.	Cumulative impact cause-effect pathway identified but impacts not material. No impacts to sediment quality are predicted for seismic surveys. Impacts to sediment quality drilling activities are predicted to be localised within 500 m of each well. Though there is the potential for an increase in potential impact as each area is very small (500 m) material impacts are not predicted.	Identified but impacts not material nor added to by the Regia MSS. No further assessment required.
	Air Quality					✓					Temporary, small-scale, and recoverable impacts.	N - Limited to individual activity discharge location	N - Limited to duration of individual activity	High for individual and cumulative impacts.	No cumulative impact cause-effect pathway identified. Impacts to air quality from activities are predicted to be localised, and atmospheric emissions will rapidly disperse to background levels close to the emissions source given the open ocean environment and prevailing wind. Emissions are not predicted to affect the achievement of the National Environmental Protection Measure for Ambient Air Quality (NEPM AQQ) (NEPC 2021) protection goals., with no potential to accumulate over spatial or temporal scales.	None identified
	Climate					✓					Small-scale and low intensity impacts.	N - Global climate	N - Indeterminable	High for individual and cumulative impacts.	Although GHG emissions from activities will add to the global atmospheric levels of GHG emissions, the quantities estimated to be released are insignificant on a global scale.	None identified
	Ambient Light - Operational			✓							Temporary, small-scale, and recoverable impacts.	Y - Bioregion, BIAs, and biologically important behaviours for sensitive species	Y - Consecutive activities, and seismic and single drilling operation may occur concurrently	High for individual and cumulative impacts.	There is potential for cumulative impacts depending on location of activities and sensitive receptors. Although changes in ambient light are restricted to typically 20 km radius of individual activities, activities may occur consecutively over several years within the Otway Basin and seismic and drilling at a single location have the potential to occur concurrently	Identified and further assessment required to determine if impacts are material.
	Ambient Light - Flaring			✓	✓						Temporary, small-scale, and recoverable impacts.	N - Only single drilling operation at any one time	Y - Consecutive activities if others are flaring in similar location	High for individual and cumulative impacts.	There is potential for cumulative impacts depending on location of activities and sensitive receptors. Although flaring light impacts are restricted to typically 50 km radius of individual short-term operations (max. 120 hours per well), flaring may occur consecutively over several years within the Otway Basin.	Identified and further assessment required to determine if impacts are material.

Environmental Component	Sub-Component	Environmental Aspect (yellow = drilling specific)									CIA Scoping					Cumulative Cause-effect Pathway
		Physical Presence	Seabed Disturbance	Artificial Light - Operational	Artificial Light - Flaring	Atmospheric Emissions	Underwater Sound - Continuous	Underwater Sound - Impulsive	Routine Discharges	Drilling Discharges	Acceptable Levels (Effect) Ecological integrity and biodiversity conservation (Temporary/reversible/recoverable, small scale and/or low intensity) Assessing scale and nature	Potential for Cumulative Impact - Spatial Extent	Potential for Cumulative Impact - Temporal Extent	Predictability and Certainty	Scoping Assessment Outcome	
	Ambient Sound						✓	✓			Temporary, small-scale, and recoverable impacts.	Y - Bioregion, BIAs, and biologically important behaviours for sensitive species	Y - Consecutive activities Seismic and single drilling operation may occur concurrently	Moderate for individual and cumulative impacts.	There is potential for cumulative impacts depending on location and timing of activities and sensitive receptors. Although sound impacts are restricted to within typically 10s of kms around individual activities, activities may be occurring consecutively over a period and seismic and drilling (at a single location) have the potential to occur concurrently.	Identified and further assessment required to determine if impacts are material.
Ecological Environment	Benthic Habitats and Communities		✓							✓	Temporary, small-scale, and recoverable impacts.	N - Limited to individual activity area	N - Limited to weeks-months after individual activity	High in individual and cumulative impacts.	No cumulative impact effect pathway identified. The area of impact is relatively small compared to the extent of the distribution of benthic habitats and associated benthic fauna found within the Otway Basin. Widespread changes to the benthic environment or ecosystem functioning or integrity are not predicted. No overlap with threatened ecological communities. Overlap with Zeehan AMP, which has benthic habitat as a value, only occurs one activity.	None identified
	Coastal Habitats and Communities										N/A for planned activities. (No impact to coastal areas from planned drilling operation impacts).					None identified
	Plankton						✓	✓	✓	✓	Temporary, small-scale, and recoverable impacts.	N - Limited to individual activity area	N - Recovery days post activity	Moderate for individual and cumulative impacts.	No cumulative impact effect pathway identified. Discharges to the water column are not predicted to impact water quality at a cumulative scale and therefore will not impact plankton at an ecological integrity level. Continuous noise from drilling and vessel operation is not predicted to impact plankton. The cumulative impact of impulsive sound from consecutive seismic operations has been assessed and controlled in relevant EPs. Impacts from VSP are short term (<20 hours per well and nor predicted to result in impacts at scale to contribute to cumulative impacts.	None identified
	Invertebrates		✓				✓	✓		✓	Temporary, small-scale, and recoverable impacts.	N - Limited to individual activity with exception of multiple seismic operations	N - Limited to weeks-months after individual activity	High for individual and cumulative impacts.	No cumulative impact effect pathway identified. Continuous noise from drilling and vessel operation and VSP is not predicted to impact invertebrates. The cumulative impact of impulsive sound from consecutive seismic operations has been assessed and controlled in relevant EPs.	None identified

Environmental Component	Sub-Component	Environmental Aspect (yellow = drilling specific)									CIA Scoping					Cumulative Cause-effect Pathway
		Physical Presence	Seabed Disturbance	Artificial Light - Operational	Artificial Light - Flaring	Atmospheric Emissions	Underwater Sound - Continuous	Underwater Sound - Impulsive	Routine Discharges	Drilling Discharges	Acceptable Levels (Effect) Ecological integrity and biodiversity conservation (Temporary/reversible/recoverable, small scale and/or low intensity) Assessing scale and nature	Potential for Cumulative Impact - Spatial Extent	Potential for Cumulative Impact - Temporal Extent	Predictability and Certainty	Scoping Assessment Outcome	
	Fish and Sharks						✓	✓			Not inconsistent with EPBC Act Management Plans, and Recovery Plans. Temporary, small-scale, and recoverable impacts.	N - Limited to individual activity with exception of multiple seismic operations	N - Periods of biologically important behaviours for sensitive species	High for individual and cumulative impact sense.	No cumulative impact cause-effect pathway identified. Underwater sound from drilling is predicted to be localised to within 190 m for recoverable injury and TTS for fish and sharks and within 450 m for VSP. The area of impact from concurrent seismic and drilling activities is small compared to the extent of the distribution of fish and shark species. The area of impact from concurrent seismic and drilling activities is small compared to the white shark distribution BIA but is considered moderate for the foraging BIA. However, seismic survey and drilling operations with the potential to affect the foraging BIA in the northern extent of VIC/P79 are mutually exclusive and cannot occur concurrently. Sound impacts are not identified as a threat within the Recovery Plan for the White Shark (Carcharodon carcharias) (DSEWPaC 2013a).	None identified
	Birds			✓	✓		✓	✓			Not inconsistent with EPBC Act Management Plans, and Recovery Plans. Temporary, small-scale, and recoverable impacts.	Y - BIAs for sensitive species (Bioregion)	Y - Periods of biologically important behaviours for sensitive species	High for individual and cumulative impacts.	There is potential for cumulative impacts associated with light depending on location of activities and sensitive receptors, i.e. foraging, migrating, and breeding birds. There is no cumulative effect pathway for underwater sound with the consequence of underwater sound on birds from drilling activities assessed as negligible. Regarding the potential for cumulative impacts to diving birds and little penguins associated with underwater sound from seismic activities, there is only one other seismic survey scheduled to occur in proximity to the Regia MSS. The Beach Energy Calico seismic survey was due to commence in February through to May 2025. CGG understands this project has yet to receive regulatory approval, it is not anticipated this survey will be occurring at the same time as the Regia MSS. Thus, cumulative impacts to diving birds and penguins as a result of one or more seismic surveys occurring in proximity to the Regia MSS operational area are not expected. Although changes in ambient light are restricted to typically 20 km radius of individual activities, activities may be occurring consecutively over several years throughout the region and seismic and drilling at one location have the potential to occur concurrently.	Identified and further assessment required to determine if impacts are material.
	Marine Reptiles			✓	✓		✓	✓			Not inconsistent with EPBC Act Management Plans, and Recovery Plans. Temporary, small-scale, and recoverable impacts.	N - No BIAs or critical habitat	N - No periods of biologically important behaviours for sensitive species	High for individual and cumulative impacts.	No cumulative effect pathway identified. Individuals in the area are expected to be transient, with no BIAs, critical habitat, or biologically important behaviours within the Otway Basin. Lighting doesn't impact in water navigation or behaviours and impacts from noise will be temporary and recoverable.	None Identified

Environmental Component	Sub-Component	Environmental Aspect (yellow = drilling specific)									CIA Scoping					
		Physical Presence	Seabed Disturbance	Artificial Light - Operational	Artificial Light - Flaring	Atmospheric Emissions	Underwater Sound - Continuous	Underwater Sound - Impulsive	Routine Discharges	Drilling Discharges	Acceptable Levels (Effect) Ecological integrity and biodiversity conservation (Temporary/reversible/recoverable, small scale and/or low intensity) Assessing scale and nature	Potential for Cumulative Impact - Spatial Extent	Potential for Cumulative Impact - Temporal Extent	Predictability and Certainty	Scoping Assessment Outcome	Cumulative Cause-effect Pathway
	Marine Mammals						✓	✓			Not inconsistent with EPBC Act Management Plans, and Recovery Plans. Temporary, small-scale, and recoverable impacts.	Y - BIAs for sensitive species (Bioregion)	Y - Periods of biologically important behaviours for sensitive species	Moderate for individual and cumulative impacts.	There is potential for cumulative impacts associated with underwater sound depending on location of activities and sensitive receptors, i.e. endangered species, foraging and migrating BIAs. Although sound impacts are restricted to within typically 10s of kms around individual activities, activities may be occurring consecutively over a period and seismic and drilling at one location have the potential to occur concurrently.	Identified and further assessment required to determine if impacts are material.
	Conservation Values and Sensitivities		✓			✓	✓	✓		✓	Not inconsistent with SE Marine Parks Network Management Plan. Temporary, small-scale, and recoverable impacts.	Y - Zeehan AMP	Y - Periods of biologically important behaviours for conservation values	High for individual and cumulative impacts.	The Zeehan Marine Park is overlapped by three proposed activities. See individual ecological receptors above for assessment of conservation values of the Zeehan Marine Park which include benthic habitats that supports animal communities and invertebrates, seabirds, the white shark and migrating blue whales and humpback whales.	Identified for seabirds and whales and further assessment required to determine if impacts are material.
Socio-economic Environment (Other marine and coastal users)	Coastal Communities and Onshore Tourism Activities	✓		✓	✓						Temporary, small-scale, and low intensity impacts.	N - Not predicted to see multiple activities from single vantage point (King Island, Victorian coast)	Y - May be able to see different activities over time from single vantage point (King Island, Victorian coast)	High for individual and cumulative impacts.	Cumulative effect pathway identified, associated with visibility of different activities over time, but impacts not material. The likelihood of visibility of multiple activities from a single vantage point is considered low given the distances offshore it is not predicted that rig and vessel would be distinguishable from other existing vessel traffic.	Identified but impacts not material. No further assessment required.
	Offshore Petroleum Activities	✓									Temporary, small-scale, and low intensity impacts.	N	N	High for individual and cumulative impacts.	Cumulative effect pathway identified but impacts not material. Other activities are scheduled and/or operate within their own exclusion zones/petroleum titles. Notice to mariners will provide advanced warning and opportunity to plan transit route. At most avoidance of a single seismic survey vessel and towed equipment, and a single drilling location at any given time with minimal impact.	Identified but impacts not material. No further assessment required.
	Offshore Renewable Energy Activities	✓									Temporary, small-scale, and low intensity impacts.	N	N	High for individual and cumulative impacts.	No cumulative impact effect pathway identified. There are no reasonably foreseeable future projects or activities in the offshore Otway Basin.	None Identified
	Defence Activities	✓	✓								Temporary, small-scale, and low intensity impacts.	Y - Displacement from concurrent and consecutive seismic and drilling areas	Y - Displacement from concurrent and consecutive seismic and drilling areas	High for individual and cumulative impacts.	Cumulative effect pathway identified but impacts not material. Industry standard controls in place such as notice to mariners will provide advanced warning and opportunity to plan transit route. At most avoiding a single seismic survey vessel and towed equipment, and a single drilling location at any given time with minimal impact. Impacts to maritime archaeological heritage are not predicted from seismic surveys. Drilling activities required to undertake seabed surveys prior to seabed disturbance. Impacts to UXO are not a planned event and therefore cumulative impacts are not predicted.	Identified but impacts not material. No further assessment required.

Environmental Component	Sub-Component	Environmental Aspect (yellow = drilling specific)									CIA Scoping					
		Physical Presence	Seabed Disturbance	Artificial Light - Operational	Artificial Light - Flaring	Atmospheric Emissions	Underwater Sound - Continuous	Underwater Sound - Impulsive	Routine Discharges	Drilling Discharges	Acceptable Levels (Effect) Ecological integrity and biodiversity conservation (Temporary/reversible/recoverable, small scale and/or low intensity) Assessing scale and nature	Potential for Cumulative Impact - Spatial Extent	Potential for Cumulative Impact - Temporal Extent	Predictability and Certainty	Scoping Assessment Outcome	Cumulative Cause-effect Pathway
	Shipping	✓									Temporary, small-scale, and low intensity impacts.	Y - Displacement from concurrent and consecutive seismic and drilling areas	Y - Displacement from concurrent and consecutive seismic and drilling areas	High for individual and cumulative impacts.	Cumulative effect pathway identified but impacts not material. The area of impact is small compared to the area available for shipping. Industry standard controls in place such as notice to mariners will provide advanced warning and opportunity to plan transit route. At most avoiding a single seismic survey vessel and towed equipment, and a single drilling location at any given time with minimal impact.	Identified but impacts not material. No further assessment required.
	Marine Tourism	✓									Temporary, small-scale, and low intensity impacts.	Y - Displacement from concurrent and consecutive seismic and drilling areas	Y - Displacement from concurrent and consecutive seismic and drilling areas	High for individual and cumulative impacts.	Cumulative effect pathway identified but impacts not material. The area of displacement is small compared to area available for tourism. Industry standard controls in place such as notice to mariners will provide advanced warning and opportunity to plan transit route. At most avoiding a single seismic survey vessel and towed equipment, and a single drilling location at any given time with minimal impact.	Identified but impacts not material. No further assessment required.
	Recreational Diving and Surfing						✓	✓			N/A for planned activities. No affect to divers and surfers from planned drilling operations are predicted.					None identified
	Recreational Fishing	✓									Temporary, small-scale, and low intensity impacts.	Y - Displacement from concurrent and consecutive seismic and drilling areas on-shelf area	Y - Displacement from concurrent and consecutive seismic and drilling areas	High for individual and cumulative impacts.	Cumulative effect pathway identified but impacts not material. The area of displacement is small compared to area available for recreational fishing. Industry standard controls in place such as notice to mariners will provide advanced warning and opportunity to plan activities. At most avoiding a single seismic survey vessel and towed equipment, and a single drilling location at any given time with minimal impact.	Identified but impacts not material. No further assessment required.
	Commercial Fisheries	✓	✓				✓	✓			Affected persons will not be worse off because of the activity.	Y - Displacement from concurrent and consecutive seismic and drilling areas	Y - Displacement from concurrent and consecutive seismic and drilling areas	High for individual and cumulative impacts.	Cumulative effect pathway identified. Displacement of fishers operating in fisheries with spatial extent that may be overlapped by several offshore activities, i.e. displaced by multiple exclusion zones (rig and seismic survey) or different exclusion zone over time. Although displacement impacts are restricted to within typically 2 kms around individual activities, drilling may be occurring consecutively over a period and seismic and drilling at one location have the potential to occur concurrently. Minor behavioural disturbances are predicted to commercial fish species from underwater sound and cumulative impacts are not predicted.	Identified and further assessment required to determine if impacts are material.
Cultural Environment	First Nations Peoples Heritage including but not limited to Sea Country, Song Lines, and totemic species.	✓	✓	✓	✓		✓	✓		✓	Not inconsistent with Indigenous Protected Area Plans. Temporary, small-scale, and recoverable impacts.	Y - Sea Country	Y - Over term of activities	Moderate in individual and cumulative impacts.	Cumulative effect pathway identified. Drilling and other activities may have the potential to cumulatively affect cultural values and sensitivities in the region.	Identified and further assessment required to determine if impacts are material.

Environmental Component	Sub-Component	Environmental Aspect (yellow = drilling specific)									CIA Scoping					
		Physical Presence	Seabed Disturbance	Artificial Light - Operational	Artificial Light - Flaring	Atmospheric Emissions	Underwater Sound - Continuous	Underwater Sound - Impulsive	Routine Discharges	Drilling Discharges	Acceptable Levels (Effect) Ecological integrity and biodiversity conservation (Temporary/reversible/recoverable, small scale and/or low intensity) Assessing scale and nature	Potential for Cumulative Impact - Spatial Extent	Potential for Cumulative Impact - Temporal Extent	Predictability and Certainty	Scoping Assessment Outcome	Cumulative Cause-effect Pathway
	Maritime Archaeological Heritage		✓								No disturbance of maritime cultural heritage.	N - Only single drilling operation at any one time	N - Control Measures in place to detect and prevent interactions	High for individual and cumulative impacts.	No cumulative effect pathway identified. Impacts to maritime archaeological heritage are not predicted from seismic surveys. Drilling activities required to undertake seabed surveys prior to seabed disturbance. Impacts to maritime archaeological heritage are not a planned event and therefore cumulative impacts are not predicted.	None Identified

REGIA
Marine Seismic Survey

ALARP Assessment

Appendix F2: REG-EP-031-F2

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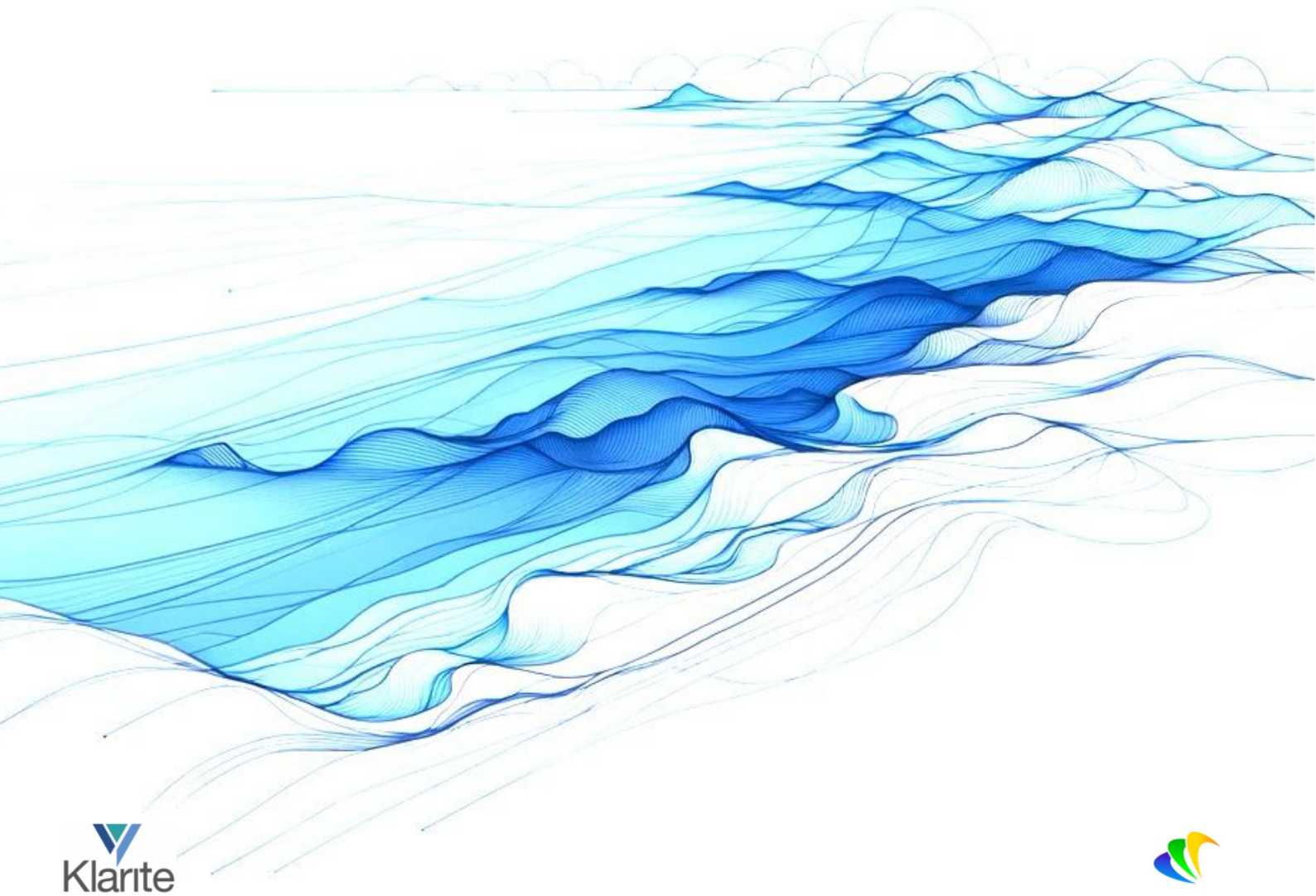

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Executive Summary

This report presents a comprehensive ALARP (As Low As Reasonably Practicable) assessment across ten environmental impact and risk pathways relevant to the Regia Marine Seismic Survey (Regia MSS). The assessment applies a consistent, step-by-step framework that combines baseline compliance obligations, discretionary control measures, and a semi-quantitative analysis of effectiveness and cost (sacrifice).

For each impact or risk pathway, the process identifies:

- The baseline level of residual impact or risk after legal and operational requirements are applied.
- The cumulative cost, time, or operational effort (sacrifice) required to implement additional control measures.
- The marginal environmental benefit achieved at each step.

Control measures were adopted where they delivered meaningful reductions in impact or risk relative to their cost. Measures were rejected where further reduction would be grossly disproportionate to the sacrifice required. This ensures that effort is concentrated where environmental returns are highest.

A final cross-pathway analysis confirmed that:

- Most total sacrifice was invested in pathways with the highest baseline risk, such as underwater sound, physical presence, and collisions with marine fauna.
- Pathways with already low impact levels, such as atmospheric emissions and planned discharges, showed diminishing returns, supporting early cut-off points in the assessment.
- A comparative metric — impact reduction per unit of sacrifice — demonstrates that CGG's approach delivers proportionate and justifiable environmental outcomes.

Overall, the assessment confirms that impacts and risks have been reduced to a level that is as low as reasonably practicable, in accordance with regulatory expectations and environmental best practice.

Table of Contents

Executive Summary 2
Table of Contents 3
1 Introduction 5
1.1 Purpose 5
1.2 Definitions 5
1.3 ALARP Concept 6
2 Scope of the ALARP Assessment 8
2.1 Exclusions from Scope 8
3 Consultation Input 10
4 Establishing ALARP Baselines 11
4.1 Baseline for Risk and Impact 11
4.2 Baseline for Sacrifice 11
4.3 Why This Approach Was Adopted 12
4.4 Consideration of Alternative Approaches 12
5 ALARP Process 13
5.1 Assigning Subjective Values 13
5.2 Step-by-Step Process 15
5.3 Endpoint of the ALARP Assessment 18
5.4 Process Outputs 19
5.5 Ensuring Integrity in ALARP Assessments 24
6 ALARP Assessment – Impacts 26
6.1 Benthic Disturbance 26
6.2 Atmospheric Emissions 27
6.3 Planned Discharges 33
6.4 Physical Presence 38
6.5 Underwater Sound 45
6.6 Artificial Light 65
7 ALARP Assessment – Risks 71
7.1 Accidental Release of Materials or Waste Overboard 71
7.2 Collisions with Marine Fauna 77
7.3 Introduction of Marine Pest Species 83
7.4 Accidental Release of Fuel 90
8 Conclusion 97
9 Document Control 99
10 References 100

Annex 1 - Public Comment 101
Annex 2 - Objections and Claims Raised from Consultation 102
Annex 3 - Ensuring Integrity in ALARP Assessments 107
Guidance for Assessors 107
Guidance for Reviewers 107

1 Introduction

This document presents the **ALARP** (As Low As Reasonably Practicable) assessment undertaken by CGG for the Regia Marine Seismic Survey (**Regia MSS**). The ALARP principle is a core requirement of environmental management under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023* ("**the Regulations**"). It requires that environmental impacts and risks associated with the activity are reduced to a level that is ALARP.

The ALARP assessment forms one of the key demonstrations in support of the Environment Plan (**EP**) for the Regia MSS. It complements the environmental impact and risk assessment by evaluating whether further reductions in environmental impacts and risks can be achieved through additional or alternative control measures, and whether any such measures are reasonably practicable to adopt in the context of the activity.

This assessment is supported by:

- The environmental assessments in Appendices D1–D4 and E1–E9, which establish the baseline level of environmental impact and risk after legislative requirements have been applied.
- The risk and impact matrices contained in Annexes 1 and 2 of Appendix B3.
- A stepwise, semi-quantitative evaluation of environmental benefit and associated sacrifice for each control measure considered.

Figures, tables, and supporting materials are provided to clearly communicate the decision-making process and demonstrate compliance with the ALARP requirement of the Regulations.

1.1 Purpose

The purpose of this assessment is to demonstrate that the environmental risks and impacts associated with the Regia MSS have been reduced to a level that is as low as reasonably practicable. It does so by evaluating whether additional or alternative control measures offer environmental benefit that is proportionate to the sacrifice required to implement them. The assessment provides a transparent, stepwise justification for which measures have been adopted and which have not, in accordance with the Regulations.

1.2 Definitions

The following definitions are used throughout this document and their distinctions and nested nature is imperative in being able to reproduce the outcomes of the assessments.

Table F2-1 - Definitions

Term	Definition
Measures	A collective term for anything that eliminates, substitutes, controls, manages, or administers an impact or risk.
Activity limitation	A measure that eliminates or substitutes, constrains, limits, or otherwise restricts the activity such that impacts and risks can be avoided, or lessened to or below acceptable levels.
Control Measure	A system, an item of equipment, a person or a procedure, that is used as a basis for managing environmental impacts and risks of an activity. (OPGGS (Environment) Regulation 5).

Term	Definition
Environmental Performance Standard	A statement of the performance required of a control measure.
Environmental Management System	For an activity, includes the responsibilities, practices, processes and resources used to manage the environmental aspects of the activity.

1.3 ALARP Concept

ALARP is a core element of environmental management in the Regulations. It recognises that while environmental impacts and risks can often be further reduced, not all potential measures are reasonably practicable. ALARP is not a simple cost-benefit exercise — it requires a balanced judgement of the level of risk or impact against the sacrifice involved in implementing further control measures.

The goal of an ALARP assessment is to determine whether additional impact and risk reduction is achievable without incurring sacrifices that are grossly disproportionate to the environmental benefit. To support this, Table F2-1 outlines the key conceptual parameters that influence ALARP assessments.

Table F2-2 - Conceptual parameters in assessing whether ALARP has been reached.

Impact or Risk Reduction Achievable (Intrinsic Effectiveness)	Sacrifice Required for Adoption
Reduced Occurrence: This includes decreasing the occurrence (either likelihood or uncertainty) (E.g., of emissions and discharges).	Financial Cost: The most obvious sacrifice is the direct financial cost of implementing a control measure. This includes the cost of purchasing equipment, technology, or services, as well as any ongoing maintenance and operational costs.
Reduced Severity: This includes decreasing the effect or consequence (E.g., of emissions and discharges).	Time and Effort: Implementing new processes or technologies often requires significant time and effort. This can include the time taken for research and development, training staff, and integrating new systems into existing workflows.
Compliance with Regulations: Meeting or exceeding environmental regulations can improve environmental outcomes and avoid legal penalties.	Operational Disruption: Introducing new control measures can disrupt regular operations. This might mean downtime, reduced productivity, or the need to alter business practices temporarily or permanently.
Long-term Sustainability: Sustainable practices can ensure long-term viability and resilience of the business and the environment.	Resource Allocation: Resources, including human resources, might need to be reallocated. This could mean diverting staff from managing one impact or risk to managing a different or new impact or risk.
Ecosystem Preservation: Protecting natural habitats and biodiversity, which has intrinsic value and can support long-term ecological balance.	Opportunity Cost: Implementing a control measure might mean foregoing other opportunities. For instance, investing heavily in one area of environmental protection might limit a company's ability to invest in other areas.

Measures that offer risk or impact reduction *commensurate with the sacrifice* must be adopted. Further, even measures involving *disproportionate sacrifice* may be required, provided the sacrifice is not *grossly* disproportionate. Only in cases of gross disproportionality can a control measure be justifiably excluded.

This makes it essential that the levels of risk and impact are well understood before the ALARP process begins. These levels were determined through the environmental assessment process outlined in Appendix B3 and applied in the Preliminary Environmental Impact and Risk Assessment, Appendices D1–D4 and E1–E9. Together, they provide the foundation for evaluating which control measures can be considered reasonably practicable.

2 Scope of the ALARP Assessment

The ALARP assessment for the Regia MSS forms a key part of CGG's approach to ensuring that environmental impacts and risks are reduced to a level that is as low as reasonably practicable. The assessment considers each identified risk and impact and evaluates the adoption or rejection of additional, alternative, or improved control measures. The process begins from a realistic baseline, already incorporating all legally required measures and activity constraints.

The scope of the assessment includes:

- Establishing baseline levels of impact/risk and sacrifice using the outcomes of the environmental assessments (Appendices D1–D4 and E1–E9).
- Evaluating discretionary control measures beyond those mandated by legislation or company policy.
- Assessing the environmental benefit of adopting a control measure in terms of additional risk or impact reduction.
- Comparing the benefit to the cumulative sacrifice required to adopt and maintain the control measure (e.g. cost, time, disruption, opportunity cost).
- Determining whether the control measure is reasonably practicable or grossly disproportionate.
- Documenting the rationale for adopting or rejecting each measure.

This structured approach ensures the assessment supports a transparent and traceable demonstration that the environmental risks and impacts of the activity have been reduced to ALARP in accordance with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023.

2.1 Exclusions from Scope

The ALARP assessment focuses on the decision-making process for adoption/rejection of control measures only. Several other elements of the broader environmental management system are excluded from this assessment, as explained below.

2.1.1 Activity Limitations

Activity limitations are not control measures and are therefore excluded from the ALARP assessment. These limitations form part of the baseline definition and the environmental context in which control measures are assessed. They cannot reasonably be considered in ALARP decisions because:

- Their costs are variable and context-specific, arising from survey design and environmental constraints rather than implementation choices.
- They relate to the activity's scope and objective, not the cost of adopting a control measure.
- They are either complied with or not, lacking a performative or measurable management component.
- They eliminate or substitute risks (at the top of the hierarchy of controls), rather than managing them.

- They are used to set the boundaries of the assessment, forming the baseline against which ALARP can be argued.
- They do not serve as discretionary control measures subject to cost-benefit evaluation.

2.1.2 Environmental Management System

Similarly, supporting measures that are part of the Environmental Management System (found in the Implementation Strategy (Appendix B3)) are part of establishing baselines for the ALARP assessment and excluded from the ALARP assessment. These elements are designed to support the effectiveness of all control measures, not act as control measures themselves. For example, an oil pollution emergency plan or an induction program does not directly protect the environment it is the performance of personnel and the availability of equipment, rather than the plan itself, that delivers environmental protection.

While these measures are essential for ensuring the effectiveness of adopted control measures, they do not form part of the ALARP decision-making process. Rather, they form part of the baseline sacrifice required to manage environmental impacts and risks and are addressed separately in the implementation and performance monitoring framework.

3 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2 - Objections and Claims Raised from Consultation.

4 Establishing ALARP Baselines

The starting point for an ALARP assessment is never assumed to be zero sacrifice or maximum (inherent) impact or risk. This is because:

- Titleholders are legally required to implement certain environmental management measures (e.g. under the EPBC Act or maritime law).
- These measures already incur sacrifice in the form of time, effort, and financial cost.
- They have already contributed to reducing the unmitigated impact or risk associated with the activity.

The ALARP assessment must therefore begin from a realistic and regulated baseline, which includes all legally required measures, and any activity limitations or constraints already committed to that shape how the activity is carried out. It is the combined effect of these measures on residual impact or risk that form the baselines.

4.1 Baseline for Risk and Impact

The baseline level of impact or risk is drawn directly from the outcomes of the environmental assessments (see Appendices D1–D4 and E1–E9), which apply all relevant legislative requirements and activity limitations as the starting point. The ranking values are derived from the risk and impact assessment matrices provided in Annexes 1 and 2 of Appendix B3.

While the nominal values assigned to each impact or risk level originate from these matrices, the subsequent reductions resulting from the adoption of additional control measures are used for relative comparison only. They do not correspond to absolute values in the original matrices but instead support a semi-quantitative and transparent tracking of progress lower toward ALARP.

4.2 Baseline for Sacrifice

The baseline level of sacrifice is defined as the total cost of meeting all relevant legislative requirements and activity limitations for undertaking the activity relevant to each aspect.

This includes:

- The cost of preparing the Environment Plan (EP).
- The cost of complying with environmental management legislation.
- Costs associated with undertaking consultation to gather input into the EP.
- The time value of regulatory engagement and approvals.

This combined sacrifice is expressed in the assessment as a unit value of 1 at the commencement of each individual assessment. All subsequent discretionary control measures are evaluated as proportionate increases above this baseline. Each assessment shows the incremental sacrifice per control measure, or group of control measures, and the cumulative sacrifice as a ratio above the baseline of 1. For example, if the baseline was equal to $100 (ratio = 1) and the cost of the first additional control measure is $50 (ratio = 0.5) then the cumulative total is $150 (ratio 1.5).

4.3 Why This Approach Was Adopted

This method of establishing baselines was selected to ensure that the ALARP assessment does not compare discretionary controls to a hypothetical “do nothing” case, which is inconsistent with regulatory obligations. Further, this approach ensures the marginal benefit of each control measure is evaluated against the actual residual impact/risk reduction it achieves. This reflects accepted good practice that environmental legislation sets the minimum standard, and that each control measure is assumed to be functioning and in place before assessing whether additional reduction is reasonably practicable.

4.4 Consideration of Alternative Approaches

Following feedback during the consultation process, CGG considered several alternative methods for calculating baselines and comparisons. These included:

- Absolute cost comparisons between control measures and total project profit. This approach was not adopted, as it would have required the disclosure of commercially sensitive pricing and contract terms, which is not in CGG’s interests nor a legislative requirement.
- A strict monetary valuation of environmental benefit. This was also rejected, as it fails to consider the effectiveness of control measures and assumes a linear relationship between cost and environmental value, which often does not hold in practice.
- Proportional cost methods, in which additional control measures would be assessed as a percentage of total project costs. This method was considered but ultimately set aside because it risks over-simplifying the ALARP assessment. For example, a low-cost control could be highly effective, while a high-cost control may offer little additional benefit.

CGG's adopted method ensures that the ALARP assessment reflects the context of the project, recognises existing commitments, and applies a balanced, defensible and repeatable framework for assessing the reasonableness of further risk or impact reduction.

5 ALARP Process

The purpose of this process is to assess whether an environmental impact/risk has been reduced to ALARP by progressively evaluating the effectiveness and cost of control measures.

5.1 Assigning Subjective Values

The ALARP process relies on the application of professional judgement and expertise within a structured and calculated method. It is a semi-qualitative process that will vary depending on the participants and the context in which the assessment is made. There follow instructions on how to assign values in this process which aim to reduce subjectivity.

5.1.1 Assigning Intrinsic Effectiveness

A central element of ALARP assessments is determining the degree to which a control measure provides an environmental benefit. This can be otherwise stated as degree to which a control measure reduces environmental impact or risk. For the purposes of this ALARP process, ***intrinsic effectiveness*** is used as a suitable and practical proxy for measuring environmental benefit.

Intrinsic effectiveness refers to the degree to which a control measure, on its own merits, is expected to reduce the impact or risk it is designed to address. In this process, this is expressed as a percentage reduction in the residual impact or risk. A control measure that is 90% intrinsically effective is considered to reduce 90% of the remaining impact/risk for that specific pathway.

This makes intrinsic effectiveness an ideal proxy for environmental benefit because it:

- Quantifies the marginal gain achieved by the control measure.
- Allows comparability across different measures and impact pathways.
- Provides a basis for calculating the residual impact/risk after each step.
- Enables the plotting of environmental return on sacrifice using the ALARP graphs.

Intrinsic effectiveness is not a generic rating but rather a context-specific estimate based on the following attributes:

- Functionality – How well does the measure perform its intended role?
- Availability – Is the measure accessible or deployable when and where needed?
- Reliability – Does it perform consistently in real-world conditions?
- Survivability – Can it maintain its function under expected stressors?
- Independence – Can it operate effectively without relying on other measures?
- Compatibility – Does it integrate well with existing activity design and systems?

The collective baseline measures, and each control measure considered thereafter in the ALARP process, is assigned an intrinsic effectiveness rating based on these characteristics. This rating serves as the quantified expression of its environmental benefit.

5.1.2 Assigning Sacrifice in ALARP Assessments

In the context of this ALARP process, sacrifice is the cumulative burden incurred by adopting the baseline measures and each control measure. Sacrifice is considered in the broadest sense, encompassing not only direct financial costs but also time requirements and broader operational or environmental complications collectively understood as money, time, and trouble.

Sacrifice = Money + Time + Trouble

Each component of sacrifice should be considered and described in qualitative terms in the discussions, as relevant, to underpin the semi-quantitative output required for the assessment.

Money

This refers to any direct or indirect financial outlay associated with the adoption of the measure, including:

- Equipment purchases or hire
- Additional staffing or consultancy costs
- Fuel, maintenance, or other operational expenses
- Cost of training, onboarding, or coordination
- Data processing, integration, or analysis costs

Time

This refers to any extension to the activity duration or any increase in lead time or delay caused by the adoption of a measure. Time-based impacts often carry a compounding effect, as they may extend environmental exposure periods, inflate operational costs, or affect coordination with third parties. Examples include:

- Longer vessel deployment periods
- Delay in acquisition
- Administrative time required to gain approvals or permits
- Increased mobilisation or demobilisation time

Trouble

This refers to all other burdens or trade-offs that may not be directly financial or time-based but still influence the overall cost of adoption. “Trouble” is especially relevant where a control measure increases other environmental impacts or risks, creates practical implementation issues, or introduces uncertainty that itself becomes a risk. This includes:

- Cross-pathway environmental trade-offs (e.g. increased emissions from an additional whale spotter vessel that provides increase protections for whales)
- Operational complexity or safety risks (e.g. deploying gear in tight conditions)
- Regulatory, stakeholder, or reputational risks
- Technical reliability and compatibility issues (e.g. new technologies introducing uncertainty)
- Burden of coordination, logistics, or collaboration

5.2 Step-by-Step Process

1. Identify the environmental impact / risk pathway for consideration.
2. To establish the baseline sacrifice:
    a. Start by identifying (and consider grouping) the:
        i. mandatory mitigation measures already required (by law, regulation, or standards).
        ii. relevant activity limitations.
        iii. management system elements that will contribute to the management of impacts and risks.
    b. Record the results in tabular form using the template at Table F2-3 adding rows for each mitigation measure (or group) that form the baseline. Explain why this measure has been included and what makes it effective. The baseline table should now be completed.
    c. Consider the incremental sacrifice (cost, time, effort) required to comply with all baseline measures in a dollar value where possible and note for later use. This value is not included. Do not record this value in the assessment.
3. Set the baseline impact / risk level using the conclusion of the relevant impact or risk assessment, enter the value in Table F2-4 at both locations with an 'X'.
4. Determine the first measure to be assessed and:
    a. Assign intrinsic effectiveness percentage and enter the value into Table F2-4 at 'Y' and justify this scoring in Table F2-4 (See Section 5.1.1 for instruction).
    b. Consider the incremental sacrifice (cost, time, effort) in a dollar value where possible and using the baseline sacrifice value convert to a ratio for publication. Enter that the ratio value in Table F2-4 at 'Z' and justify this scoring in Table F2-4. Create a running total in the cumulative sacrifice column.
5. Once the estimated intrinsic effectiveness percentage has been assigned calculate the marginal reduction (MR) and residual impact / risk after adoption (Res_{After}) using the formulas:

$$MR = Res_{Previous} \times IE\ (\%)$$

$$Res_{After} = Res_{Previous} - MR$$

Where:

MR = Marginal Reduction (of an impact or risk).

Res (Previous) = Residual impact or risk after the adoption of the previous control measures.

IE = Intrinsic effectiveness of a control measure or group of control measures in the context of the previously considered baseline and additional control measures.

Res (After) = Residual impact or risk after the adoption of the control measure under consideration.

The first measure row should now be completed and the Res $_{After}$ value can be carried down a row to become the Res $_{Previous}$ value for the next control measures to be assessed.

6. Identify the most effective control measure, or group of control measures and in the next row of the table:

    a. Estimate its additional benefit by assigning a percent to its intrinsic effectiveness (IE) in the context of the residual impact / risk of previous control measures (Res $_{Previous}$).

    b. Record the result in Table F2-4 and separately document why the percent of effectiveness has been assigned by discussing the control measures functionality, availability, reliability, survivability, independence, and/or compatibility.

    Note: The next most effective measure doesn't necessarily mean the one with the next highest intrinsic effectiveness. It is preferred that professional judgement is used to attempt to fill gaps in impact / risk management. This may or may not be the control measure attributed with the highest percentage intrinsic effectiveness.

7. Estimate the incremental additional sacrifice (money, time, or trouble) on a monetary basis that it would take to adopt the measure and record the result in the table. Enter the cumulative sacrifice by calculating the running total as the sum of all sacrifices for previously considered and adopted control measures.

8. Keep adding rows to the table, detailing the next most effective control measure, or group of control measures, and assigning its intrinsic effectiveness and incremental sacrifice as done previously. Keep considering additional control measures until the Res $_{Previous}$ is less than a value of 0.5.[1]

9. Plot the data from Table F2-4 (Res Previous and Cumulative Sacrifice) graphically including an order two polynomial trendline. Find the point of inflection on the trendline which is the point at which there are diminishing returns (i.e. there is no amount of sacrifice that is going to reduce the risk or impact further). This is typically the point where the trendline is nearly horizontal. Then, draw in the vertical ALARP threshold line using the point of inflection as the coordinates. Control measures on the left of the ALARP threshold line should be adopted and control measures on or beyond the vertical line can be justifiably rejected.

10. Plot the same data on another graph showing the cumulative sacrifice (line) and reduction achieved (bar) and check that the measure adopted closest to the point of inflection shows that the cumulative sacrifice is clearly grossly disproportionate to the benefits gained. This would be shown by a large and comparatively significant gap between the cumulative sacrifice and the resultant benefit reduction show for the control measure being considered.

[1] This value is justified later.

Table F2-3 - Example Baseline Measures Table

Baseline Measures	Inclusion Rationale	Intrinsic Effectiveness
Measure 1 Title	*Explain why this measure is included, how it managed the impact/risk, and reference its origins.*	*Explain why this measure is effective considering the instructions in Section 5.1.1*
Measure 2 Title		
Measure 3 Title		
Measure 4 Title		

Table F2-4 – Example Step-by-step ALARP Assessment Table

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
1	Baseline Measures	See previous tables.	-	-	-	'X'	1.0	1.0	See Table F2-2	
2	First measure		'X'	'Y'			'Z'			
3	Second measure									

5.3 Endpoint of the ALARP Assessment

The ALARP assessment reaches its endpoint when it can be demonstrated that any further control measures would require a sacrifice that is grossly disproportionate to the environmental benefit (i.e. risk or impact reduction) that could be achieved. This does not mean that all risk or impact has been eliminated, nor that every conceivable control has been considered. Rather, ALARP requires that all reasonably practicable measures have been identified, assessed in context, and either adopted or justifiably rejected.

Figure F2-1 and Figure F2-2 illustrate this principle. As control measures are progressively adopted, residual risk or impact is reduced and cumulative sacrifice increases. Over time, the environmental benefit gained from each new measure typically diminishes, while the associated sacrifice rises. The point at which this trade-off becomes grossly disproportionate marks the practical and conceptual endpoint of the ALARP process.

5.3.1 Justification for Residual Impact/Risk Threshold of 0.5

A residual impact or risk value of 0.5 has been used as the cut-off point for further assessment in this ALARP process. This value reflects a logical and proportionate threshold based on two key principles:

- A threshold of 0.5 ensures that even relatively low residual values (e.g. 1) must still demonstrate a reduction by at least half before being considered ALARP. For higher residuals, the process requires consideration of multiple control measures to achieve this low level, reinforcing a structured and progressive reduction. This reinforces that greater effort is put towards higher residual levels of impact or risk.
- If the residual level has been reduced to less than 0.5, especially from a higher starting point, this shows a significant and measurable reduction has occurred. Coupling this with the use of a polynomial trendline to identify the point of diminishing returns provides a practical and evidence-based end to the assessment — once the line flattens and residuals are <0.5, enough has been done to reduce the risk or impact to a level that is demonstrably as low as reasonably practicable.

This approach supports transparent decision-making while ensuring the focus remains on material reductions with genuine environmental or safety benefit.

5.3.2 Cost of Further Analysis Endpoint

In accordance with this approach, it is not necessary to assess every potential variation or emerging technology to demonstrate that ALARP has been achieved. Control measures must be assessed relative to the current baseline, which already includes legally mandated and previously adopted measures. The remaining risk or impact must then be weighed against the additional sacrifice required to reduce it further.

A control measure may be considered not reasonably practicable, and therefore rejected for any of the following reasons:

- **Marginal Reduction**: The residual impact or risk is already low, and the additional reduction achievable is minor, offering limited environmental benefit.
- **High Cost**: The measure imposes a high financial or operational burden for only a slight improvement in impact or risk reduction, resulting in diminishing returns.
- **Limited Effectiveness**: The control is unlikely to significantly reduce the relevant risk or impact, and the cost or disruption cannot be justified.

- **Better Alternatives Exist**: More effective or less costly options are available to achieve a similar or greater outcome.
- **Unacceptable Trade-offs**: The measure would interfere with other critical business, safety, or environmental functions in a way that outweighs its benefits.
- **Risk Transfer Without Net Benefit**: The measure shifts the risk or impact without reducing its overall significance, undermining the value of the sacrifice.

These criteria support a structured and transparent conclusion that ALARP has been reached. Justification for the rejection of any control must be documented and linked to the existing risk profile, anticipated effectiveness of the measure, and the scale and nature of the associated sacrifice.

This progressive, contextual method ensures that the ALARP standard is met without turning the assessment into an open-ended or speculative exercise. It aligns with both the regulatory intent of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023* and the practical realities of managing environmental impacts and risks in offshore petroleum activities.

5.4 Process Outputs

5.4.1 Tables

Each ALARP assessment includes structured tabular outputs that provide transparency and traceability in the stepwise evaluation of control measures. These tables complement the graphical outputs and discussion points by clearly presenting the rationale, sequence, and comparative value of each control measure assessed. Two key tables are included in each assessment:

1. **Baseline Measures Table**

Table F2-3 is an example table that will be reproduced for each ALARP assessment. This table documents the measures included in the baseline for each specific impact or risk. It identifies the activity limitations, and mandatory measures that are already in place due to regulatory requirements, company standards, or previous design decisions. The purpose of this table is to:

- Establish a clear and consistent starting point for the ALARP assessment.
- Demonstrate that legally required measures and activity limitations have already been applied.
- Show that the residual impact/risk level being assessed is not the unmitigated or inherent level, but rather the level remaining after baseline measures are adopted.

Each entry in the table includes the name of the measure (or group of measures), the reason for its inclusion (e.g. legislative obligation, internal policy), and its intrinsic effectiveness on reducing impact or risk. This ensures clarity in how the baseline was derived and provides a defensible foundation for evaluating additional control measures.

2. Step-by-step ALARP Assessment Table

Table F2-5 is an example table that will be reproduced for each ALARP assessment where each column has the following meanings:

Step	Sequence of control application (starting from baseline)
Short Title	Name of the measure (or group of measures) under consideration
Details of Control Measures	Summary of the measure (or group of measures) under consideration
Res $_{\text{Previous}}$	Impact or risk level before applying this control measure.
Intrinsic Effectiveness (IE):	Estimated % reduction if applied to the baseline.
Marginal Reduction (MR)	Actual reduction achieved from the baseline.
Res $_{\text{After}}$	New impact or risk level after the control measure is applied.
Incremental Sacrifice	Cost or burden added by this control shown as a ratio of cost from the baseline.
Cumulative Sacrifice	Total sacrifice including previous controls shown as a ratio of cost from the baseline
Intrinsic Effectiveness	As described in Section 5.4.3.
Sacrifice Quantum	As described in Section 5.4.3

This table presents the core of the ALARP assessment and captures the progressive evaluation of additional, alternative, or improved control measures. It lists each control measure (or group of control measures) considered and shows:

- The incremental reduction in impact or risk it would achieve relative to the baseline.
- The sacrifice required to implement it, including financial, time, operational, and opportunity costs.

This stepwise format allows the reader to follow the logic of the assessment in a transparent, structured manner. It also enables comparisons across measures and supports the conclusion of whether the final residual level of risk or impact has been reduced to ALARP.

Together, these tables demonstrate that each measure has been considered in context, with due regard to its contribution to impact/risk reduction, its relative sacrifice, and the existing baseline from which it is assessed.

Table F2-5 - Example ALARP Assessment Table (Grey text is instructional and/or should be replaced by the assessor)

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
1	Baseline Measures	See baseline table and discussion.	-	-	-	*4*	1	1	See Baseline Measures Table	*The sacrifice quantum for baseline measures is always 1. Any justification or context that is useful for later comparisons can be included here.*
2	*Next Most Effective Measure*	*Detail of the control measures or group of control measures.*	*4*	*90%*	*3.6*	*0.4*	*0.6*	*1.6*	*Describe and justify the scoring (%) assigned for intrinsic effectiveness highlighting any gaps or uncertainties and following the instructions in Section 5.1.1*	*Describe and justify the scoring for the incremental sacrifice assigned highlighting any assumptions and following the instructions in Section 5.1.2.*
3	*Next Most Effective Measure*	*Detail of the control measures or group of control measures.*	*0.4*	*50%*	*0.2*	*0.2*	*0.2*	*1.8*		
4	*Next Most Effective Measure*	*Detail of the control measures or group of control measures.*	*0.2*	*75%*	*0.15*	*0.05*	*0.8*	*2.6*		

5.4.2 Graphs

Two graphs are used to show the results of each ALARP assessment. They are described below.

1. **Residual Impact/Risk vs Cumulative Sacrifice (Scatter Plot)**

In concept, these graphs are about establishing a rate of return on environmental benefit. This graph shows the progressive adoption of control measures, beyond baseline measures, that reduce impact/risk plotted against the cumulative sacrifice it takes to adopt each subsequent control measure. Once plotted, an order two polynomial line-of-best-fit can be used to show how residual impact/risk decreases as more sacrifice is invested. This helps to identify the point of inflection where additional effort no longer results in proportionate benefit. Once the point of inflection is found, an ALARP threshold can be plotted as a vertical line at that point of inflection. These graphs focus on the efficacy of each control measure as it is confirmed as adopted and helps with the decision such as: *Have you done enough?*

A second-order polynomial trendline is used in preference to linear or exponential trendlines because it best reflects the real-world behaviour of cumulative environmental benefit relative to incremental investment. In the context of ALARP assessments, control measures tend to show non-linear returns: initial actions often yield large reductions in impact or risk with relatively low sacrifice, while later measures offer progressively smaller reductions for greater sacrifice. This creates a natural curve rather than a straight-line relationship.

A linear trendline assumes a constant rate of reduction per unit of sacrifice, which oversimplifies the decision-making process and can misrepresent when grossly disproportionate sacrifice is reached. An exponential trendline, on the other hand, implies a continuously accelerating or decelerating trend, which does not align with the plateau effect typically observed once the most effective measures have been adopted.

The second-order polynomial (a parabolic curve) allows for both the initial steep reduction and the subsequent flattening of the curve, making it ideal for identifying the point of diminishing returns shown by the vertical line originating at the point of inflection of the curve. This is a useful visual cue for determining when ALARP has been achieved. This makes it a more appropriate and defensible choice for evaluating the proportionality of environmental benefit to sacrifice across a range of control measures.

2. **Combined ALARP Chart**

In concept, these graphs are about validating the point of inflection (from the previous scatter plot graph) as a point at which the costs of adopting further measures are grossly disproportionate (not just disproportionate) and providing a visual aid to communicate the stepwise ALARP process. The combined ALARP charts combine a bar chart showing residual impact/risk in discrete steps (i.e. how much each control measure reduces impact/risk) based on its effectiveness and a line chart showing cumulative sacrifice. The visual effect contrasts the size of the benefit each control measure gives (bar height drop) with the amount of sacrifice required to achieve it. These graphs focus on the direct effect of each control measure and highlight the cost-benefit trend. It makes it easy to point out which control measures had the most benefit versus cost and confirms that the point of inflection in the first graph is at a grossly disproportionate level.

5.4.3 Discussions

Each ALARP assessment includes three structured discussion components that accompany the tables and graphs. These discussions are essential to documenting how values were assigned, providing justification for key assumptions, and supporting the interpretation of outputs.

Baseline 'Inclusion Rationale'

A column in Table F2-3 includes a discussion that should explain how the baseline residual impact or risk and baseline sacrifice were established. It provides the context for the first row of the assessment table and ensures transparency in defining the starting point for all subsequent evaluation. The baseline cost established also sets the relevant baseline sacrifice ratio for that assessment.

Intrinsic Effectiveness Discussion

This discussion, detailed in each impact and risk ALARP Assessment table, justifies the percent effectiveness assigned to each control measure (or group of measures) in the context of the residual impact or risk remaining at that point in the assessment. It is linked directly to Step 4b of the process and supports the calculation of marginal reduction and residual values.

For each measure considered, the discussion should address:

- How the measure functions to reduce the impact or risk (i.e. mechanism of effect),
- One or more of its intrinsic characteristics that influence effectiveness, such as:
  - Functionality (how well it performs).
  - Availability (how accessible or deployable it is).
  - Reliability (how consistently it performs).
  - Survivability (its robustness under expected conditions).
  - Independence (whether it operates effectively without relying on other measures).
  - Compatibility (whether it works well with previously adopted measures or the baseline activity design).

This qualitative explanation supports the numerical effectiveness percentage and helps show that values were assigned with technical judgement and context-specific reasoning.

Sacrifice Quantum Discussion

This discussion, detailed in each impact and risk ALARP Assessment table, justifies the estimated additional sacrifice associated with adopting each control measure. It supports the value entered in the process and ultimately feeds into the cumulative sacrifice curve used in graphing and inflection point analysis.

The discussion will:

- Identify the nature of the sacrifice — whether it relates to financial cost, additional time, increased effort, or other opportunity costs (e.g. lost data, reduced survey efficiency).
- Where a dollar estimate is used, explain what is included in the estimate and whether it represents one-off or ongoing costs and be converted to a ratio.
- Discuss any non-monetary trade-offs, such as:
  - Increased exposure to different environmental risks.
  - Reduced safety margins.
  - Disruption to core activity objectives.

This discussion ensures that the sacrifice values are understood not just numerically, but in terms of real-world implications and helps the reader evaluate whether a control measure's cost is reasonably proportionate to the benefit achieved.

Alternative, Additional, or Improved Control Measures Discussion

As part of each ALARP assessment, a structured and systematic process is applied to ensure that all reasonably practicable control measures are identified and evaluated. This includes consideration of additional, alternative, or improved measures before, during, and after the stepwise assessment of control measures. The intent is to ensure that the assessment demonstrates that current control measures adopted are the most effective in the circumstance and that no viable opportunities for further reduction have been overlooked.

Before beginning the stepwise ALARP assessment, a feasibility scan is undertaken to identify the full range of potentially applicable control measures for the impact or risk pathway under consideration. This includes measures that are:

- Additional to those already included in the baseline.
- Alternative to proposed measures that may offer a different approach to risk reduction.
- Improved versions of existing measures that could increase effectiveness or efficiency.

This feasibility search is not limited to measures previously implemented by the titleholder. It also includes emerging technologies, peer-reviewed recommendations, relevant person suggestions, and relevant guidance or regulatory instruments. Importantly, identification at this stage does not imply that the measure must be implemented or fully assessed, but rather that it has been acknowledged and will be considered through the assessment process.

Throughout the step-by-step ALARP assessment, each control measure or group of measures is considered in order of effectiveness. At each step, the opportunity to substitute in additional, alternative, or improved control measures is explicitly evaluated before proceeding to the next step. This may result in refinement of the control measure selection, modification of grouping, or comparative evaluation to determine whether the current selection represents the best practicable approach at that stage. This ongoing consideration ensures that the process is adaptive and incorporates the best available information as the assessment progresses.

After the primary assessment has been completed and the point of diminishing returns has been reached, the final step is to review any remaining additional, alternative, or improved control measures not already addressed. These are evaluated to determine whether their adoption would result in any material benefit to impact or risk reduction, or whether the cost and effort associated with their implementation would be clearly grossly disproportionate.

5.5 Ensuring Integrity in ALARP Assessments

ALARP assessments rely on structured judgment, evidence-based reasoning, and transparency. However, the method is also inherently susceptible to manipulation if not undertaken with discipline and integrity. Two common avenues of manipulation include:

- **Overestimating Intrinsic Effectiveness**: Assigning a control measure a higher-than-warranted effectiveness score can artificially reduce the residual impact/risk early in the process. This can result in fewer subsequent control measures being assessed or adopted and may falsely suggest that risks or impacts have been reduced to ALARP levels.

- **Overestimating Sacrifice**: Similarly, inflating the estimated cost, time, or operational burden (i.e. sacrifice) of adopting a control measure can lead to the premature rejection of otherwise reasonable measures by classifying them as grossly disproportionate.

To avoid these pitfalls, the assessment should be guided by a disciplined and conservative approach:

- **Underestimate Intrinsic Effectiveness Where Justifiable**: Wherever a level of uncertainty exists in the functional performance of a control measure, it is appropriate to conservatively assign a slightly lower effectiveness score. This helps ensure that the assessment does not overstate environmental benefit and that opportunities for further improvement are not prematurely excluded.
- **Strengthen Sacrifice Justifications**: Sacrifice estimates should be clearly documented with transparent assumptions, references to comparable costs or operational experience, and a clear distinction between incremental and baseline effort. Conservative framing should be avoided unless supported by evidence, and vague estimates should not be used to dismiss measures without adequate rationale.

Those completing and reviewing ALARP assessments should be alert to signs of these manipulations. An overly rapid drop in residual impact/risk, repeated rejection of measures based on loosely justified sacrifice, or a pattern of assigning very high effectiveness scores with minimal explanation may indicate that the assessment is not being applied rigorously.

Maintaining a disciplined and transparent approach ensures that ALARP decisions genuinely reflect environmental performance that is ALARP, rather than merely defensible on paper. Annex 3 - Ensuring Integrity in ALARP Assessments provides the guidance that CGG gave its ALARP assessors and ALARP reviewers to ensure the integrity of the process.

6 ALARP Assessment – Impacts

Following the completion of the Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4), and the subsequent full impact assessments (Appendices E1-9), this ALARP assessment covers the following impact pathways:

- Change to benthic habitat from anchoring.
- Change to local air quality, climate, or ecosystem dynamics from atmospheric emissions.
- Change to water quality, fauna behaviour, or physical condition from planned discharges.
- Change to the functions, interests, and activities from physical presence.
- Change in fauna behaviour, hearing capacity, or physical condition from underwater sound.
- Change in fauna behaviour from artificial light

The following sections of this document assess each impact pathway in turn.

6.1 Benthic Disturbance

This impact was assessed in the PEIRA. Initially, the following measure was adopted to remove this cause effect pathway: no anchoring permitted within the activity planning area. However, due to the possible deployment of anchored acoustic monitoring buoys as part of the Fauna Management Plan, this pathway re-emerged following updates to regulatory guidelines.

The nature and scale of this impact is so small and necessary for protection of an important species that an abbreviated demonstration is applied in this case.

The possible deployment of up to three anchored acoustic monitoring buoys is expected to result in localised, minor, and reversible disturbance to the seabed, with each anchor and associated gear occupying approximately 2 square metres. This scale and type of interaction is comparable to routine demersal fishing practices (e.g. lobster potting) already occurring in the area and does not involve dragging, excavation, or long-term placement.

Sensitive benthic habitats that would be unable to tolerate this extremely small disturbance are not expected to occur and routinely experience these impacts from fishing activities and vessel anchoring prolific in the areas the buoys are expected to be located.

The only control measure reasonable to adopt is a procedure to select deployment locations such that mapped features of ecological significance are avoided.

Given the very limited footprint, temporary nature of the interaction, the tolerance of the benthic habitat to these small-scale effects, and the benefits gained for marine fauna protection, no further control measures are reasonably practicable to reduce the environmental impact of anchoring. Alternative buoy designs (e.g. free-floating or mid-water) are not viable due to the need for positional stability in offshore conditions and would introduce operational reliability risks without meaningfully reducing environmental impacts. On this basis, the impact of benthic disturbance is ALARP.

6.2 Atmospheric Emissions

6.2.1 Baseline

Table F2-6 specifies the activity limitations, legislative requirements, and components of the implementation strategy elements have been considered in the establishment of a baseline impact level and baseline quantum of sacrifice.

Table F2-6 - Baseline Measures - Atmospheric emissions

Baseline Measures	Inclusion Rationale	Intrinsic Effectiveness
Exclusive Use of Marine Diesel Oil (MDO)	MDO is a low-sulphur fuel (<0.5% sulphur by mass) that complies with MARPOL Annex VI and Australian law. It avoids the need for exhaust gas cleaning systems and provides cleaner combustion than residual fuels.	High. This measure eliminates most sulphur oxide emissions and significantly reduces particulate and other noxious emissions. It is highly functional and reliable.
MDO-specific bunkering, fuel sampling, and quality verification	Ensures that only compliant fuel is used throughout the operation, minimising the risk of non-compliance and environmental breaches.	High. Provides independent verification of compliance and ensures emission reductions are consistently achieved across the duration of the survey.
Maintenance of compliant engines and emission control systems	Required to support the use of MDO and maintain combustion efficiency and emissions performance.	High. Enables consistent emissions reduction through proper engine function and compatibility with low-sulphur fuel.
Emissions recordkeeping and compliance verification	Administrative burden required to demonstrate compliance with MARPOL Annex VI. Forms part of legal obligations and ensures transparency and auditability.	Moderate. While indirect, this measure supports ongoing compliance and enhances the effectiveness of other baseline measures.

The outcome of the impact assessment (conducted in the PEIRA) for atmospheric emissions was that the effect was ranked as negligible (1) and the uncertainty ranked as low (2). Therefore, the residual impact after the application of baseline measures is 3.

The quantum of sacrifice for complying with the baseline has been calculated and includes the following:

- The commitment to use Marine Diesel Oil (MDO) as the sole fuel type throughout the survey, which meets the requirements of Regulation 14 of MARPOL Annex VI and the Protection of the Sea (Prevention of Pollution from Ships) Act 1983. This fuel contains no more than 0.5% sulphur by mass, in accordance with the International Maritime Organization's global sulphur cap and eliminates the need for exhaust gas cleaning systems. While MDO is significantly more expensive than higher-sulphur residual fuels, its exclusive use represents a necessary and unavoidable cost to comply with Australian law and international obligations.
- Additional costs included in the baseline sacrifice include MDO-specific bunkering, fuel sampling and quality verification, and the maintenance of compliant engine systems and emission controls. These measures are mandatory for lawful operation in Australian waters and form part of the base level of sacrifice.
- The administrative burden associated with emissions recordkeeping and compliance verification under MARPOL Annex VI is also included.

These combined costs and efforts form the cumulative baseline sacrifice, which is assigned a unit value of 1.0 in the ALARP assessment. This allows subsequent discretionary control measures to be evaluated proportionally.

6.2.2 Assessment

Table F2-7 shows the step-by-step process followed for the ALARP assessment of atmospheric emissions. The reasons to support assigning percentage values for the intrinsic effectiveness (or environmental benefit) and the incremental sacrifice are provided in Table F2-7.

6.2.3 Consideration of Alternative, Additional or Improved Control Measures

In accordance with the ALARP assessment process, CGG has considered a range of additional, alternative, and improved control measures that might reduce atmospheric emissions beyond those already adopted in the baseline. While these measures were technically feasible in some instances, each was assessed in the context of the small residual impact remaining after implementation of the legally mandated baseline measures. As such, all were found to involve grossly disproportionate sacrifice relative to their marginal environmental benefit and were therefore rejected.

Advanced Emission Reduction Technologies

This option included the potential use of exhaust gas cleaning systems (commonly known as scrubbers), selective catalytic reduction (SCR) systems, and the retrofit of more environmentally advanced engines. These systems are proven in the maritime industry and can reduce emissions effectively when used with heavy fuel oils. However, in the context of this activity—where Marine Diesel Oil (MDO) is already in use and compliant with the 0.5% sulphur limit—the additional emissions reductions offered by such technologies are negligible. Retrofitting costs, downtime, integration risks, and increased operational complexity were assessed, and the measure sacrifice was estimated at 100.0, far exceeding any potential incremental benefit.

Alternative Fuels

The use of alternative fuels such as liquefied natural gas (LNG) or hydrogen was also considered as a substitution for MDO. These fuels can deliver cleaner combustion and reduced atmospheric emissions, especially when replacing residual or bunker fuels. However, the environmental benefits compared to already low-sulphur MDO are marginal in this context. Further, the technical and logistical challenges of adapting a seismic survey vessel to run on LNG or hydrogen—including lack of supply infrastructure, vessel compatibility, and regulatory hurdles—render this option technically unfeasible at present. The measure sacrifice was estimated at 200.0, due to the need for substantial capital investment and operational redesign.

These evaluations support the conclusion that no further practical control measures exist that could meaningfully reduce atmospheric emissions from the Regia MSS without incurring clearly excessive cost, effort, or operational compromise. The residual impact has therefore been reduced to ALARP.

Table F2-7 - Step-by-step ALARP Assessment - Atmospheric Emissions

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
1	Baseline Measures	See baseline table and discussion.	-	-	-	3	1	**1**	The baseline measures collectively provide a comprehensive and enforceable framework for minimising emissions. The use of low-sulphur Marine Diesel Oil (MDO) ensures compliance with MARPOL Annex VI and significantly reduces sulphur oxide and particulate matter emissions. Mandatory bunkering controls, fuel sampling, and maintenance of compliant engine systems ensure these reductions are reliably achieved. Recordkeeping and verification measures add an administrative compliance layer, ensuring transparency and auditability. These baseline measures are highly effective and have little to no dependency on other systems. Their effectiveness is primarily driven by their legal status.	The baseline sacrifice includes the higher cost of MDO relative to residual fuel oils, expenses associated with fuel sampling and quality verification, and the ongoing maintenance of compliant engine systems. These costs are substantial and unavoidable, as they represent legal minimum standards for operation in Australian waters. The administrative burden associated with emissions recordkeeping under MARPOL Annex VI also adds time and resource requirements. These baseline costs are assigned a unit value of 1.0 and reflect a significant proportion of total emissions mitigation expenditure.
2	CGG Marine Assurance System	Company-wise system that ensures all emissions-related compliance processes and vessel audits are completed.	3	90%	2.7	0.3	0.1	**1.1**	This system supports emissions management by ensuring that environmental requirements are embedded within vessel selection, auditing, and operational readiness procedures. It includes pre-survey OVID-style inspections, vessel vetting, crew briefings, and assurance reviews. Its functionality is high because it enhances implementation of already effective control measures. It is	The Marine Assurance System is part of CGG's existing operational framework, meaning much of its structure is already established. While not insignificant, the incremental cost of applying it to this specific emissions context is relatively low. It involves internal auditing and oversight rather than the deployment of new systems or equipment. However, the measure requires experienced personnel and

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
									reliable and compatible with all baseline measures, ensuring that procedural and technical standards are upheld consistently across the operation. However, the marginal benefit is small due to the already low residual impact following baseline compliance.	planning effort. Given the minimal remaining impact to be reduced (Res = 1.0), even this relatively small additional cost is proportionally significant—but it remains reasonable. This justifies its adoption.
3	Energy Efficiency Operating Procedures	Procedures to reduce emissions through fuel-efficient operations (e.g., speed optimisation, load balancing).	0.3	30%	0.09	0.21	1.5	**2.6**	Energy Efficiency Operating Procedures (EEOPs) are rated at 30% effectiveness due to their capacity to reduce emissions further by lowering fuel consumption. They improve operational efficiency during transits, standby, and low-activity phases. Their performance is functional, available, and highly compatible with existing baseline measures.	The cost of implementing EEOPs is minimal however a seismic survey relies on keeping a true heading at a given speed to improve data quality. Therefore, implementing these procedures for the duration of the survey is of high cost and so is given a sacrifice score of 1.5.

6.2.4 Results

Figure F2-1 displays the progressive ALARP assessment for the impact pathway of atmospheric emissions, plotting impact reduction against cumulative sacrifice. Each point on the graph represents a control measure (or group of measures), beginning with baseline compliance and progressing through discretionary enhancements.

The baseline measures achieve most of the impact reduction and are plotted at a cumulative sacrifice of 1.00. These are considered essential for lawful operations and establish the starting point of the assessment.

The next control measure, CGG Marine Assurance System, adds oversight and enforcement capacity, resulting in a modest additional reduction in residual impact. Its low cost and functional compatibility with existing systems place it well before the ALARP threshold, indicating that it is a proportionate and reasonable measure.

A third measure, Energy Efficiency Operating Procedures (EEOPs), adds minimal cost and further reduces emissions by optimising vessel operations (e.g. speed adjustments and load balancing). However, due to the already low residual impact after baseline mitigation measures, and the high relative sacrifice, the environmental benefit of this control measure is beyond the ALARP threshold drawn at the point of diminishing returns and thus has not been adopted.

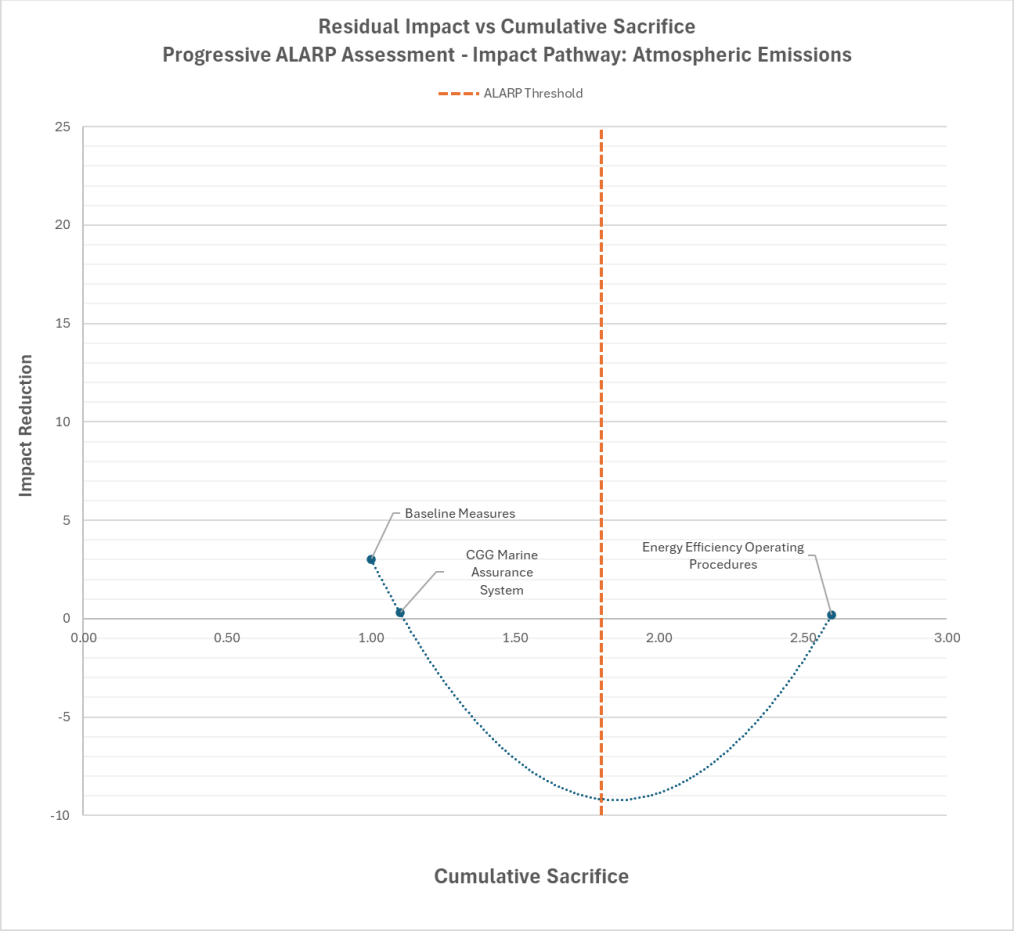

Figure F2-1 - Residual Impact vs Cumulative Sacrifice for Atmospheric Emissions. This chart illustrates the diminishing environmental benefit of additional control measures as cumulative sacrifice increases.

Figure F2-2 presents a combined view of the residual impact reduction (bar) and cumulative sacrifice (line) associated with each control measure or group adopted or considered in the ALARP assessment for atmospheric emissions.

The baseline measures, shown as the first and tallest bar, deliver the greatest reduction in atmospheric emissions, with a residual impact reduction value of 3.0. The CGG Marine Assurance System, reflected as the second bar, contributes a modest additional environmental benefit by ensuring that emissions-related protocols are consistently implemented and audited. The associated sacrifice is small relative to the benefit, resulting in a proportionate and adopted control measure.

The third measure considered aims to reduce emissions further by optimising vessel operation (e.g. speed adjustments and fuel usage efficiency). However, this measure provides only marginal benefit in the context of already low residual emissions and incurs a relatively high cumulative cost. As indicated by the steep rise in the cumulative sacrifice line with little corresponding impact reduction, EEOPs were rejected as grossly disproportionate.

This chart provides visual confirmation that most of the emissions reduction is achieved through baseline compliance, with only one additional discretionary measure adopted, and further options confirmed to show gross disproportion.

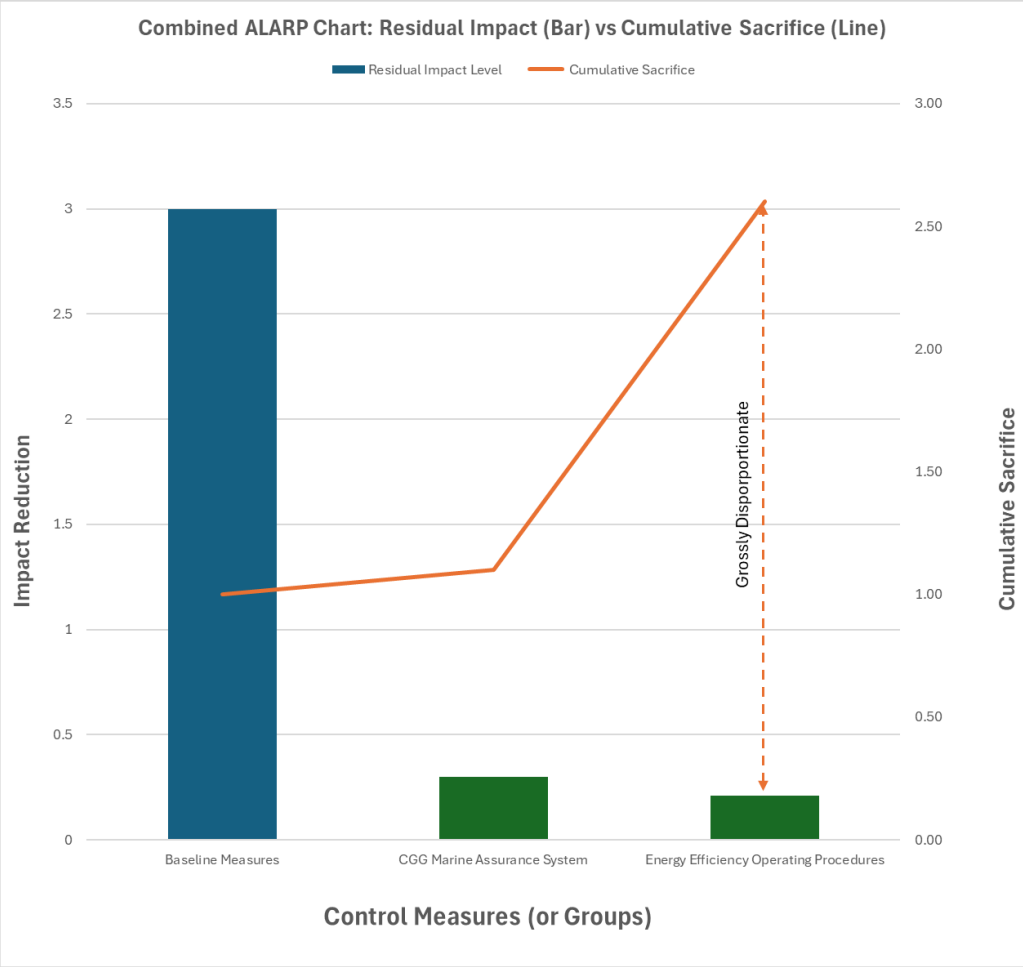

Figure F2-2 - Combined ALARP Chart: Residual Impact (Bar) vs Cumulative Sacrifice (Line) for Atmospheric Emissions. Most impact reduction is achieved through baseline measures.

6.3 Planned Discharges

6.3.1 Baseline

Table F2-8 specifies the activity limitations, legislative requirements, and components of the implementation strategy elements have been considered in the establishment of a baseline impact level and baseline quantum of sacrifice.

Table F2-8 - Baseline Measures – Planned Discharges

Baseline Measures	Inclusion Rationale	Intrinsic Effectiveness
CGG Marine Assurance System	Ensures compliance with all relevant maritime discharge standards including MARPOL and Marine Orders. Includes vessel vetting, pre-survey inspections, and operational assurance processes.	High. This measure ensures planned discharges such as bilge and wastewater are managed in accordance with international law. It is functional, reliable, and compatible with all vessel operations.

The outcome of the impact assessment (conducted in the PEIRA) for planned discharges was that the effect was ranked as negligible (1) and the uncertainty ranked as low (2). Therefore, the residual impact after application of baseline measures is 2.

The quantum of sacrifice for complying with the baseline has been calculated and includes:

- The implementation of the CGG Marine Assurance System, which includes vessel audits, discharge protocol reviews, and contractor pre-qualification requirements.
- Administrative oversight to ensure discharge equipment and handling procedures meet legal standards.
- Ongoing operational effort to maintain vessel discharge performance in compliance with regulatory expectations.

These measures are embedded into CGG's broader management system and are well established. Accordingly, the cumulative baseline sacrifice is assigned a value of 1.0 to enable proportional comparison with subsequent measures.

6.3.2 Assessment

Table F2-9 shows the step-by-step process followed for the ALARP assessment of planned discharges. The reasons to support assigning percentage values for the intrinsic effectiveness (or environmental benefit) and the incremental sacrifice are provided in Table F2-9.

Table F2-9 - Step-by-step ALARP Assessment – Planned Discharges

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
1	Baseline Measures	See baseline table and discussion.	-	-	-	2	1	**1**	The CGG Marine Assurance System ensures that all discharges are compliant with international maritime discharge standards (e.g. MARPOL). It is functional, reliable, and fully integrated with CGG's existing assurance processes, including vessel audits, inspections, and contractor pre-qualifications.	Assigned a value of 1.0 to reflect the normal cost of prequalification, discharge compliance verification, and vessel inspection protocols. These are routine and embedded company practices and not seen as discretionary expenditure.
2	Enhanced Wastewater Treatment	Advanced filtration or chemical treatment systems to reduce pollutants in discharged water.	2	5%	0.1	1.9	8	**9**	Enhanced wastewater treatment systems offer marginal additional reductions in trace pollutant concentrations but provide negligible environmental benefit due to already low-volume and regulated discharges. The systems are technically feasible but redundant in this context.	These systems are expensive to retrofit, especially for seismic support vessels, and involve increased maintenance costs. With little added environmental benefit, the sacrifice is grossly disproportionate and is assigned a value of 8.0.
3	Zero Discharge Systems	Full containment and post-survey disposal of wastewater and bilge.	1.9	5%	0.095	1.805	8	**17**	Zero discharge systems eliminate planned discharges by capturing and storing all waste fluids for later disposal. However, given the small volumes and low risk, the environmental benefit of this approach is negligible.	These systems are proven in other industries but require costly modifications and space onboard. The operational burden and poor cost-benefit ratio render the measure grossly disproportionate, with a sacrifice rating of 8.0.

6.3.3 Consideration of Alternative, Additional or Improved Control Measures

In accordance with the ALARP assessment process, CGG considered a range of additional, alternative, and improved control measures that might reduce the impact associated with planned discharges beyond those already achieved through the baseline. Given the low level of residual impact, all measures considered were determined to offer negligible benefit or involve grossly disproportionate sacrifice.

Recycling and Reuse

This option explored the potential for onboard water recycling systems to reduce the volume of planned discharges. However, due to the low discharge volumes associated with this activity and the complexities involved in installing and maintaining such systems aboard seismic vessels, the net benefit was found to be negligible. The measure sacrifice was estimated at 0.8. Additionally, human health and hygiene considerations added complexity and risk. The measure was rejected.

These evaluations support the conclusion that the residual impact from planned discharges during the Regia MSS has been reduced to ALARP.

6.3.4 Results

Figure F2-3 illustrates that the residual impact after applying the baseline measures is already low (assigned a value of 3). Two additional control measures were evaluated to determine whether further reductions could be justified. However, these measures provide only marginal environmental benefit while introducing substantial additional cost and complexity.

Despite their technical feasibility, the environmental benefit curve clearly flattens after the baseline, and both additional measures fall well beyond the ALARP threshold indicated on the graph. This shows that the cumulative sacrifice required to adopt these measures is grossly disproportionate to the limited improvement in environmental outcome they would deliver. As such, no further measures are warranted, and the impact of planned discharges is considered reduced to ALARP.

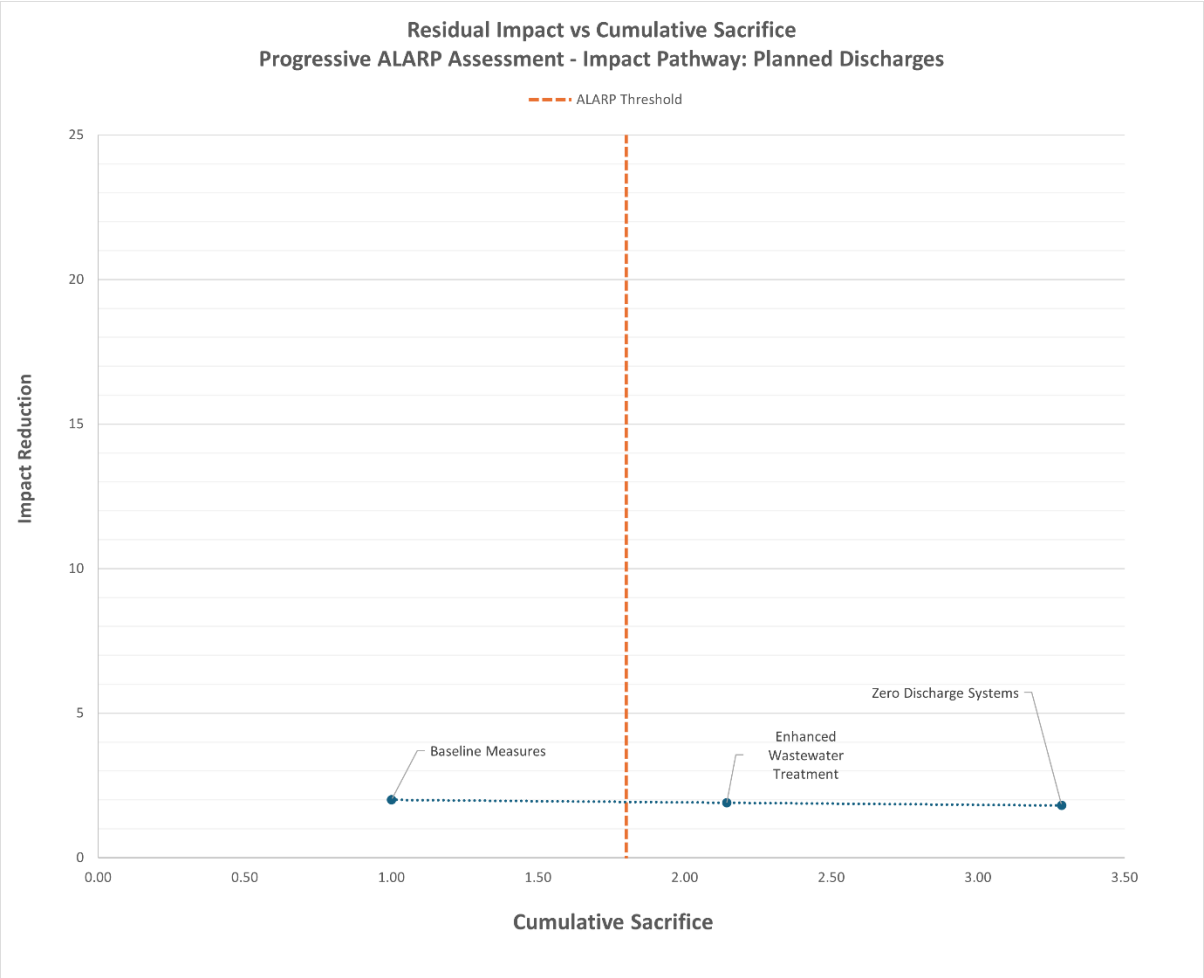

Figure F2-3 -Residual Impact vs Cumulative Sacrifice – Planned Discharges. The graph illustrates the progressive reduction in impact from planned discharges as control measures are considered, plotted against the cumulative sacrifice required to implement each measure.

Figure F2-4 is a combined ALARP chart which presents both the residual impact reduction (bars, left axis) and the cumulative sacrifice (line, right axis) for control measures addressing planned discharges. The baseline measures achieve a substantial reduction in impact with minimal sacrifice. The next two measures offer almost no additional reduction in impact (as they target discharges already reduced to minimal levels) but incur increasingly significant costs. The graph confirms that both control measures clearly exceed the point of gross disproportionality. This graph reinforces that, for this impact pathway, environmental outcomes are best managed through compliance with baseline maritime discharge standards and oversight mechanisms, without the need for more extreme and costly measures.

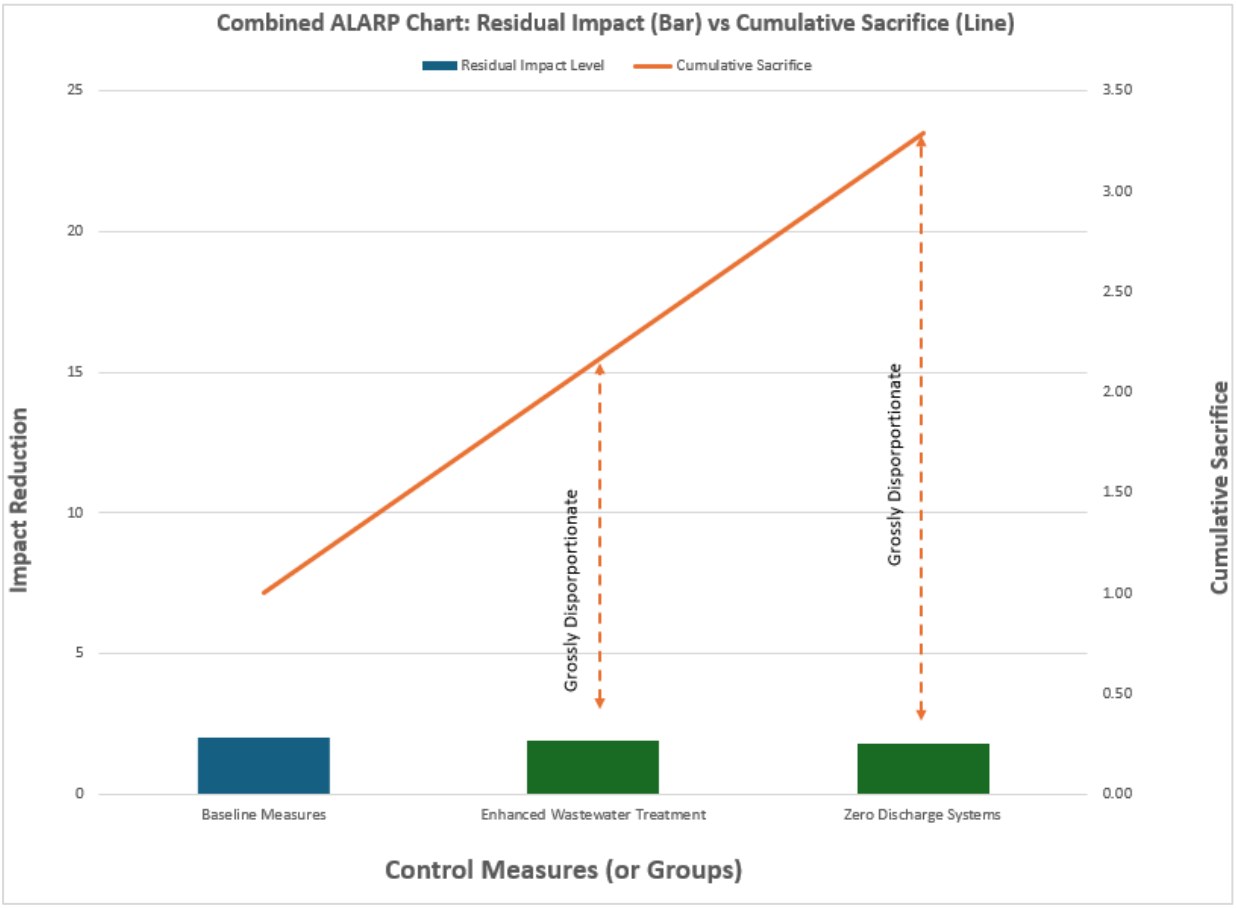

Figure F2-4 - Combined ALARP Chart – Planned Discharges. This chart overlays residual impact levels (bars) with cumulative sacrifice (line) across control measures.

6.4 Physical Presence

6.4.1 Baseline

Table F2-10 specifies the activity limitations, legislative requirements, and components of the implementation strategy that have been considered in the establishment of a baseline impact level and baseline quantum of sacrifice.

Table F2-10 - Baseline Measures - Physical Presence

Baseline Measures	Inclusion Rationale	Intrinsic Effectiveness
Activity limitations	The activity limitations derived through consultation have ensured that it is possible for the survey to be undertaken in a manner that minimises interference with other marine users.	These commitments provide certainty to other marine users and keep the impacts of physical presence to a minimum.
CGG Marine Assurance System	This measure includes the CGG Technical Operations Manager and the Quality Control Representative along with all the practices and processes required to safely undertaken the activity. It is considered by CGG as integral to undertaking any activity.	It is in CGG's interests to cooperate with other marine users and CGG's and its contractors are experienced in marine operations.
Support Vessel	The support vessel is another company minimum standard and works to remove obstructions and communicate with other marine users. It'll be partly responsible for implementing the On-Water Communications Plan.	This measure ensures the uncertainty levels associated with this impact are kept at low levels through communications on the water and forward planning with other marine users.
Consultation Management System	The CMS ensures that multiple forms of communication are used to compliment the on-water comms efforts. This measure provides forward operations look ahead notifications to those who requested it.	This measure increases the number of communications channels and provides forward notifications, adding to the effectiveness of the other measures.
Streamer Tail Buoys	This measure ensures that the ends of the submerged towed streamers can be detected.	This measure means that other marine users know which areas to avoid after the survey vessel has passed an area of interest and when it may be safe to return to the area.
Sail Line Plan	This document governs and coordinates the activity on the water and is agreed by CGG and all contracted parties prior to the commencement of the survey.	This document provides alignment between different vessels and contractors and therefore reduces impacts.

The outcome of the impact assessment for physical presence was that the effect was ranked as moderate (3) and the uncertainty ranked as low (2). Therefore, the residual impact after the application of baseline measures is six (6).

The quantum of sacrifice for complying with the baseline has been calculated and includes the following:

- While the baseline measures adopted to manage physical presence are demonstrably effective, their present-day cost to CGG is relatively low. The activity limitations (such as exclusion zones, depth constraints, and block restrictions) are the result of design

compromises made through consultation. These limitations do not represent a direct financial outlay, but they restrict survey coverage and reduce the area of interest available to CGG, effectively diminishing potential data yield and commercial flexibility. This trade-off forms part of the embedded sacrifice.

- The other systems and plans included in the baseline—such as the Marine Assurance System, Consultation Management System, Sail Line Plan, and associated on-water procedures—are the product of years of operational experience. While they no longer carry high implementation costs, their effectiveness today reflects historical investment in systems development, staff training, and lessons learned through previous campaigns. In this sense, the cost has already been borne and is embedded in CGG's standard practice, even though the marginal cost of applying them to the Regia MSS is little.

As a result, while these measures significantly reduce residual risk and contribute to the credibility of the baseline, only a small proportion of their historical cost is allocated to the baseline sacrifice in this ALARP assessment. The cumulative baseline sacrifice is therefore assigned a conservative unit value of 1.0, with the understanding that the cost-efficiency of these measures is high due to CGG's prior experience and integration of these processes into standard operations. These combined costs and efforts form the cumulative baseline sacrifice, which is assigned a unit value of one (1) in the ALARP assessment. This allows subsequent discretionary control measures to be evaluated proportionally.

6.4.2 Assessment

Table F2-11 shows the step-by-step process followed for the ALARP assessment of physical presence. The reasons to support assigning percentage values for the intrinsic effectiveness (or environmental benefit) and the incremental sacrifice are provided in Table F2-11.

Table F2-11 - Step-by-step ALARP Assessment – Physical Presence

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness Section 5.4.3 Disc	Sacrifice Quantum
1	Baseline Measures	See baseline table and discussion.	-	-	-	6	1	1	The baseline measures include a combination of activity limitations and procedural systems designed to minimise interference with other marine users. This includes spatial restrictions developed through consultation, CGG's Marine Assurance System, the use of a support vessel, tailored on-water communications protocols, and notification systems via the Consultation Management System. Collectively, these controls are highly effective due to their compatibility, availability, and the way they operate as integrated standard procedures.	The baseline sacrifice reflects the accumulated investment CGG has made in operational systems, consultation processes, and support infrastructure over time. While the marginal cost of their implementation on any single project is relatively low, they represent years of refinement and are treated here as the foundational cost of doing business responsibly.
2	Adjustment Protocol	This procedure ensures monetary adjustment for any unreasonable interference with other marine users.	6	90%	5.4	0.6	2	3	The Adjustment Protocol provides financial assurance to other marine users in the event of unreasonable interference. Its functionality, availability, and compatibility make it highly effective at mitigating conflict and maintaining good faith with stakeholders. By offering a transparent and pre-agreed resolution pathway, it significantly reduces the impact of spatial overlaps and conflict escalation.	This is primarily an administrative measure, requiring upfront development of a protocol and internal commitment to follow through. Its costs are minor relative to the overall activity budget and are more than offset by the value of resolving disputes efficiently without recourse to litigation or lengthy negotiation.
3	Fisheries Liaison Officer (FLO)	This is a dedicated competent person available in a local port able to be responsive to any immediate concerns, provide a focal point for queries, and support	0.6	90%	0.54	0.06	0.05	3.05	The FLO serves as a direct point of contact for fishers and other marine users. Its functionality, availability, and independence make it a highly responsive and effective control measure. The ability to provide real-time support, local presence, and continuity across interactions contributes to strong stakeholder confidence and early resolution of concerns.	The measure has a low financial footprint—generally requiring part-time engagement of a locally based professional—but delivers high returns in maintaining relations and avoiding unnecessary delays. Its incremental sacrifice is minimal and fully justified by its stakeholder-facing role.

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness Section 5.4.3 Disc	Sacrifice Quantum
		compensation claims.								
4	Petroleum SIMOPS Plan	Ensures coordination of activities with other titleholders in the region to minimise interference.	0.06	90%	0.054	0.006	0.025	3.10	The SIMOPS plan ensures operational coordination with other offshore petroleum activities, reducing the risk of conflict or safety issues. Its functionality, compatibility, and survivability in complex operating environments make it a trusted tool for managing shared marine spaces. It formalises what might otherwise be ad hoc communications, preventing misalignment or unintentional interference.	This control is primarily procedural, building on existing industry practice. It requires updates to project documentation and alignment with third-party operational schedules. The cost is minor and primarily borne during planning, making it a low-burden but high-value measure.
5	Sea Country Protection Plan	This measure facilitates the identification and management of new information, relevant to the activity, through collaboration of First Nations people who decide to be part of the program.	0.006	50%	0.003	0.003	0.10	3.2	The Sea Country Protection Plan provides a culturally appropriate pathway for Traditional Owner groups to engage with CGG regarding marine access or presence. It reflects availability, independence, and compatibility with other stakeholder management processes. While not a control measure, it meaningfully reduces potential social impact.	This program is modest in cost, generally involving coordination with internal or contracted community engagement professionals. It strengthens CGG's social licence to operate and ensures marine access issues are managed respectfully and constructively.

6.4.3 Consideration of Alternative, Additional or Improved Control Measures

Given the inherent nature of marine seismic surveys, the physical presence of vessels and equipment in the marine environment cannot be eliminated. As such, a comprehensive suite of control measures has already been adopted to minimise the impact of this unavoidable presence on other marine users. These include spatial planning commitments, dedicated consultation systems, real-time communications, and commercial resolution mechanisms. The adopted measures are well-established, operationally proven, and tailored to the survey context, providing high levels of intrinsic effectiveness with relatively low sacrifice. Because physical presence is not a variable that can be managed away — only managed better — there are no reasonable additional, alternative, or improved control measures that could further reduce this impact without introducing significant duplication, operational inefficiency, or grossly disproportionate cost. Consequently, no further control measures have been considered in this assessment.

6.4.4 Results

Figure F2-5 illustrates the stepwise reduction in residual impact from the physical presence of the seismic survey, plotted against the cumulative sacrifice associated with each adopted control measure. The downward-sloping polynomial trendline indicates that successive measures continue to achieve meaningful reductions in impact up to a clear point of diminishing returns. Notably, the *Adjustment Protocol* provides the most significant marginal reduction following the baseline measures, highlighting its critical role in managing and resolving interference with other marine users. This measure alone substantially decreases the residual impact through a transparent and proactive compensation mechanism, enabling early resolution of conflict. The *Fisheries Liaison Officer*, *Petroleum SIMOPS Plan*, and *Sea Country Protection Plan* each provide incremental benefits that fine-tune engagement with different stakeholder groups. All adopted measures fall well within the ALARP threshold, demonstrating that each contributes proportionate benefit in exchange for relatively low sacrifice. The assessment confirms that impacts from physical presence have been reduced to ALARP through targeted, effective, and reasonably practicable controls.

Figure F2-6 presents the residual impact reductions (bar graph) and the associated cumulative sacrifice (line graph) for control measures adopted to manage the impact pathway of physical presence. The baseline measures provide the largest single reduction in impact, with the *Adjustment Protocol* contributing the next most significant improvement through clear, functional mechanisms for resolving interference with other marine users. With baseline measures adopted and the adjustment protocol in place there is almost no residual impact to manage.

Subsequent measures — including the *Petroleum SIMOPS Plan* and *Fisheries Liaison Officer (FLO)* — provide smaller but still meaningful reductions, with relatively low additional sacrifice. Notably, the final two measures — the *Sea Country Protection Plan* and the *FLO* — sit beyond the point of diminishing returns, where cumulative sacrifice begins to exceed proportionate environmental benefit. Although these final measures may be considered grossly disproportionate by standard ALARP thresholds, they have been adopted regardless to reflect commitments made through consultation and to ensure environmental performance outcomes can be easily achieved.

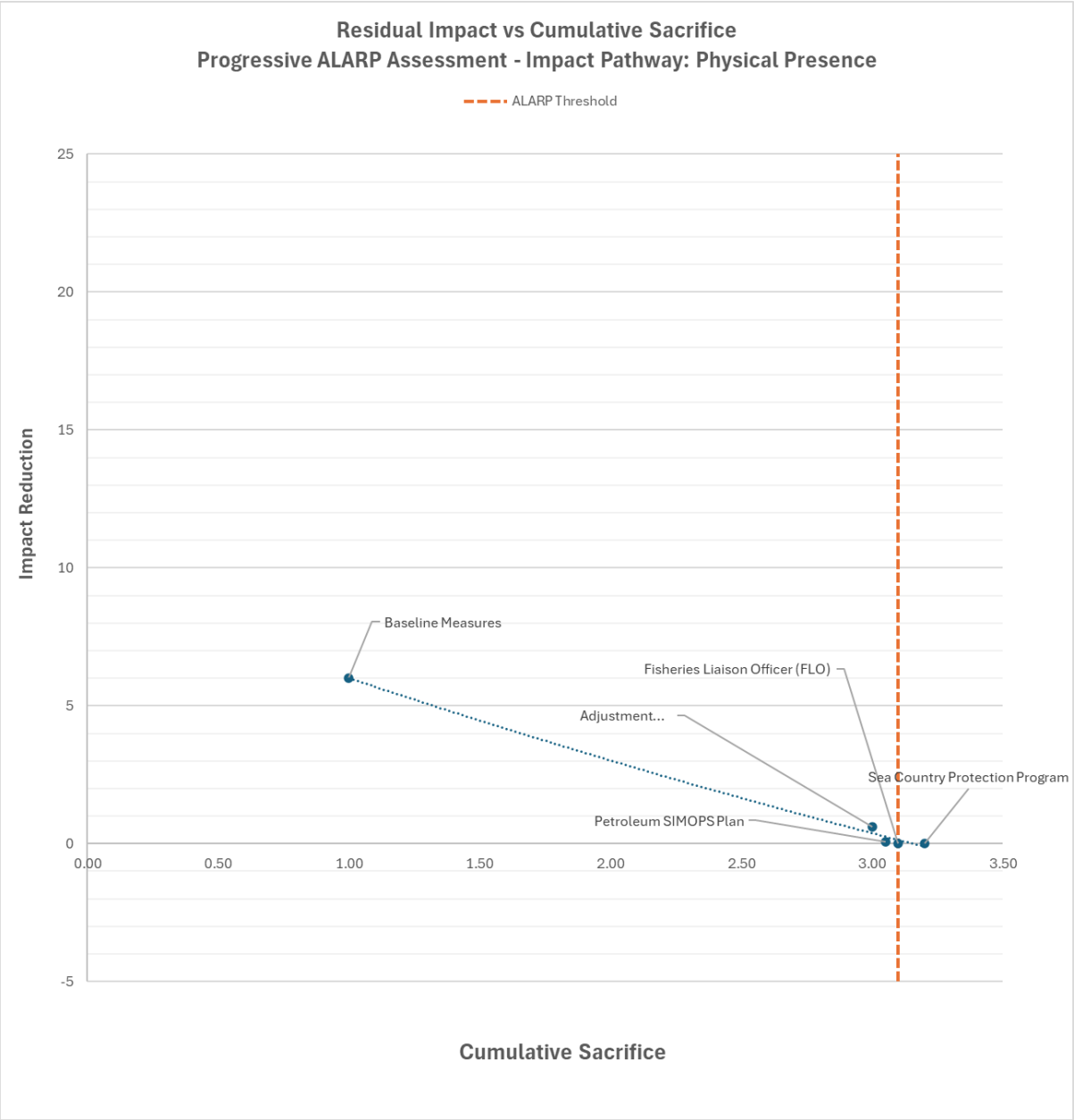

Figure F2-5 - Residual Impact vs Cumulative Sacrifice – Physical Presence: This graph presents the progressive reduction in residual impact from the survey's physical presence against the cumulative sacrifice required to implement each adopted control measure. The curve demonstrates meaningful stepwise reductions, with the Adjustment Protocol providing the largest marginal improvement following baseline commitments. All measures were adopted prior to reaching the ALARP threshold, confirming that the impact has been reduced as low as reasonably practicable.

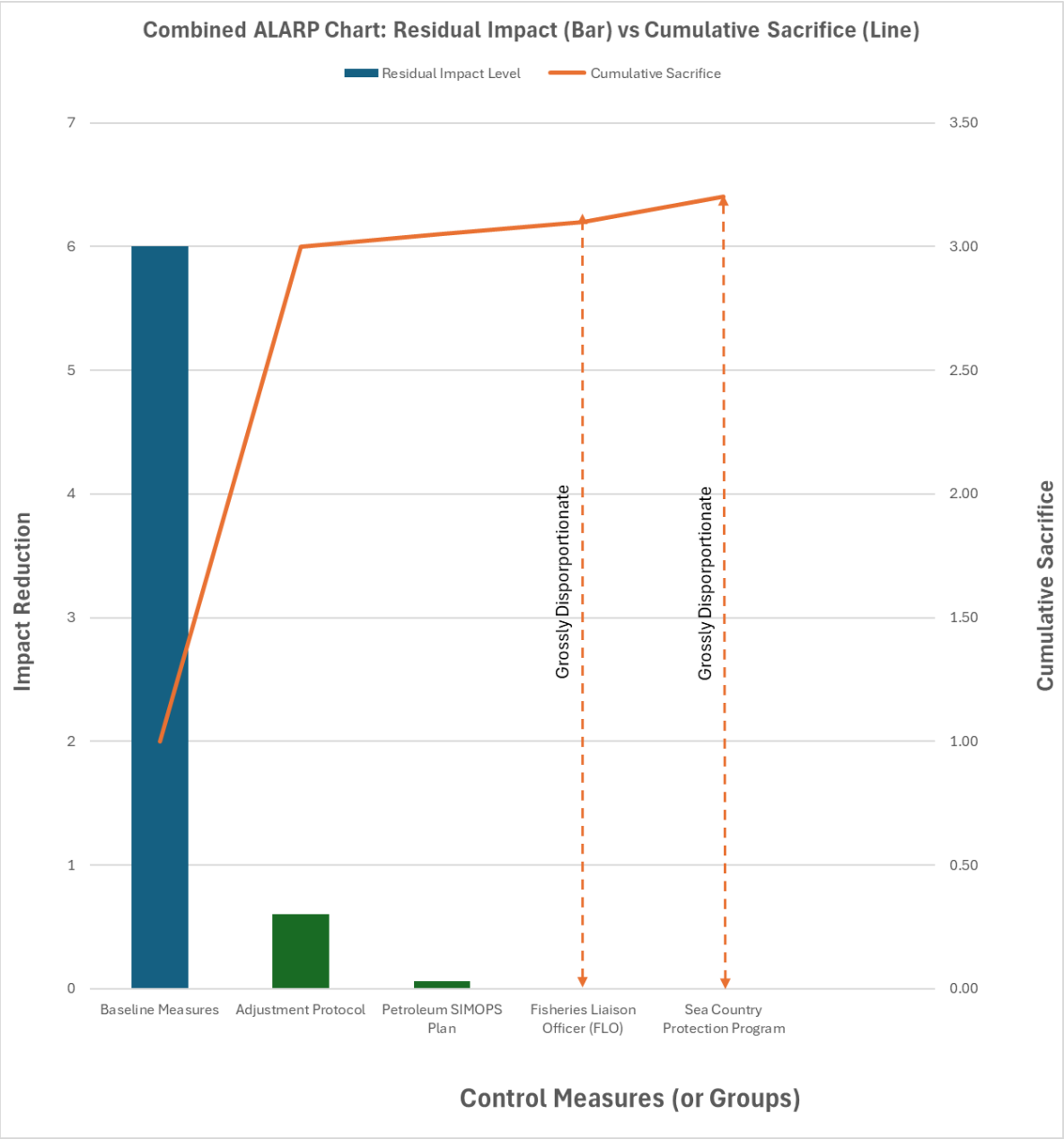

Figure F2-6 -Combined ALARP Chart – Physical Presence: This chart displays the residual impact reductions (bars) and cumulative sacrifice (line) associated with each adopted control measure. It highlights the dominant role of baseline measures and the substantial benefit of the Adjustment Protocol. Despite providing only marginal additional reduction in impact, the final two measures were adopted to support equity, responsiveness, and stakeholder inclusion beyond the point of strict cost-benefit proportionality.

6.5 Underwater Sound

The impact assessment for sound was separated into seven (7) individual impact assessments due to the complexity of the pathway between sound and each receptor category. The outcome of the impact assessments for underwater sound were as follows:

Table F2-12 - Impact Assessment Rankings - Underwater Sound

Receptor	Effect	Uncertainty	Predicted Impact Level
Plankton	Minor (2)	Low (2)	Low (4)
Fish	Minor (2)	Medium (3)	Medium (6)
Invertebrates	Minor (2)	Medium (3)	Medium (6)
Birds	Minor (2)	Medium (3)	Medium (6)
Turtles	Minor (2)	Low (2)	Low (4)
Marine Mammals	Moderate (3)	High (4)	High (12)
Diving, Surfing, & Swimming	Negligible (1)	Low (2)	Low (3)

While each of these receptors has different sensitivities and modes of exposure, a detailed ALARP analysis for each individual receptor group is neither practical nor proportionate – particularly when the control measures adopted for marine mammals provide a conservative and encompassing form of impact reduction for all others.

Marine mammals have been selected as the representative or surrogate receptor group for this assessment because they are both the most acoustically sensitive and the most legislatively protected. The impact pathway for marine mammals was assessed as carrying the highest residual impact ranking (12). As such, control measures required to reduce impacts to marine mammals are more stringent than those that would be warranted for less sensitive receptors. Further supporting this approach, the control measures act at the source-pathway level, reducing the intensity, timing, and proximity of acoustic emissions in a way that inherently reduces exposure for all other receptor groups.

By addressing the highest impact pathway to the most sensitive receptor group and demonstrating that these control measures achieve ALARP for marine mammals, it is reasonable to infer that impacts to all other receptors from underwater sound have also been reduced to ALARP.

6.5.1 Baseline

Table F2-13 specifies the activity limitations, legislative requirements, and components of the implementation strategy that have been considered in the establishment of a baseline impact level and baseline quantum of sacrifice.

Table F2-13 - Baseline Measures – Underwater Sound

Baseline Measures	Inclusion Rationale	Intrinsic Effectiveness
Avoided core Blue Whale and SRW seasons through shoulder-period scheduling	Seasonal timing selected to avoid overlap with peak presence of either species while maximising survey efficiency.	Shoulder-season scheduling reduces overlap with both Southern Right Whale and Blue Whale peak periods. This activity design element avoids the need for active mitigation during known high-risk periods. Independent of equipment-based controls and highly compatible with operational efficiency.
EPBC Act Policy Statement 2.1 (Part A) Procedures	Mandatory under national policy; includes pre-start, start-up, and shut-down procedures to minimise acoustic impacts on whales.	Reduces the likelihood of auditory injury and behavioural disturbance through procedural controls. Implements structured pre-start, soft-start, and shutdown procedures that directly interrupt the acoustic exposure pathway during sensitive periods. High functionality and reliability, as procedures are well-defined, tested, and incorporated into national policy. Compatible with vessel operations and implemented independently through Fauna Management Plans.
EPBC Regulations Part 8: Vessel and Operating Procedures	Legal requirement; governs vessel behaviour around cetaceans to minimise disturbance.	Provides physical buffer zones around cetaceans that reduce proximity risk and behavioural disturbance. These requirements are mandatory and standardised, ensuring reliability and compatibility across vessel types. Functional and easily implemented by vessel crew.
Fauna Management Plan (FMP)	Industry standard and operational document that ensures detection, classification, and response protocols are implemented for marine mammals.	Serves as the core implementation document for species detection and mitigation. Ensures standardised response protocols are in place and followed. High functionality and compatibility with marine operations. Reliable framework supporting consistent performance.
Marine Fauna Observers (MFOs)	Highly trained observers ensure continuous real-time monitoring of whale presence to inform adaptive mitigation measures.	Ensures real-time detection and behaviour monitoring. Visual detection range is typically up to 5 km under good conditions but limited at night or in poor weather. MFOs are experienced and trained, offering high reliability and independent verification. Functionality is high during daylight but reduced during dark hours.
Application of DMAC 12 Guidelines – Management of Seismic Survey Interactions with Diving Operations	Adopted to ensure diver safety during seismic operations by avoiding acoustic interference with known commercial or scientific diving activities. This measure reflects international best practice for managing sound-related interactions with divers and aligns with CGG's duty of care obligations.	This measure functions by providing pre-survey notification and real-time coordination with known diving operations in the area. The DMAC 12 guidelines are well-established and widely recognised across the industry, offering high functionality and reliability. They are also independent of other mitigation measures. Because divers are not present in large numbers and most areas of operation are far offshore, the application of this measure provides a highly effective safeguard at relatively low operational cost.

The quantum of sacrifice required to implement the baseline control measures for underwater sound is the most substantial of any impact pathway considered in the ALARP assessment. These measures reflect both legislative obligations and adopted standards that significantly shape the design, duration, and conduct of the survey. The Fauna Management Plan (FMP), which operationalises EPBC Policy Statement 2.1, includes detailed pre-start, soft-start, and shut-down procedures. These procedures require continuous monitoring and, when triggered, lead to temporary cessation of the seismic source, introducing vessel downtime and potential delays to the survey. Each shutdown and start-up cycle can result in the loss of optimal acquisition conditions and increased total survey duration.

The requirement for MFOs demands the deployment of trained personnel and adds direct labour, training, and compliance monitoring costs. Additionally, the shoulder-season scheduling to avoid peak presence of Blue Whales and Southern Right Whales limits the available acquisition window, increasing the risk of weather-related disruption and reducing scheduling flexibility. These constraints translate to higher operational costs due to narrowed survey windows and increased likelihood of weather-induced downtime.

Collectively, these measures form a baseline that carries a significant cumulative sacrifice, not just in financial terms, but in terms of lost efficiency, reduced flexibility, and constrained survey design. However, they also deliver a high degree of effectiveness and reflect CGG's commitment to regulatory compliance and environmental protection. This baseline is assigned a unit value of 1.0 in the ALARP assessment, representing the minimum necessary sacrifice to meet legal and industry standards while setting the platform for evaluating discretionary additional controls.

6.5.2 Assessment

To support the ALARP assessment for underwater sound emissions, a dedicated review of potential mitigation technologies and practices was conducted and documented in Appendix F5 – Marine Mammal Detection Technology Assessment. The purpose of that appendix was to ensure that a wide range of available, emerging, and alternative control measures were identified and considered as part of the overall ALARP assessment.

The inclusion of Appendix F5 in the submission does not imply that all listed technologies or methods require detailed assessment within the ALARP process. Rather, the appendix served as a scoping and input tool, informing the structured, step-by-step ALARP process by ensuring that no obvious or commonly cited mitigation approach was overlooked without consideration.

It is important to clarify that an ALARP assessment does not require exhaustive analysis of every conceivable control measure. Instead, the process is intended to identify and adopt those measures that provide clear, demonstrable reductions in impact – unless the cost, time, or effort required to implement them would be grossly disproportionate to the environmental benefit they offer. Once the assessment shows that diminishing returns have been reached, and that further mitigation options provide no material improvement or involve clearly disproportionate sacrifice, then the ALARP threshold has been satisfied.

Table F2-14 shows the step-by-step process followed for the ALARP assessment of underwater sound. The reasons to support assigning percentage values for the intrinsic effectiveness (or environmental benefit) and the incremental sacrifice are provided in Table F2-14.

Table F2-14 - Step-by-step ALARP Assessment – Underwater Sound

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
1	Baseline Measures	See baseline table and discussion.	-	-	-	12	1.00	1.00	Baseline measures represent the full suite of mandatory controls under law and guidance, including implementation of exclusion zones, shutdown procedures, and seasonal timing restrictions. These controls act directly at the source and through procedural intervention. They are highly functional, independently applied, and broadly compatible across the vessel systems. Their consistent use over multiple surveys and refinement through experience provides high reliability. As such, the baseline effectiveness is considered high.	This baseline includes significant embedded costs such as downtime from shutdown procedures, additional personnel for MFOs and implementation of legislative compliance systems. The cumulative effort to design, coordinate, and deliver baseline measures is taken as a unit value of 1.00, representing substantial but unavoidable cost of compliance.

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
2	Towed PAM	Towed PAM equipment and PAM detection monitors	12	50%	6	6	0.19	1.19	Towed PAM enables continuous underwater acoustic monitoring for marine mammal vocalisations, especially in low-visibility conditions or at night. Its effectiveness may be limited by background noise, vocalisation behaviour of species, and operational interpretation. However, the extended range of >10 km from the sound source makes it a valuable addition to the suite of detection lines of evidence. To add to its efficacy, it functions independently from visual observation, is available and widely deployed in the industry, and is compatible with vessel systems. A 50% effectiveness rating reflects its supplementary but imperfect contribution alongside the baseline.	Towed PAM involves acquisition, calibration, and maintenance of acoustic arrays and analysis systems. Monitoring requires a dedicated operator. Compared to baseline systems, it adds a specialised capability with moderate effort and cost, estimated at 0.19 sacrifice units, reflecting modest additional investment relative to operational cost.
3	Night-time Procedures	Additional procedures associated with startups and shutdowns.	6	20%	1.2	4.8	0.13	1.31	Night-time start-up and shutdown procedures add precautionary steps when visibility is reduced, functioning by increasing the likelihood of avoiding interactions with undetected fauna. However, the absence of visual verification limits their reliability. They are procedural, compatible, and independently implemented, justifying a modest 20% effectiveness rating due to the inherent uncertainty they address.	Night-time procedures involve increased procedural checks, potential delays, and crew attention during hours of reduced visibility. Compared to the baseline, this measure has a minor cost impact but reduces operational flexibility. A sacrifice of 0.13 reflects time costs and complexity added to survey scheduling.

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
4	Spotter Vessel	Additional vessel in the field with marine fauna observers and associated procedures	4.8	50%	2.4	2.4	0.58	1.90	A dedicated spotter vessel extends detection range spatially and provides redundancy to onboard MFOs. It increases visual coverage and facilitates early detection of whales at greater distances. The measure is highly functional and independent, and its reliability depends on weather and observer performance. MFO's onboard are still only effective during daylight hours and in good visibility. Given its increased surveillance capacity, a 50% effectiveness score is justified.	Operating a second vessel requires significant expense for chartering, crew, and fuel. It introduces logistical complexity and coordination challenges. However, the added coverage and redundancy make this one of the more expensive discretionary measures, assigned a sacrifice of 0.58, which is more than half the baseline cost.
5	Pre-start aerial overflight	Prior to commencing survey, a clearance survey of the starting line and the adjacent SRW BIA	2.4	5%	0.12	2.28	0.01	1.90	One gap in the measures considered so far is the need to understand the broader abundance of marine mammals prior to starting the survey and reliance on behavioural avoidance may occur. A pre-start aerial overflight allows a one-time broad area scan of the start location and SRW BIA. It is independent and functional but only offers a snapshot view, with limited duration of effectiveness. It is compatible with vessel-based procedures but overlaps with visual and acoustic systems. As such, its marginal contribution is rated at 5%.	Aerial overflights require aircraft, crew, and coordination. The pre-start flight is short-duration and planned, so the cost impact is minimal. The one-time cost is low, with a sacrifice unit of 0.01 though this is only justified because of the specific need identified.

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
6	Acoustic Detection Units	3 x tethered buoys	2.28	40%	0.912	1.368	0.16	2.06	Acoustic detection buoys provide passive monitoring in fixed locations (e.g., adjacent to BIAs). They will be used specifically for protections for Southern Right Whales. They function independently from other control measures and enhance detection where vessel systems have gaps. Their effectiveness depends on placement, detection range, and interpretation. They are reliable under good conditions and compatible with existing detection processes. Whilst the PAM technology being used is tried and tested, the application of the equipment on a tethered buoy is relatively untested. There are questions about the accuracy of detections in the presence of seismic sound. Overall, a 40% effectiveness score is a fair estimation of the gap filled by this measure.	Deployment and retrieval of three acoustic detection buoys involve equipment leasing, positioning planning, and monitoring by trained personnel. The measure introduces a high cost and resource burden, but compared to baseline costs, a sacrifice of 0.16 reflects that it is a targeted and limited additional layer of protection.
7	Relief PAM/MFO	Additional person to manage fatigue across observers	1.368	5%	0.0684	1.2996	0.04	2.10	The relief PAM/MFO role addresses fatigue and performance sustainability, following consultation with stakeholders. It ensures uninterrupted coverage and supports consistent quality in observations. Though it doesn't extend detection range, it increases reliability. For this reason, it is rated at 5%, reflecting its indirect but important contribution.	The relief observer role adds to crew numbers and logistics, increasing accommodation and scheduling demands. However, it directly responds to consultation feedback and supports implementation quality. The cost is modest (0.04) relative to the entire program and delivers resilience in staffing.

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
8	Support personnel	Whale expert panel, Environment Officer, Survey Environment Advisor	1.2996	80%	1.03968	0.25992	0.09	2.20	The whale expert panel, Environment Officer, and Survey Environment Advisor contribute to strategy, compliance, and real-time decision-making. They enhance implementation quality and adaptiveness of measures. These roles operate independently and are compatible with all other systems. Their support significantly boosts effectiveness of procedural measures, justifying an 80% effectiveness rating.	Support personnel are already part of broader environmental and safety programs, so costs are shared across compliance efforts. Still, dedicated environmental roles and expert panels require coordination, meetings, and operational availability. A 0.09 sacrifice unit captures this indirect but meaningful cost.
9	Additional overflights	A weekly overflight	0.25992	5%	0.012996	0.246924	0.08	2.27	Additional weekly overflights provide periodic updates on whale locations and may support a broader view of the departure of SRW and/or the arrival of PBW. They cannot verify previous detections and can only operate when weather conditions allow reducing their availability. Overflights also overlap with PAM and MFO functions. Their effectiveness is constrained by timing and redundancy, justifying a 5% score.	By this point in the ALARP assessment, the cumulative sacrifice has already surpassed the point at which further investments yield only marginal environmental benefit. The accumulated cost of multiple flights, along with the logistical burden of scheduling and weather dependency, outweighs the minimal incremental risk reduction. As such, the cost—although moderate on its own—is considered grossly disproportionate when viewed in the broader context of measures already adopted.

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
10	PAM on the spotter vessel	Towed PAM equipment and PAM detection monitors on the spotter vessel	0.246924	50%	0.123462	0.123462	0.19	2.46	Deploying PAM on the spotter vessel extends passive acoustic coverage and improves detection in the survey area. It functions independently and adds resilience to the PAM system. However, it duplicates an existing function already integrated into the towed PAM system. A 50% effectiveness score is used to reflect improved coverage but not novel capability.	Adding PAM to the spotter vessel introduces a parallel monitoring system already available through towed PAM and static acoustic buoys. While it would improve redundancy, the benefit is marginal given the effectiveness of previously adopted measures. The cost—comparable to the original PAM system—adds significantly to the cumulative sacrifice without providing commensurate risk reduction. At this stage of the assessment, where the residual impact is already low, this duplicated capability represents a grossly disproportionate sacrifice.

6.5.3 Consideration of Alternative, Additional or Improved Control Measures

In accordance with good environmental practice and this ALARP process, a range of additional, alternative, and improved control measures were considered beyond those already included during stepwise assessment. Each control measure was evaluated in terms of its potential to further reduce impacts associated with underwater sound emissions, and its corresponding level of sacrifice. The following discussions outline the reasons why specific measures were either rejected, partially adopted, or deemed infeasible. In each case, consideration was given to the measure's functionality, availability, reliability, independence, compatibility with existing systems, and its cost-effectiveness relative to its environmental benefit.

Frequency Reducing Sound Source Technologies

The Bluepulse (©SERCEL) is a purpose-built acoustic source that is available as a 'new' installation or as an upgrade to existing systems. Its key innovation is minimizing high frequency emissions without compromising accurate and dependable results for seismic acquisition, hence reducing environmental noise impacts.

When comparing the source signature to a conventional airgun array the following can be observed:

- Source signatures are similar in the main seismic frequency band (~ 1-100Hz).
- The Bluepulse frequency spectrum is slightly more oscillatory (ringy) in the low frequencies which would be of concern for a high-end broadband seismic image.
- The Bluepulse frequency spectrum is flatter out to 80Hz not reflecting the traditional signature of a conventional source.
- The Bluepulse frequency spectrum is attenuated outside of the main seismic bandwidth (0-200Hz) which is deemed the (environmental) advantage of this method.

Bluepulse generates considerably less energy with each shot compared to a conventional source. Hence peak-to-peak energy for the Bluepulse is half that of a conventional array and the peak-to-bubble ratio is also significantly less. This suggests the Bluepulse is not as efficient, and the seismic pulse not as clean as a conventional source.

These performance characteristics are the major concern when considering the amplitude supported play of the Otway Basin in general, where high resolution, accurate imaging of the seismic amplitude is required, even more so into the deeper plays expected in the Regia area. Processing complexities in the Otway Basin stem from the hard carbonate seabed and shallow lithologies along with shallow Tertiary canyons.

Adequate energy from the seismic source is required to penetrate these shallow layers to image the zone of interest. Particular seismic attributes are needed to accurately characterise the gas prospect including far angle stacks which require more energy for imaging, especially with the longer streamer length needed to image under the shallow zones. Conventional air gun arrays have an evidentiary track record of meeting all the objectives required of seismic acquisition in the Otway Basin, including successful mitigation of environmental impacts.

A typical contractual standard for a conventional seismic source would be:

- A primary amplitude (peak) of ≥ 50.0 bar-m, a peak-to-peak amplitude of ≥ 100.0 bar-m, and a peak-to-bubble ratio of at least 25

Compare this with the Bluepulse;

- A primary amplitude (peak) of ≥ 30.0 bar-m, a peak-to-peak amplitude of ≥ 60.3 bar-m and a peak-to-bubble ratio of at least 12.3.

To utilise the Bluepulse in the Otway with a required degree of confidence it would need to be qualified against a conventional source. Multiple test lines would need to be shot with a full conventional source array and a full Bluepulse array so a direct comparison could be made to determine whether the final seismic image acquired by the Bluepulse contains all necessary information from the zone of interest. Without this qualification the seismic data would be sub-par and would need to be reacquired with all the issues that would ensue. The risk on the geophysical imaging side of utilizing this new technology is too high without more comprehensive testing to better understand the risk-reward outcomes. Environmental problems associated with conventional seismic have been previously addressed through a range of mitigation methods. If the Bluepulse technology is more extensively tested against industry standards and demonstrates equivalent outcomes it will likely become a system of choice going forward.

However, at this point-in-time the Bluepulse remains a new and relatively untested technology whose outcomes need to be more fully documented and tested. If the seismic source is unreliable it will lead to increased downtime, increased infill shooting and generally more time with the vessel in the field and more shots. A known, reliable conventional seismic source will lead to efficient acquisition with the vessel in field for the shortest time possible and the fewest shots. Therefore, Bluepulse technology has been rejected.

Alternative Acquisition Technology (Marine Vibrosis)

The use of marine vibrosis and other emerging alternatives to conventional airgun technology was also evaluated. These systems may emit lower peak sound levels and offer potential environmental benefits; however, they are not yet commercially mature or widely used in offshore seismic operations. More importantly, their long-term environmental impacts – particularly those associated with particle motion – are not well understood. As such, adopting these technologies would require significant further research, environmental assessment, and investment before they could be demonstrated to offer a net reduction in environmental impact. In this context, it is more prudent to manage the known risks of conventional acoustic sources using well-established and effective control measures. The option was therefore rejected as unfeasible/impracticable.

Bubble Curtains and Acoustic Blankets

Bubble curtains and acoustic blankets are widely used to attenuate underwater noise in point-source construction activities such as pile driving. However, their effectiveness depends on stationary deployment and consistent geometry, making them unsuitable for mobile activities such as seismic surveying. The moving nature of the Regia MSS sound source renders these technologies infeasible from both an operational and effectiveness standpoint. This measure was considered technically infeasible and excluded from further consideration prior to Step 2 of this assessment.

PAM via Third-Party Vessels

The option of utilising third-party or non-dedicated vessels to deploy PAM systems was assessed at Step 2 and again at Step 10 of this assessment. While these vessels may extend geographic coverage, their operational independence and the variability of equipment make the reliability and integration of detection data less certain. When compared to CGG's dedicated and well-integrated PAM installations, the marginal improvement was minimal. This measure was rejected based on reduced reliability and elevated uncertainty.

Infra-red Cameras

Infra-red (thermal) cameras were considered as an alternative and/or additional option at Step 2 for extending marine fauna detection into low-visibility and night-time conditions. However, their detection range—particularly for low-frequency cetaceans—is limited compared to PAM, and their performance offshore remains largely unproven. CGG has ongoing discussions with technology developers who acknowledge the technology is not yet commercially viable. Given the availability of more effective and established technologies already adopted in the baseline and in the steps that follow (e.g. PAM and trained MFOs), the marginal benefit of this equipment was not sufficient to justify its cost.

Drone Technology (Offshore)

Offshore drone platforms were reviewed as a possible enhancement to detection and identification capabilities of marine fauna, particularly during daylight hours. However, drones launched from the survey vessel are limited in range and do not offer significant gains beyond what trained MFOs already provide from elevated vantage points. Their added complexity and limited benefit rendered them a poor investment relative to existing detection systems. This measure was considered as an alternative at Step 3 and rejected.

Satellite Imagery for Whale Detection (Partial Adoption)

The use of satellite imagery to support whale detection was considered for inclusion as an additional line of evidence to inform pre-survey planning at Step 6. While satellite-based observation is not suitable for real-time mitigation due to limitations in spatial resolution, revisit frequency, and weather dependency, it may offer value as a pre-survey tool to identify areas of likely whale presence or absence in the weeks leading up to activity commencement and/or commencement of southerly migration out of the reproductive BIA. As such, CGG has chosen to partially adopt this measure by supporting a trial of satellite-based whale detection prior to the survey. The aim of this trial is to assess whether near real-time imagery, when combined with validated detection algorithms, can offer useful intelligence on whale distribution patterns. This information may assist in refining the initial sail line selection and pre-start procedures. The use of this technology will not replace existing mitigation measures but will complement them where feasible and subject to satellite availability and data quality. The limited cost and potential utility of this measure support its inclusion as a low-sacrifice, trial-based enhancement.

Drone Technology (Onshore)

Drone deployment from onshore positions near the Southern Right Whale Reproduction BIA presents an opportunity to supplement visual monitoring through behavioural observation and wider-area coverage.

Unmanned aerial vehicles (UAVs), drones, have rapidly emerged as an effective tool for marine mammal research, complementing traditional visual observation techniques for assessing whale abundance and distribution. UAVs can conduct large-scale aerial image-based surveys at a fraction of the cost of manned aircraft and without many of the associated safety risks (Koski et al., 2009; Hodgson et al., 2017). Their low operating cost also enables flexible survey designs, including simultaneous multi-UAV coverage. Although UAVs remain subject to aviation regulations and earlier models were range-limited, ongoing technological developments continue to expand their operational capacity.

Recent applications demonstrate their utility. Drone-based surveys in New South Wales covered 23 sites spanning 1,000 km and were found to be a cost-effective method for marine megafaunal assessments under suitable conditions (Kelaher et al., 2023). In South Australia, UAVs have been used to examine spatial relationships between SRW mothers and calves, providing insights into maternal behaviour (Nielsen et al., 2019). For small cetaceans, drone surveys have produced more accurate

population and behavioural data than traditional vessel-based approaches, including for Bottlenose Dolphin (*Tursiops truncatus*) (Fettermann et al., 2022).

Available evidence indicates that UAVs cause minimal disturbance to baleen whales, with studies showing very little drone-generated sound penetrates the water (Christiansen et al., 2016; Christiansen et al., 2020), and that any disturbance is likely minor compared to crewed aircraft or nearby vessels (Raoult et al., 2020). Drone-based observation therefore represents a less invasive alternative for monitoring marine mammals.

Operational challenges remain in sub-optimal weather, low light, high winds, and rough seas. A study in Norway evaluating UAV performance across 12 missions found that detection certainty varied between cetacean groups and was influenced by sea state, glare, and luminance, though overall UAVs were effective when environmental variability was considered (Aniceto et al., 2018).

As flight range, stability, and camera resolution improve, UAVs are becoming an increasingly reliable component of marine mammal monitoring programs. Integrated with traditional methods, UAVs can enhance detection reliability, broaden spatial coverage, and improve the overall effectiveness of marine mammal research and conservation.

Drones offer an alternative to traditional fixed-wing aerial surveillance. The following factors have been considered by CGG in the adoption of this control measure:

- **Cost Effectiveness:** Drone operations deliver substantially lower costs compared with fixed-wing aerial surveys. Traditional aerial monitoring requires aircraft charter fees, pilot and observer wages, fuel, and maintenance, all of which are costly and inflexible.
- In contrast, drone operations involve a small two-person crew and rechargeable batteries, with no airfield or refuelling requirements. The same budget that might fund a single weekly aircraft flight can typically support multiple drone sorties per day, resulting in increased observation hours and improved statistical reliability. Lower mobilisation and maintenance costs also make it feasible to extend the monitoring season or add additional sites without exceeding project budgets.
- **Flexibility in Short Weather Windows:** Drone crews can mobilise within minutes when short calm periods arise - conditions typical of southern coastal environments. Unlike fixed-wing aircraft, drones do not require prior aircrew scheduling or flight slot coordination. This rapid-deployment capability allows operators to take advantage of limited weather windows, maintaining continuity of observations that would otherwise be lost to forecast uncertainty.
- **Launch Site Adaptability:** Drones can be deployed from a wide range of accessible coastal vantage points - such as cliffs, beaches, or headlands - eliminating the need for distant take-off locations or transit over water. Launching near target habitats reduces flight time, increases efficiency, and enables adaptive survey coverage in response to dynamic whale distributions.
- **Station-Keeping and Behavioural Documentation:** Unlike aircraft, which must maintain forward motion and often circle targets, drones can hover motionless above sightings. This allows stable, repeatable documentation of individual animals, group interactions, or calf-cow pairs without causing disturbance. The ability to hold position enhances data quality by removing motion blur and maintaining consistent geometry for photo-identification and behavioural recording.
- **Enhanced Visual and Thermal Detection:** Modern multi-sensor payloads, such as the Zenmuse H30T, integrate high-resolution RGB, thermal, and zoom imaging on a single

gimbal. Thermal sensors can detect whale blow plumes or body heat at extended distances and under low-visibility conditions, while optical zoom enables detailed examination of morphology, scarring, and fine-scale behaviour. Combined, these capabilities deliver a level of visual and thermal fidelity that far exceeds that obtainable from crewed aircraft operating at higher altitudes and speeds.

- **Reduced Disturbance and Acoustic Footprint:** Drones operate quietly and at lower altitudes than manned aircraft, producing minimal acoustic disturbance. This allows for recording of surface behaviour, social interaction, and resting activity, improving behavioural accuracy and welfare outcomes for observed animals. All UAV operations will comply with prescribed minimum separation distances, altitude restrictions, and marine fauna disturbance mitigation requirements.
- **Safety and Risk Reduction:** Uncrewed aerial systems remove the inherent risks associated with low-level flight over water. Operations can continue safely under marginal visibility or moderate wind conditions that would ground manned flights. Redundant telemetry links, automated return-to-home (RTH) functions, and built-in safety protocols provide predictable and secure system recovery, supporting Civil Aviation Safety Authority (CASA)-approved Beyond Visual Line of Sight (BVLOS) operations.
- **High Spatial and Temporal Resolution:** Drone surveys enable concentrated effort within key nearshore nursery zones (e.g., 2-5 km offshore), where whale aggregations are most frequent. Their ability to operate repeatedly across consecutive days provides continuous temporal coverage rather than isolated transects, producing finer-scale mapping of distribution, movement, and habitat use relative to environmental conditions.
- **Data Quality and Integration:** All imagery and telemetry are captured digitally with embedded GPS, UTC timestamp, altitude, and camera parameters, ensuring traceability and repeatability. 4K video and still imagery is immediately suitable for GIS integration and spatial analysis. Drones can also operate in conjunction with coastal observers, enabling real-time triangulation and verification of sightings.
- **Environmental and Regulatory Advantages:** Drone operations have a minimal environmental footprint - no aviation fuel use, reduced noise, and low emissions. They comply with CASA BVLOS regulations designed to mitigate risk to crewed aviation in sensitive coastal airspace. Field teams typically consist of only two personnel, reducing both logistical complexity and site disturbance.
- **Rapid Redeployment and Multi-Site Coverage:** Drone systems can be rapidly redeployed between nearby sectors - such as The Craggs, Narrawong Beach, and Cape Nelson - within a single operational day. Mission parameters are pre-programmed , ensuring consistent transect replication and efficient daily re-tasking in response to whale movements or changing weather conditions.

Drone-based BVLOS monitoring provides a safer, more flexible, and cost-effective alternative to manned aerial surveys for whale observation. It allows adaptable launch points, stable hover-based behavioural recording, enhanced visual and thermal detection, and efficient utilisation of short weather windows. The approach maintains high spatial and temporal data resolution, minimises environmental impact, and adheres to strict aviation safety and regulatory requirements. All operations remain under the discretion of the pilot-in-command, who retains final authority on flight safety and operational limits.

While this technology is still developing, early consultation and engagement with authorities has indicated that trials could be conducted ahead of the survey period. As such, this option has been

partially adopted as a complementary measure to Step 3, subject to appropriate permits and operational viability.

Unmanned PAM Craft

The deployment of unmanned surface vessels equipped with PAM technology was explored as an alternative platform for acoustic monitoring. While potentially extending coverage, these systems offer similar detection capabilities to static buoys already adopted. It is important context that the need in the case of the Regia MSS is to improve detections of Southern Right Whales within and migrating from their reproductive BIA. This, coupled with their higher cost based and limited improvement in effectiveness led to the conclusion that they did not represent a cost-effective addition. This measure was considered during Step 6 of the ALARP assessment and rejected.

Unmanned PAM Gliders

The deployment of autonomous underwater gliders equipped with PAM systems was investigated as an alternative monitoring platform; however, their operational characteristics do not align with the requirements of the Regia MSS. Gliders provide periodic, rather than continuous, detection and reporting because data are only transmitted when the vehicle surfaces, typically every few hours. This results in delayed or batch reporting cycles. This stands in contrast to the near real-time, continuous telemetry achievable with static tethered buoys, which is essential for the Regia MSS because the primary objective is to monitor received sound levels at fixed, defined locations, not to conduct broad-area whale detection. Static buoys remain at known coordinates, maintain stable hydrophone depth, and provide uninterrupted acoustic measurements and near real-time transmission, making them far more suitable for validating sound source levels during the activity.

Gliders also introduce functional limitations that reduce their utility for this application. Their movement through the water column creates flow noise and wave-wash noise, which can significantly degrade low-frequency signal quality—precisely the band relevant to both Southern Right Whale frequencies and anthropogenic impulsive sound monitoring.

Performance testing of acoustic gliders shows that while glider-based PAM is useful for broad-scale presence/absence assessments, it exhibits substantially higher missed-detection rates for low-frequency baleen whale calls compared to fixed, stationary systems. Baumgartner et al. (2020) report missed-detection rates of 26–62% for right, humpback and fin whales when gliders operate in automated mode, along with data latency inherent to glider design because detections can only be transmitted when the glider surfaces. Their mobility also makes it challenging to maintain consistent monitoring points because the Regia MSS requires fixed-point sound-level verification, a platform that moves tens of kilometres over a deployment cycle cannot fulfil this role with the required precision or repeatability.

Although gliders can extend horizontal spatial coverage, the Regia MSS monitoring strategy already achieves that coverage through a network of strategically placed static PAM buoys. Gliders therefore provide no additional detection benefit relevant to the management measures in this EP. Their higher capital and operational cost mean they do not offer a material improvement in environmental impact reduction. For these reasons, gliders were assessed at Step 6 of the ALARP assessment and rejected on the basis that static buoys provide a more reliable, more direct, and more cost-effective means of meeting the defined monitoring objectives of the Regia MSS.

Citizen Science Observations

Within Step 7, CGG considered incorporating citizen science observations into the Fauna Management Plan was considered as a means of enhancing real-time awareness of Southern Right Whale presence, particularly in the coastal reproduction BIA. While such observations can sometimes

provide useful insights, the data is not validated in real-time reducing reliability and their integration into formal mitigation procedures raises concerns around data quality and verification. Additionally, the existing suite of detection measures already ensures that Southern Right Whales can utilise their BIA's and HCTS and behavioural disturbance is minimised. However, CGG notes that citizen science programs can be effective because observations are occurring all the time and not just for a defined (and likely limited) science program. CGG does not control the program as the data goes to the Arthur Rylah Institute and has confirmed that CGG would be given unvalidated sightings data on request. Therefore, this control measure has been partially adopted as the benefit was sufficient to justify even the relatively low cost of coordination.

Plankton/Larval Krill Dispersion Modelling

This measure was suggested through consultation. It requested further analysis of impacts to planktonic organisms and larval krill through additional dispersion modelling. However, the Regia MSS environmental assessment already includes a detailed evaluation of the Bonney Upwelling and its biological significance. Moreover, current scientific understanding supports those behavioural impacts on larger taxa (e.g. whales) are an appropriate surrogate for impact management across trophic levels. This idea was deemed a supplementary input to the environmental assessment, not a control measure, and was rejected as unnecessary to inform ALARP decisions.

Plankton/Larval Krill Detection and Avoidance

This measure was suggested through consultation. Direct observation or detection of larval krill during the survey was explored but ultimately found to be infeasible. Krill are neither directly observable during operations nor spatially predictable to a sufficient degree to inform real-time mitigation. Given that the survey avoids peak upwelling periods and already incorporates broader area and timing restrictions, this measure was rejected as an unviable additional control.

Additional PAM detection systems of contracted vessels

Passive acoustic monitoring (PAM) has consistently been shown to be a reliable tool for detecting vocalising cetaceans across multiple platforms, environments, and spatial scales. Numerous studies demonstrate that baleen whale calls propagate over substantial distances, allowing detection ranges from several kilometres to tens of kilometres, depending on species, water depth, and ambient noise. For right, humpback and sei whales, moored buoy systems typically achieve instantaneous detection ranges of 9–15 km, with fin whale calls detectable over several tens of kilometres due to their low-frequency, high-source-level signals (Baumgartner et al. 2019). Right whale upcalls have been recorded up to 30 km in shelf basins and, in favourable sub-Arctic conditions, North Pacific right whale calls have propagated to 100 km from the source (Soldevilla et al. 2014). In deep ocean systems, pygmy blue whale calls may be detected at ranges approaching 200 km, depending on frequency band, ambient noise, and propagation conditions (Gavrilov & McCauley 2012). Across calving grounds, feeding areas, and migratory corridors, PAM consistently outperforms visual methods in temporal coverage—often yielding 2–10 times more detection days than aerial or shipboard surveys —and provides continuous monitoring in darkness, poor weather, and remote locations (e.g., Antarctica's PALAOA observatory) (Van Parijs 2009). The capacity for real-time transmission from autonomous buoys further supports mitigation, as demonstrated by reliable near-real-time right whale detections used for vessel-strike risk reduction off the United States east coast (Van Parijs 2009).

While PAM is highly effective for *detecting the presence* of cetaceans, its performance in estimating *distance* and *bearing* depends heavily on the configuration of the monitoring system. Single-hydrophone systems—common in mitigation buoys—detect occurrence but cannot estimate caller range or bearing without additional propagation modelling or opportunistic use of multipath arrivals, and these methods are generally unreliable for operational decision-making (Soldevilla et al. 2014).

Accurate localisation requires hydrophone arrays with precise time synchronisation, as implemented in fixed seabed arrays, bottom-mounted tetrahedral systems (e.g., PALAOA), and towed arrays (Van Parijs 2009). Towed arrays allow bearing estimation and, with vessel motion, full localisation, although performance can be reduced by vessel noise, animal avoidance behaviour, and the left–right ambiguity inherent in linear arrays (Van Parijs 2009). Glider-based systems equipped with onboard detection algorithms (e.g., DMON/LFDCS) can provide reliable near-real-time detections, but localisation remains limited unless multiple gliders or fixed buoys operate as a network (Baumgartner et al. 2020). Overall, PAM localisation accuracy is highest when using multi-sensor arrays and lowest when relying on single sensors.

Across all studies, the reliability of PAM is influenced by ambient noise, calling behaviour, and detector performance. High ambient noise—including wind, rain, vessel noise, fish choruses, and snapping shrimp—can significantly reduce detection ranges, as demonstrated in South Australia's Fowlers Bay where wind-driven noise varied by 30 dB above 100 Hz, thereby constraining baleen whale detectability during poor weather (Ward et al. 2019). Automated detectors must balance false positives and missed detections: conservative right whale detectors deployed on real-time buoys achieved near-zero false detections at the cost of higher missed-call rates (Baumgartner et al. 2019), while automated glider detectors showed species-specific missed-detection rates ranging from 18–67%, depending on call type and analyst review protocol (Baumgartner et al. 2020). PAM performance also depends on the species' vocal behaviour—obligate vocalisers (e.g., sperm whales) are detected reliably, whereas facultative vocalisers may remain silent for extended periods. Despite these limitations, the evidence across all studies shows PAM is a robust, proven, and operationally mature method for detecting cetaceans, particularly when integrated with visual monitoring and deployed using arrays or multi-platform networks.

During Step 10 of the ALARP assessment, CGG evaluated the use of passive acoustic monitoring (PAM) systems on the spotter vessel. At that stage, PAM was rejected on ALARP grounds because the incremental reduction in impact or risk was not proportionate to the additional cost, complexity, and operational burden. However, subsequent further assessment of key environmental values and sensitivities (Appendix F3) identified a critical constraint: the effective detection range of Marine Fauna Observers (MFOs) is typically limited to ~5 km under ideal conditions, substantially less during low visibility, and no visual detections at night. These limitations became highly material when the detection distances to be achieved are >15 km.

To ensure impacts and risks remain at ALARP levels, and to provide extended detection capability during low-visibility conditions where MFO effectiveness is degraded, CGG will adopt PAM technology on the spotter vessel wherever practicable. PAM will operate supplementary to visual monitoring or as a primary trigger for shutdown decisions at night. For detections of Blue Whales during November and December, CGG will require all contracted vessels to undergo a PAM-readiness assessment to confirm whether they can safely and effectively support PAM operations. PAM-ready vessels will be preferentially selected and mobilised where commercially and operationally feasible. Where full PAM deployment is not possible, CGG will implement alternative monitoring arrangements to ensure environmental performance outcomes are met.

Further control measures identified and not assessed

There was further control measures identified in Appendix F5 that were in mind during the ALARP assessment, including:

- Fibre Optic Distributed Acoustic Sensors (DAS)
- Dual Camera Detection Systems (e.g., WhalePOD, SVDS)
- AI-Enhanced Satellite Monitoring (e.g., SpaceWhale)

These measures were identified and considered during the Marine Mammal Detection Technology Assessment as potential supplementary control options. However, they were not assessed in detail within the ALARP process. In each case, the likely effectiveness of the measure was limited by its technical maturity, feasibility, or relevance to real-time seismic survey operations. Furthermore, the primary pathways for impact have already been effectively addressed through an extensive suite of adopted controls, including visual observers, PAM systems, aerial surveys, and scheduling strategies.

Given this strong baseline, any additional environmental benefit from the above-listed measures would be marginal, speculative, or redundant. As such, the cost of conducting detailed analysis for each measure was itself clearly grossly disproportionate to the potential environmental benefit that might be realised. No further action was taken, and this approach is consistent with the principle of focusing detailed ALARP assessments on measures that are either practicable or offer credible additional benefit.

6.5.4 Results

Figure F2-7 presents the progressive ALARP assessment for the impact pathway of underwater sound. Each point on the chart represents a control measure or group of measures applied sequentially, plotted by their associated cumulative sacrifice (x-axis) against the residual impact reduction achieved (y-axis).

The green dotted line is a second-order polynomial trendline fitted to the sequence of adopted measures, representing the declining efficiency of control measures as more are added. The shape of the curve illustrates the concept of diminishing returns, where early measures provide significant benefit per unit of sacrifice, while later measures achieve less additional benefit at increasing cost.

The vertical dashed red line represents the ALARP threshold—the point at which further measures become grossly disproportionate in cost relative to the incremental benefit they offer. Measures falling to the left of this line are adopted, as they provide meaningful impact reduction at reasonable or proportionate cost. Measures to the right of this line (i.e. “Additional overflights” and “PAM on the spotter vessel”) are rejected, as the cost of implementation exceeds what can reasonably be justified given the small additional environmental benefit.

This graph visually supports the decision-making process and demonstrates that ALARP has been achieved, with additional measures considered and transparently excluded based on their cost-benefit profile.

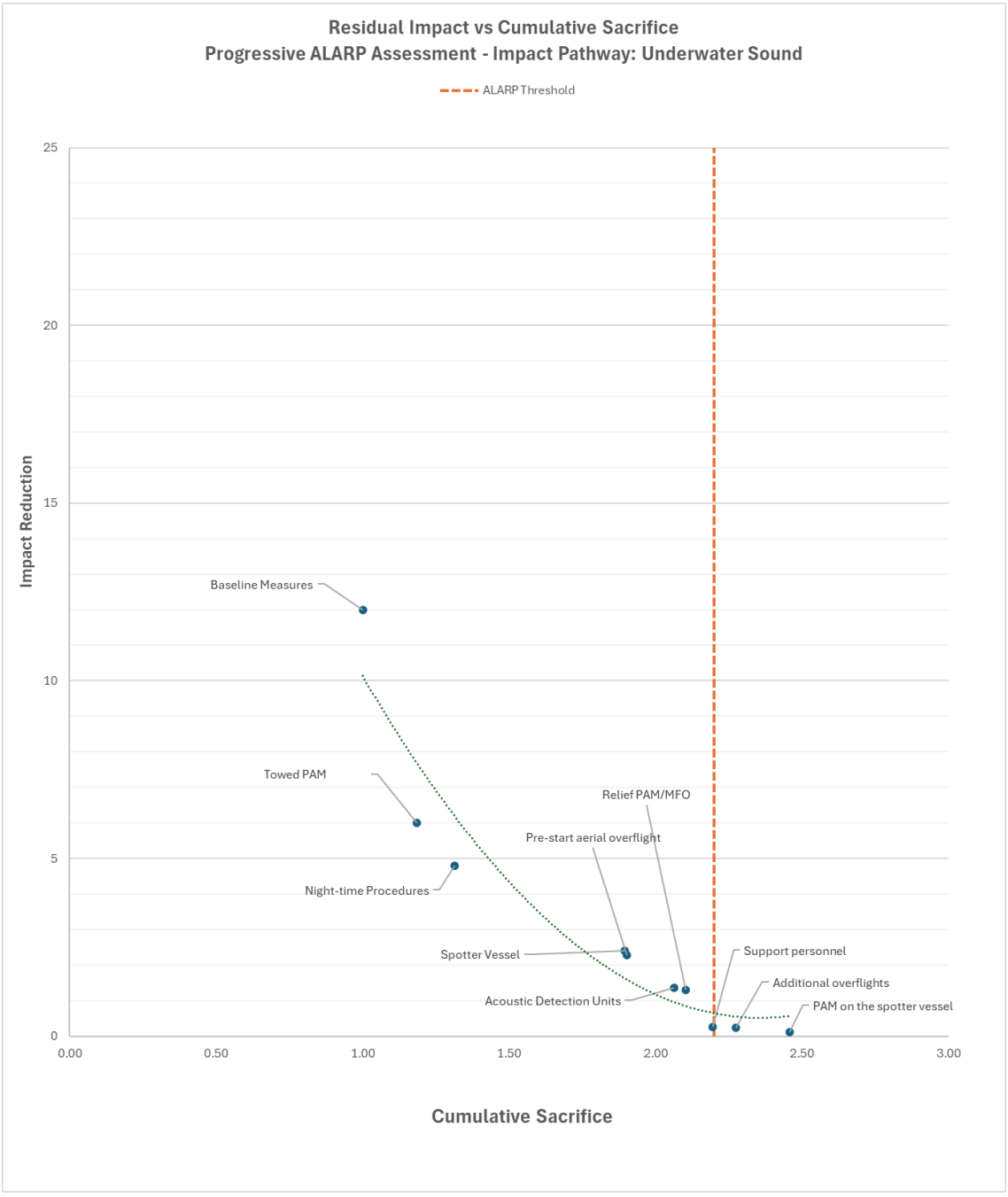

Figure F2-7 - ALARP Assessment Results - Underwater Sound: Residual Impact vs Cumulative Sacrifice for Underwater Sound Control Measures. A progressive ALARP assessment showing the impact reduction achieved by each control measure relative to the cumulative sacrifice required. The second-order polynomial trendline illustrates diminishing returns, and the dashed red line marks the ALARP threshold beyond which further measures are considered grossly disproportionate and therefore rejected.

Figure F2-8 presents a combined bar and line graph to validate the ALARP threshold identified in the residual impact vs cumulative sacrifice analysis. The bars represent the marginal reduction in residual impact or risk delivered by each individual control measure, showing the relative effectiveness of each step in the sequence. The line graph plots the corresponding cumulative sacrifice, illustrating how the total cost or effort increases with the adoption of each additional measure.

This format allows a direct visual comparison between the size of the environmental benefit (bar height) and the cost of achieving it (line slope). Early control measures show large reductions in impact for relatively small investments, while later control measures deliver diminishing benefits for greater cumulative sacrifice. The flattening of the bars combined with the steepening line demonstrates that the rate of return on environmental investment is decreasing.

The turning point, where bars become marginal and the line continues to rise sharply, supports the conclusion that the final adopted measure is at the threshold of gross disproportionality. The two rejected measures clearly fall beyond this threshold, providing confirmation of the ALARP decision made in the preceding graph.

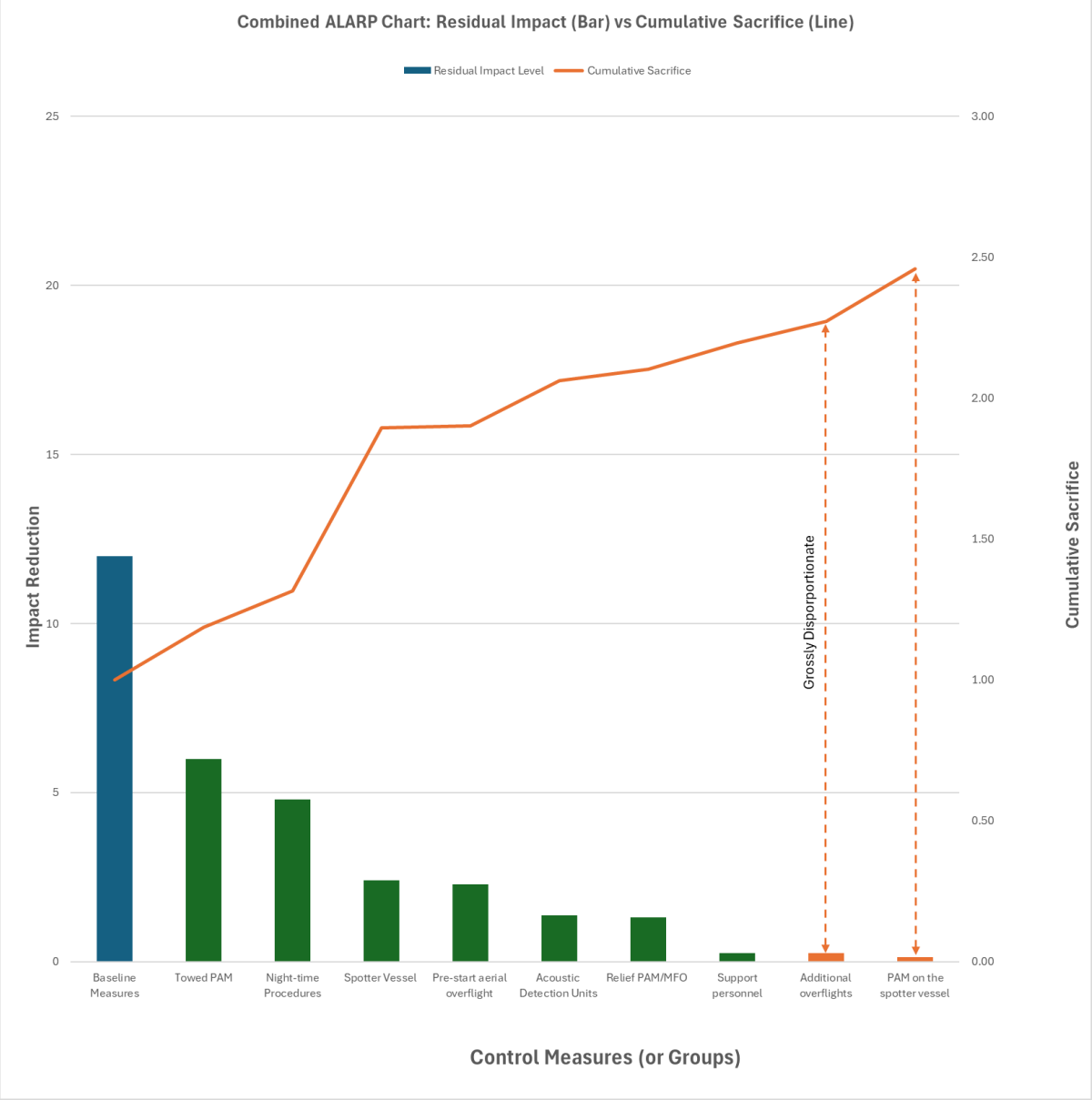

Figure F2-8 - ALARP Assessment - Underwater Sound: Marginal Impact Reduction and Cumulative Sacrifice for Underwater Sound Control Measures. Bars show the impact or risk reduction provided by each control measure; the line indicates cumulative sacrifice. This graph validates the ALARP threshold by illustrating where the marginal benefit becomes negligible relative to the rising cost of additional measures.

6.6 Artificial Light

6.6.1 Baseline

Table F2-15 specifies the activity limitations, legislative requirements, and components of the implementation strategy that have been considered in the establishment of a baseline impact level and baseline quantum of sacrifice.

Table F2-15 – Baseline Measures – Artificial Light

Baseline Measures	Inclusion Rationale	Intrinsic Effectiveness
Navigational lighting	Required under maritime safety regulations.	Not reducible due to safety obligation; sets baseline.
Vessel exclusion zone (4nm from coast)	Activity limitation to reduce overlap with recreational users also limits light exposure to the coastline.	Not reducible due to safety obligation; sets baseline.
Lighting Management Plan (LMP)	Company standard to minimise unnecessary light emissions with OVID-Style inspections checking all vessels have a LMP in place.	Minimises attraction/disruption to light-sensitive fauna.

The outcome of the impact assessment for physical presence was that the effect was ranked as minor (2) and the uncertainty ranked as low (2). Therefore, the residual impact after the application of baseline measures is four (4).

The quantum of sacrifice for complying with the baseline has been calculated and includes the following:

- Navigational lighting is required under international maritime safety regulations and is therefore a non-negotiable obligation for safe operation at sea. The commitment to maintain a 4 nm exclusion from the coastline—though primarily an activity limitation designed to reduce overlap with recreational users—has the added benefit of reducing coastal light exposure. However, this constraint limits the survey area and restricts CGG's ability to collect data in potentially high-interest nearshore zones. While not a direct financial cost, this represents a compromise in operational scope.
- The Lighting Management Plan (LMP), required for all vessels, is a company standard developed over time through internal systems and inspections, including OVID-style pre-deployment assessments. As this plan is now a mature part of CGG's operating procedures, its implementation no longer imposes significant operational costs. However, the development of the systems, experience, and refinements required to reach this level of maturity represents a historical investment that has contributed to its current effectiveness.

Overall, the baseline measures reflect a high level of intrinsic effectiveness with relatively low current cost or effort, though they are underpinned by earlier organisational investments and operational trade-offs. These combined costs and efforts form the cumulative baseline sacrifice, which is assigned a unit value of one (1) in the ALARP assessment. This allows subsequent discretionary control measures to be evaluated proportionally.

6.6.2 Assessment

Table F2-16 shows the step-by-step process followed for the ALARP assessment of artificial light. The reasons to support assigning percentage values for the intrinsic effectiveness (or environmental benefit) and the incremental sacrifice are provided in Table F2-16.

6.6.3 Consideration of Alternative, Additional or Improved Control Measures

As part of the ALARP assessment for artificial light, CGG considered additional or improved control measures beyond those already adopted. One such measure was the use of advanced light filters designed to further narrow the spectral output of onboard lighting systems. These filters can reduce visibility to certain marine fauna by removing wavelengths known to trigger behavioural responses. However, when applied on top of existing lighting controls – such as shielded fittings, dimming technologies, and blackout curtains – the additional reduction in light-related impact is minimal. Furthermore, implementing this measure would require retrofitting lighting systems across multiple vessels, introducing substantial procurement, installation, and maintenance costs. These costs include not only hardware but also operational downtime and compatibility assessments. While technically feasible, the sacrifice required (0.125 units) was assessed as grossly disproportionate to the marginal reduction in residual impact, and the measure was therefore rejected.

Other potential improvements, such as the deployment of active light detection sensors or automated brightness adjustment systems, were also considered. While conceptually interesting, these systems introduce complexity into vessel operations and present a risk of malfunction or false responsiveness in the offshore environment. Their benefit would also be marginal considering the existing effectiveness of CGG's Lighting Management Plan and onboard procedures. As such, no further control measures were identified that would provide substantial risk reduction without grossly disproportionate sacrifice.

This assessment confirms that the control measures already adopted represent a point where additional environmental benefit is outweighed by the cost, complexity, or operational risk of implementation, and that the residual impacts from artificial light have been reduced to ALARP.

6.6.4 Results

Figure F2-9 illustrates the outcome of the ALARP assessment for the artificial light impact pathway, showing how progressively adopted control measures reduce residual impact in relation to cumulative sacrifice. Each data point represents a control measure or group of measures that was assessed for its intrinsic effectiveness and corresponding cost, time, or operational effort. The plotted curve uses a second-order polynomial trendline to demonstrate the diminishing returns of environmental benefit as increasing sacrifice is invested.

In this assessment, the baseline measures (including required navigational lighting and exclusion zones) were followed by the adoption of dedicated light minimisation technologies and practices. These early measures provided substantial impact reduction at low to moderate sacrifice. Subsequent measures, such as CGG's Marine Assurance System and the appointment of a Survey Environment Advisor, continued to improve risk management but with increasingly marginal gains relative to their cost. The ALARP threshold, represented by the vertical dashed line, indicates the point at which further sacrifice would be considered grossly disproportionate to the environmental benefit gained. The final measure plotted exceeds this threshold, confirming that ALARP has been demonstrably achieved for this impact pathway.

Table F2-16 - Step-by-step ALARP Assessment – Artificial Light

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
1	Baseline Measures	See baseline table and discussion.	-	-	-	4	1	1	Baseline measures include legally required navigational lighting and a Lighting Management Plan. These measures set a foundational level of impact reduction and are not subject to modification due to their safety-critical nature. Their effectiveness is high in defining the minimum controllable level of light emissions.	Baseline measures involve no additional financial cost to CGG, as they represent legal requirements and company standards already embedded into routine operations. Their historical development involved significant investment, but their marginal cost is low.
2	Light Minimisation Measures	Shielded lighting, dimming technologies, and blackout curtains.	4	90%	3.6	0.4	5	6	The use of shielded lighting, dimming technologies, and blackout curtains directly reduces the intensity and spread of light emissions. These technologies interrupt the pathway between the source and light-sensitive fauna, making them highly effective in minimising impact. A 90% effectiveness rating has been applied to reflect this high performance without overstating precision - this value represents a well-established standard of effectiveness for measures targeting the light pathway directly.	These measures involve moderate upfront investment in technology and vessel outfitting, but they are well-established practices. Their high effectiveness justifies the cost, and the long-term operational burden is minimal.

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
3	CGG Marine Assurance System	Ensures compliance with laws and requires an OVID-style inspection prior to the survey to check the light management plan onboard.	0.4	90%	0.36	0.04	4	10	The Marine Assurance System ensures compliance with internal standards and maritime regulations, verified via OVID-style inspections. Its effectiveness lies in ensuring all vessels implement appropriate lighting controls consistently and reliably. The 90% rating is used here to maintain consistency and transparency in evaluating operational systems that consistently deliver high compliance outcomes.	The Marine Assurance System is a company standard. While the inspections involve administrative and operational overheads, these are already incorporated into CGG's workflow and contribute to multiple areas of compliance, keeping incremental cost moderate.
4	Survey Environment Advisor	Ensures the compliance with the sail line plan, the light management plan, inductions for the crews.	0.04	90%	0.036	0.004	12	22	The onboard Survey Environment Advisor ensures the correct implementation of procedures and alignment with the Sail Line Plan. Their role provides operational assurance and continuous improvement, further refining light minimisation performance on the ground. A 90% effectiveness rating is assigned to reflect the Advisor's strong role in implementation assurance.	The Survey Environment Advisor is an added operational resource. While their inclusion adds staffing cost and coordination requirements, the role provides broader assurance benefits beyond lighting and supports overall environmental compliance. The incremental cost is justified by the added certainty in implementation.

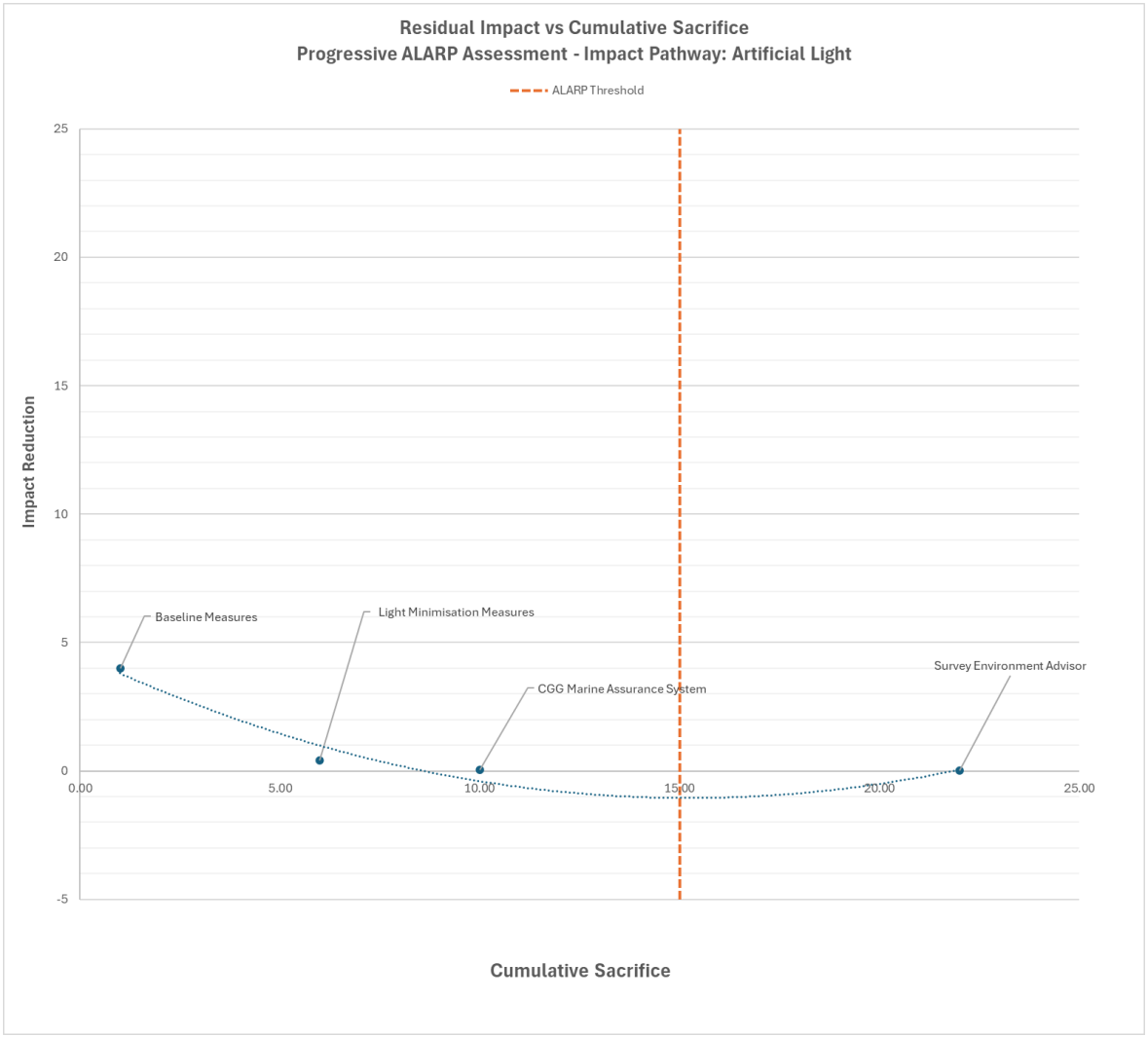

Figure F2-9 - Residual Impact vs Cumulative Sacrifice – Progressive ALARP Assessment for Artificial Light: The graph plots cumulative sacrifice (x-axis) against total impact reduction (y-axis), with a second-order polynomial trendline illustrating diminishing returns. The vertical dashed line represents the ALARP threshold, beyond which additional measures are rejected due to grossly disproportionate cost relative to benefit.

Figure F2-10 provides a combined visual summary of the ALARP assessment for artificial light, comparing the marginal environmental benefit of each control measure (bar graph) against the cumulative sacrifice required to adopt them (line graph). Each bar represents the level of residual impact reduction achieved by an individual or grouped control measure. The orange line tracks the total cost, time, or operational effort (sacrifice) accumulated with each successive measure. The graph illustrates that the greatest impact reduction was achieved through baseline measures, which include legally required lighting and spatial activity limitations. Additional measures, such as light minimisation technologies and procedural controls, yielded further reductions but at progressively higher cost for diminishing return. This contrast between bar height (benefit) and line steepness (cost) makes it visually clear where the balance between benefit and sacrifice begins to diverge — validating the point of inflection identified in the accompanying scatter plot. The chart therefore supports the conclusion that further measures, such as appointment of a dedicated Survey Environment Advisor, are grossly disproportionate and not required to reduce impact to ALARP. However, the Survey Environment Advisor is a measure already in place for other impact and risk mitigation and so remains an adopted control measure.

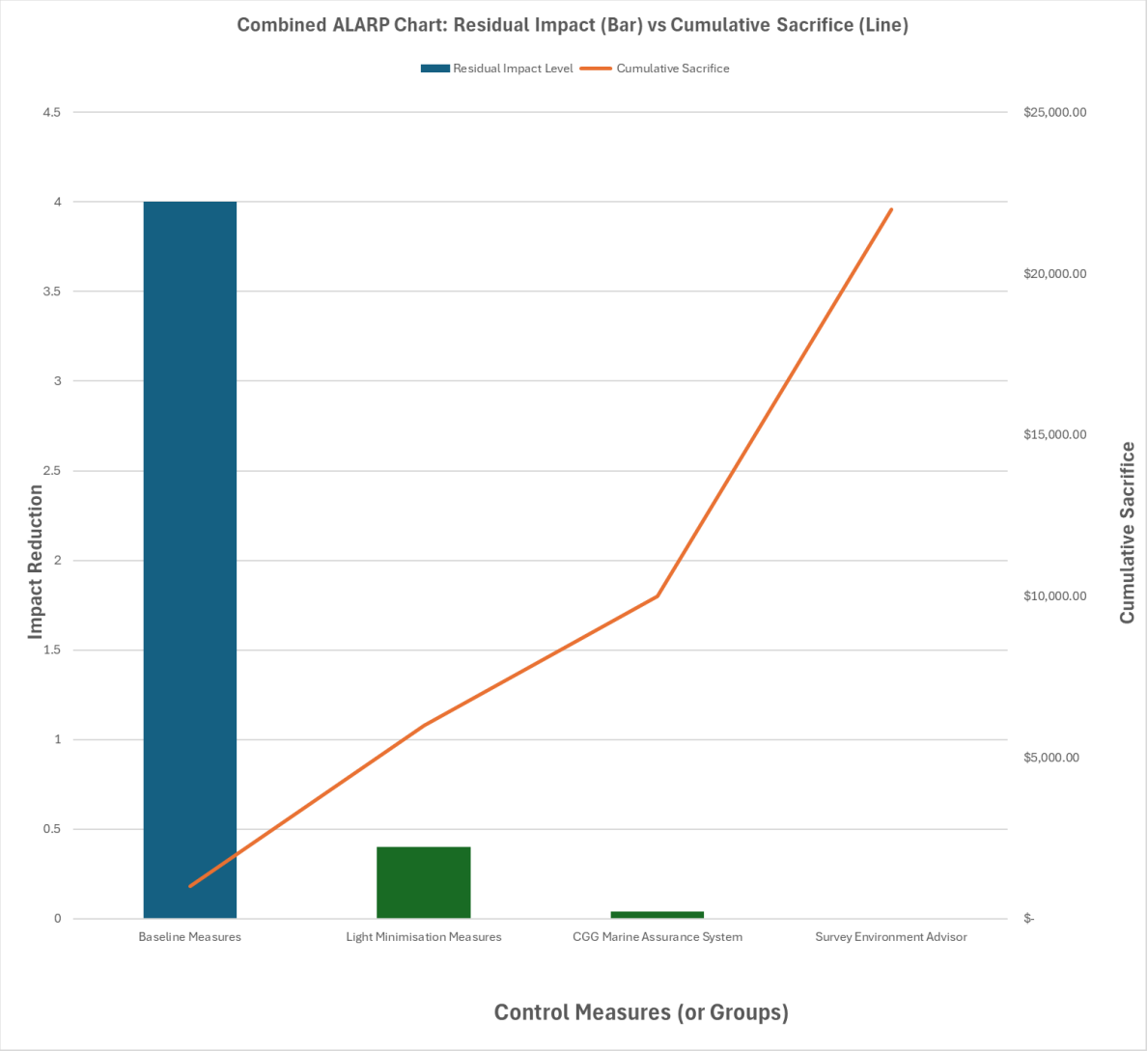

Figure F2-10 - Combined ALARP Chart for Artificial Light – Residual Impact Reduction (Bar) vs Cumulative Sacrifice (Line). The bar chart shows the impact reduction provided by each control measure or group, while the line chart illustrates the rising cumulative cost. This dual-axis visualisation highlights where diminishing returns occur and confirms that further sacrifice yields negligible environmental benefit beyond the ALARP threshold.

7 ALARP Assessment – Risks

Following the completion of the Preliminary Environmental Impact and Risk Assessment (PEIRA) (Appendix B4), and the subsequent full risk assessments (Appendices D1-4), this ALARP assessment covers the following risk pathways:

- Accidental release of materials or waste overboard.
- Collisions with marine fauna.
- Introduction of invasive marine species.
- Accidental release of fuel.

The following sections of this document assess each risk pathway in turn.

7.1 Accidental Release of Materials or Waste Overboard

7.1.1 Baseline

Table F2-17 specifies the activity limitations, legislative requirements, and components of the implementation strategy that have been considered in the establishment of a baseline risk level and baseline quantum of sacrifice.

Table F2-17 - Baseline Measures - Accidental release of materials or waste overboard

Baseline Measures	Inclusion Rationale	Intrinsic Effectiveness
Compliance with relevant legislation and MARPOL Annex V	This includes adherence to MARPOL Annex V, which sets strict rules on garbage discharge from vessels, including a complete ban on the discharge of plastics into the sea and specific controls on other types of waste. Vessels must maintain procedures for waste handling, install appropriate storage and disposal systems, and maintain records of all waste disposed. Regular inspections and audits are conducted to verify compliance.	High – Reduces the chance of illegal or accidental discharge and enforces consistent legal standards across operations.
CGG Marine Assurance System	The assurance system covers a range of practical measures to prevent waste from entering the marine environment. These include audits and inspection of contractors Garbage Management Plan, maintenance of a Garbage Record Book to log all disposals and transfers, use of clearly labelled and covered containers for segregated waste storage, and regular crew training.	High – Provides a structured and enforceable approach to prevent waste discharge through standardised procedures and oversight.
Support vessel recovery capacity	In the event of accidental loss of materials overboard, a dedicated support vessel is available to respond. The vessel is equipped with personnel and tools to assist in locating and retrieving floating or drifting materials, where recovery can be conducted safely. Operational procedures include communication protocols, response planning, and post-recovery documentation. Although reactive, this measure ensures that environmental harm can be reduced if an incident occurs.	Moderate – Helps reduce the consequences of accidental loss but does not prevent incidents from occurring.

The baseline sacrifice is set at 1.0 to provide a reference point for comparing other measures. This number does not mean the baseline is cheap or easy to implement. Meeting legal requirements and applying the CGG Marine Assurance System takes effort, resources, and planning.

- Compliance with relevant legislation and MARPOL Annex V requires vessels to maintain waste-handling systems, train crew, keep procedures up to date, and complete regular inspections.
- The CGG Marine Assurance System includes documentation, training, containment practices, and internal audits to ensure waste is handled correctly and in compliance with environmental standards.
- Support vessel recovery capacity involves maintaining readiness, equipment, and procedures to recover released materials safely and effectively if an incident occurs.

The outcome of the risk assessment for accidental release of materials or waste overboard was that the likelihood was ranked as minor (2) and the consequence ranked as unlikely (2). Therefore, the residual risk after the application of baseline measures is medium (4).

7.1.2 Assessment

Table F2-18 shows the step-by-step process followed for the ALARP assessment of release of waste. The reasons to support assigning percentage values for the intrinsic effectiveness (or environmental benefit) and the incremental sacrifice are provided in Table F2-18.

7.1.3 Consideration of Alternative, Additional, or Improved Control Measures

Several potential control measures were considered during the assessment process but not adopted, either because they offered minimal additional benefit or because their cost or complexity was disproportionate to the risk.

Real-time onboard monitoring

Tracking of all potential debris-generating equipment was considered. This would involve installing sensors and GPS tags on disposable items or high-risk components. While this could improve detection of overboard loss events, the effectiveness would be limited unless paired with immediate recovery actions. This option was reviewed in relation to Step 2. It was not adopted due to its high complexity, cost, and the fact that similar functions are already provided by the streamer recovery units, which are more practicable and widely applicable.

Deploying a dedicated marine waste observer

This role would involve real-time observation of deck activities and waste handling practices. While this could offer incremental assurance, it overlaps heavily with existing crew responsibilities. It was considered during discussion of baseline effectiveness (Step 1) and rejected on the grounds that existing controls already provide similar assurance, and the additional role would likely create redundancy without proportionate benefit.

In each case, alternative measures were either already covered in the existing system or provided marginal benefits that did not justify their implementation. The current combination of baseline and additional controls was found to be both effective and proportionate.

Table F2-18 - Step-by-step ALARP Assessment – Accidental Release of Waste

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
1	Baseline Measures	See previous tables.	-	-	-	4	-	1.0	The baseline is assigned high intrinsic effectiveness because it includes international legal compliance (MARPOL Annex V) and a structured corporate assurance system. These elements ensure all vessel waste is tracked, managed, and minimised, significantly reducing the chance of accidental release.	Assigned a unit value of 1.0 to represent the cumulative effort required to maintain compliance, implement controls, train personnel, and conduct audits. This reflects the total baseline burden rather than implying the measures are low cost or low effort.
2	Streamer Recovery Units	Streamers fitted with recovery units to prevent benthic disturbance and recover lost gear	4	60%	2.4	1.6	0.2	1.2	Streamer recovery units are moderately effective at reducing environmental harm by preventing gear loss and allowing for recovery. They reduce long-term seabed impacts and improve recoverability of materials. While they don't prevent releases, they enable quick response and clean-up.	An incremental sacrifice of 0.2 reflects the costs of installing, maintaining, and monitoring streamer recovery equipment across the spread. These systems add complexity but are manageable within existing marine operations.
3	Support Vessel	Provides capacity to recover released materials where safe and practicable	1.6	50%	0.8	0.8	0.2	1.4	The support vessel offers reactive risk reduction. It cannot prevent incidents but does lower residual impact by recovering waste after accidental release. Its effectiveness is dependent on conditions, crew availability, and time since release, so it is rated at 50%.	The incremental 0.2 rating accounts for operational planning, equipment checks, and readiness protocols. Since the support vessel is already part of operations, the added burden is considered moderate and proportionate.

7.1.4 Results

Figure F2-11 illustrates the reduction in residual risk achieved through successive control measures plotted against their cumulative sacrifice. The baseline measures provide the greatest risk reduction, reflecting established protocols and compliance with MARPOL and other maritime legislation. The addition of streamer recovery units and the deployment of a support vessel provide incremental risk reductions, though with increasing cost and complexity. The trendline clearly shows a flattening trajectory, indicating diminishing returns, and supports the conclusion that the most effective and proportionate measures have already been adopted. The ALARP threshold is shown at a cumulative sacrifice of 2.0, and all control measures fall below this, demonstrating they are proportionate.

Figure F2-12 is a combined ALARP chart that validates the assessment for the accidental release of materials or waste overboard risk pathway. It presents the residual risk reduction (bar) delivered by each control measure and the cumulative sacrifice (line) associated with implementing them. The baseline measures contribute the greatest reduction in risk, with additional benefits provided by streamer recovery units and support vessel deployment. While the incremental risk reductions are modest, all adopted measures remain within a reasonable sacrifice range. The steady rise in the cumulative sacrifice curve supports the conclusion that further measures would be grossly disproportionate relative to the low remaining risk.

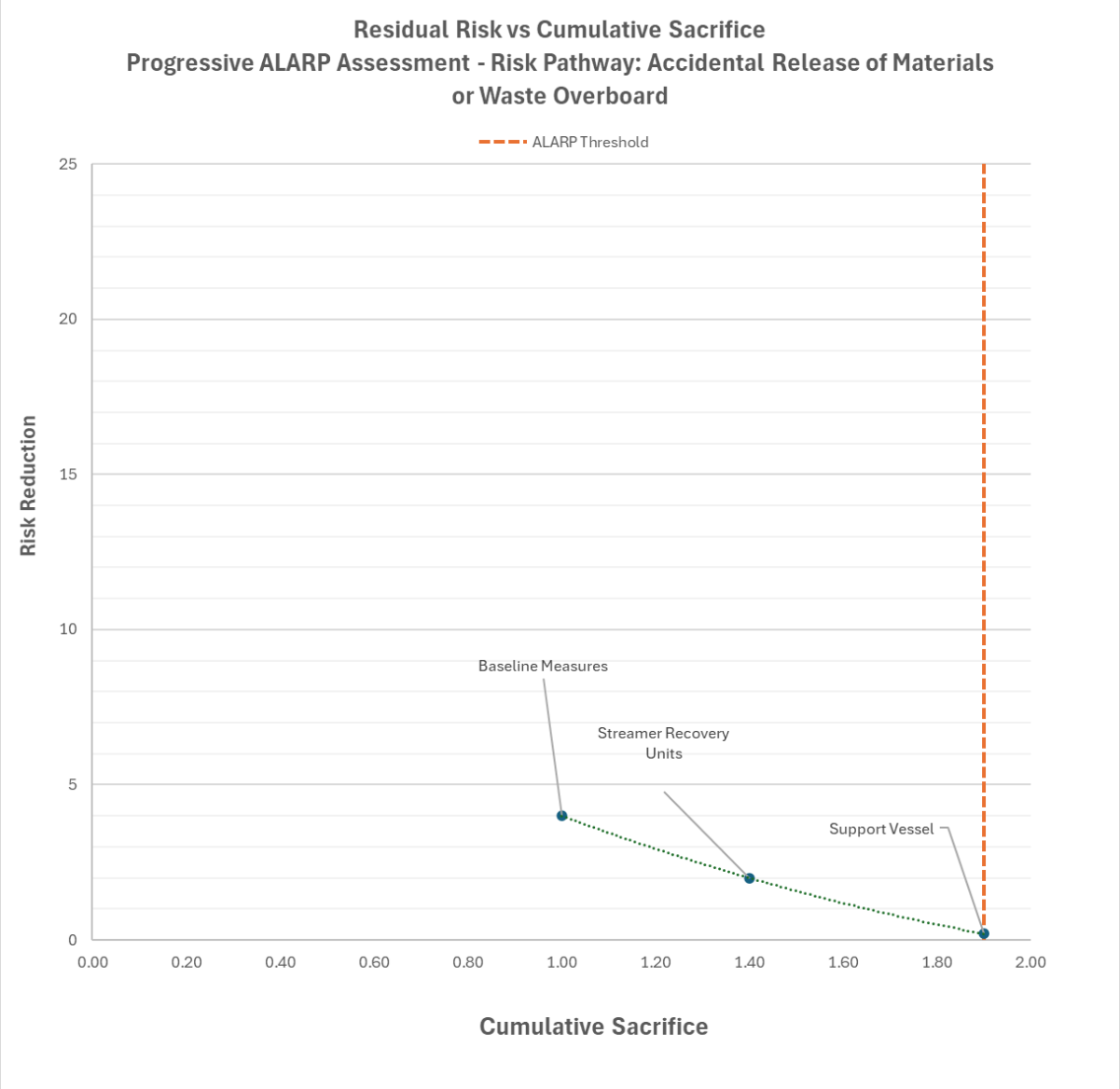

Figure F2-11 - ALARP chart showing residual risk reduction versus cumulative sacrifice for the Accidental Release of Materials or Waste Overboard risk pathway.

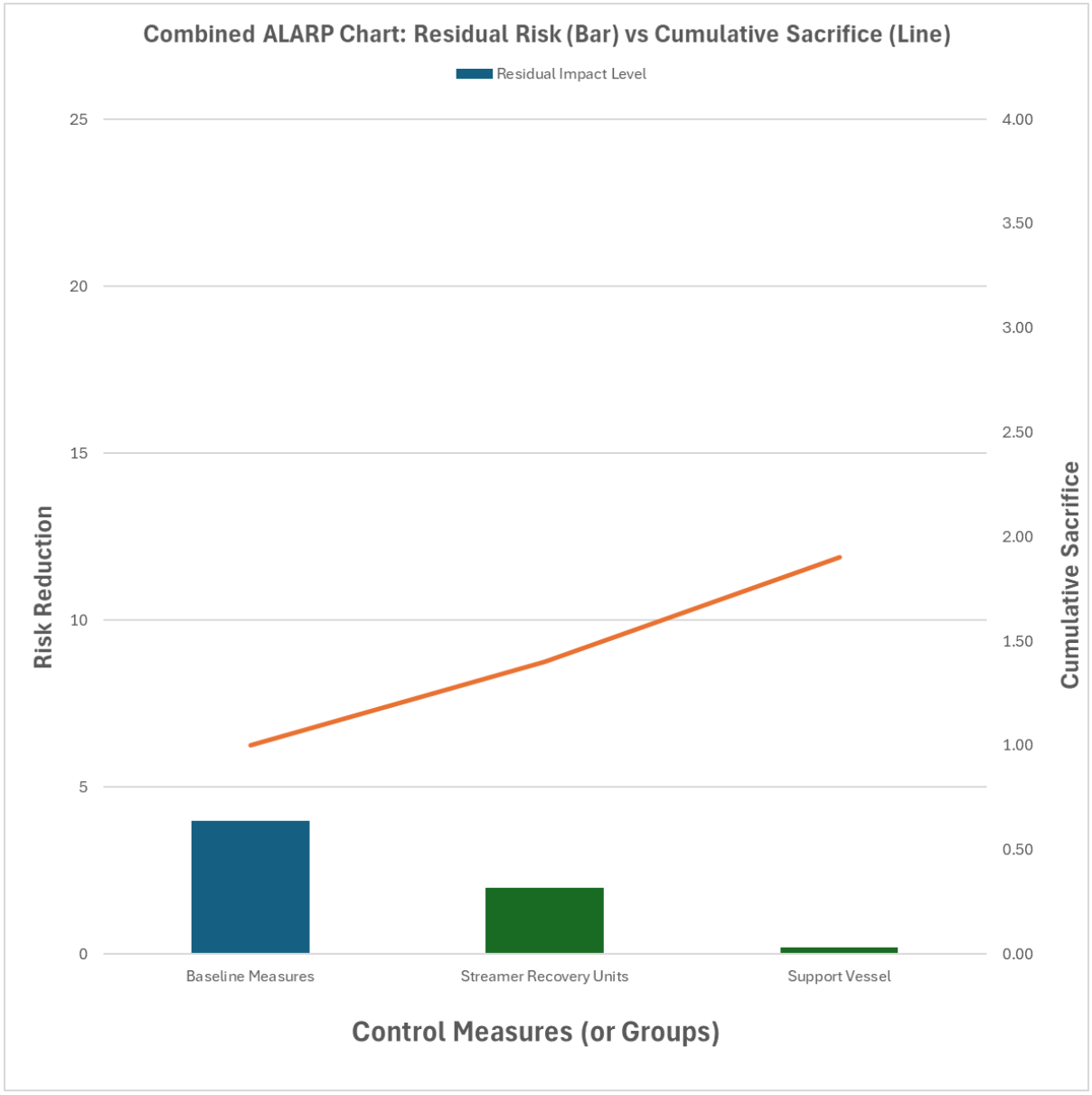

Figure F2-12 - Combined ALARP chart showing residual risk level (bars) and cumulative sacrifice (line) for the Accidental Release of Materials or Waste Overboard risk pathway.

7.2 Collisions with Marine Fauna

7.2.1 Baseline

Table F2-19 specifies the activity limitations, legislative requirements, and components of the implementation strategy that have been considered in the establishment of a baseline risk level and baseline quantum of sacrifice.

Table F2-19 - Baseline Measures – Collisions with Marine Fauna

Baseline Measure	Inclusion Rationale	Intrinsic Effectiveness
Vessel Speed Restriction	Seismic and support vessels limited to ≤6 knots during acquisition to reduce likelihood and severity of collisions with fauna, supported by national strategies and species-specific plans.	High – Lower vessel speed allows more time for fauna to detect and avoid the vessel, and for vessel operators to respond to sightings, reducing the probability and severity of collisions.
Fauna Management Plan	Implementation of Fauna Management Plan consistent with EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with Cetaceans and EPBC Act Policy Statement 2.1.	High – Clearly defined legal requirements provide a structured, enforceable approach to avoid and manage interactions with marine fauna, particularly cetaceans.
Activity Limitations (Timing)	Acquisition planned in shoulder periods for most whale abundance times. Avoidance of summer months is key.	High – Spatial and temporal planning minimises overlap with migrating whales, significantly reducing the likelihood of interactions during sensitive periods.
Marine Fauna Observers (MFOs)	Use of Marine Fauna Observers (MFOs) to maintain visual detection during operations. This includes MFO's on the spotter vessel.	High – Real-time detection of fauna enables immediate response, including shut-downs or course changes, to prevent interactions.

The outcome of the risk assessment for collisions with marine fauna was that the likelihood was ranked as rare (1) and the consequence ranked as major (4). Therefore, the residual risk after the application of baseline measures is medium (4).

The quantum of sacrifice for complying with the baseline has been calculated and includes the following:

- Operational speed limitation to ≤6 knots – This is the speed of the survey vessel as part of the acquisition; however, it does introduce some costs for other vessels fuel efficiency.
- MFO resourcing and training – Requires allocation of personnel with specialised skills, including pre-survey training and dedicated observer roles during acquisition, adding to staffing and operational expenditure.
- Compliance with separation zones under Fauna Management Plan – May necessitate course adjustments or activity pauses when fauna is detected within exclusion zones, potentially disrupting survey flow and efficiency.
- Seismic line planning and sequencing in high-risk seasons – Reduces scheduling flexibility and may require more complex operational planning to prioritise safer spatial-temporal windows.

The outcome of the risk assessment for accidental release of materials or waste overboard was that the likelihood was ranked as major (4) and the consequence ranked as rare (1). Therefore, the residual risk after the application of baseline measures is medium (4).

The cumulative quantum of baseline sacrifice is normalised to 1.0. All further control measures will be evaluated relative to this.

7.2.2 Assessment

Table F2-20 shows the step-by-step process followed for the ALARP assessment of collisions with marine fauna. The reasons to support assigning percentage values for the intrinsic effectiveness (or environmental benefit) and the incremental sacrifice are provided in Table F2-20.

7.2.3 Consideration of Alternative, Additional, or Improved Control Measures

No further control options are considered necessary. The baseline includes all identified measures from the risk assessment that deliver high effectiveness with proportionate cost. This includes extensive mitigation to reduce impacts from underwater sound, which serves as a deterrent to marine fauna and decreases the likelihood of vessel interactions. These acoustic and procedural safeguards, along with visual and acoustic detection measures, ensure that the likelihood of collisions is already low. Therefore, no further practicable measures were identified that would lower the residual risk without incurring disproportionate sacrifice.

7.2.4 Results

Figure F2-13 presents the progressive ALARP assessment for the *Fauna Collisions* risk pathway, mapping residual risk reduction against cumulative sacrifice. The baseline measures account for most of the risk reduction and establish a strong initial risk profile. A turtle entrapment mitigation measure delivers a moderate additional benefit at a proportionate cost and is therefore adopted. A third measure, Passive Acoustic Monitoring (PAM), while technically feasible, offers only marginal improvement in this risk reduction relative to the increased sacrifice required. Despite being positioned well beyond the point of diminishing returns, it has been adopted due to is application to other impact pathways. The ALARP threshold is clearly defined, and the curve confirms that the accepted measures fall within the range of proportionality.

Figure F2-14 is a combined ALARP chart which validates the progressive assessment for the fauna collisions risk pathway by displaying both the residual risk reduction (bar graph) and cumulative sacrifice (line graph) for each control measure. Again, baseline measures deliver most of the risk reduction, establishing a low initial residual risk level. The turtle entrapment mitigation measure contributes additional reduction at a proportionate cost. Passive Acoustic Monitoring, while technically feasible, provides only a marginal further reduction at a sharply increased cumulative sacrifice, placing it beyond the range of proportionality and confirming the rationale for rejection in the progressive assessment, though it is adopted to manage other impact pathways and thus will be adopted anyway. The steady rise in the cumulative sacrifice curve supports the conclusion that further measures would be grossly disproportionate relative to the low remaining risk.

Table F2-20 - Step-by-step ALARP Assessment – Collisions with Marine Fauna

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
1	Baseline Measures	See baseline table and discussion.	-	-	-	4	1.0	1.0	See individual ratings in previous tables.	1.0 (baseline normalised) – This represents the cumulative sacrifice across all baseline controls, including operational inefficiencies (e.g., low-speed transit), MFO labour and training costs, potential survey delays due to exclusion zones, and planning constraints.
2	Turtle Entrapment Mitigation	Tail buoys or streamers with no entrapment risk	4	60%	2.4	1.6	0.05	1.05	Addresses a rare but documented turtle entrapment risk by upgrading or modifying equipment that interacts with fauna near the surface. The 60% effectiveness rating reflects the ability of these equipment changes to eliminate a specific but low-frequency hazard. The rating is not higher because it is only one fauna group protected. The measure is targeted, effective in its narrow scope, and eliminates a known hazard when implemented correctly.	0.05 – This value is driven by the need to either retrofit or replace existing tail buoys with entrapment-safe alternatives. The cost is limited to equipment procurement or retrofit labour and applies only to vessels still using legacy buoys, making it low but not negligible.

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
3	Passive Acoustic Monitoring	Use of PAM during periods of low visibility or night-time to detect vocalising cetaceans and trigger mitigation action	1.6	40%	0.64	0.96	0.15	1.20	Moderate – PAM provides valuable detection capability during low-visibility conditions when visual observers are ineffective. It enhances detection of vocal species like baleen whales but is less effective for non-vocalising or deep-diving species. The 40% effectiveness rating reflects this selective capability. While PAM does not detect all fauna types, it provides strong coverage in conditions where visual monitoring fails, making it a meaningful but partial addition to detection capacity.	0.15 – This includes costs associated with equipment rental or purchase, deployment and calibration on vessels, additional staff or training to operate the system, and data interpretation. Cost is considered moderate due to specialised hardware and integration requirements already being adopted to manage other pathways.

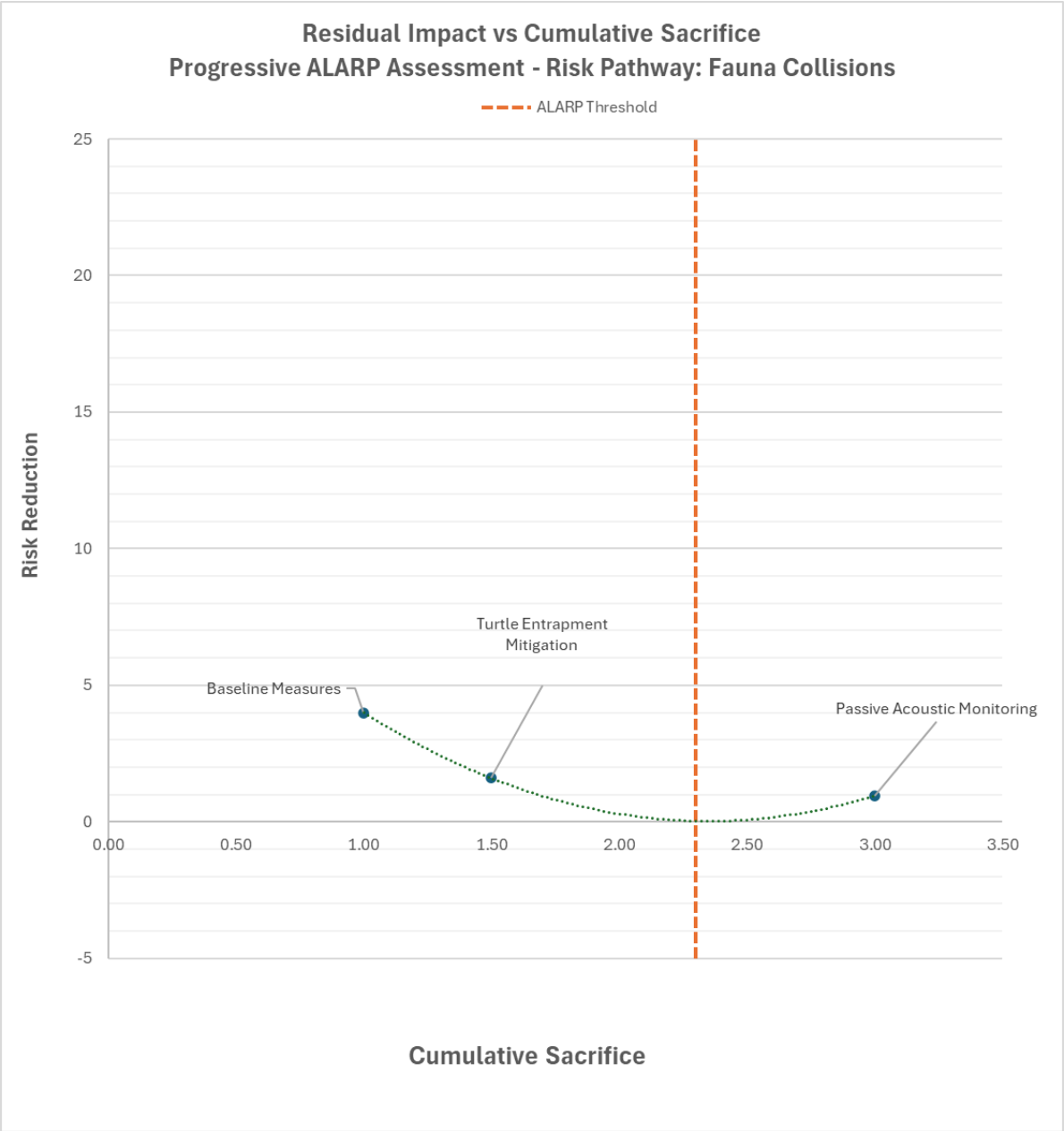

Figure F2-13 - Progressive ALARP assessment graph showing residual risk versus cumulative sacrifice for the Fauna Collisions pathway.

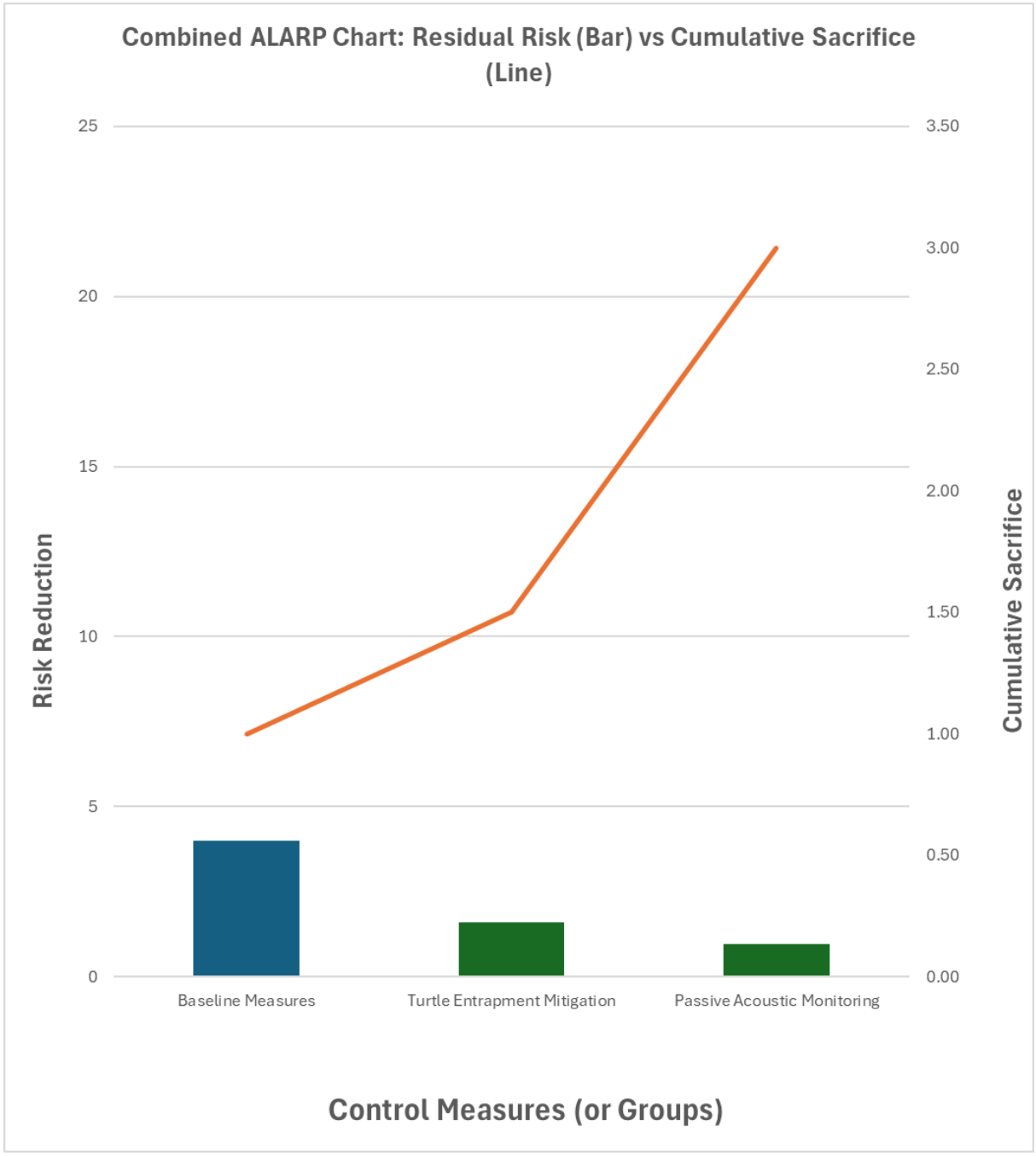

Figure F2-14 - Combined ALARP chart showing residual risk (bar) and cumulative sacrifice (line) for the Fauna Collisions risk pathway.

7.3 Introduction of Marine Pest Species

7.3.1 Baseline

Table F2-21 specifies the activity limitations, legislative requirements, and components of the implementation strategy that have been considered in the establishment of a baseline risk level and baseline quantum of sacrifice.

Table F2-21 - Baseline Measures – Invasive Marine Species

Baseline Measures	Inclusion Rationale	Intrinsic Effectiveness
Vessel contractor pre-qualification assessment	This measure ensures that only vessel contractors with acceptable biofouling management procedures and practices are considered for use. It aligns with internal environmental protection standards (GM-STD-MA-003) and acts as a proactive filter to reduce IMS risk at the earliest stages of planning and procurement. This pre-qualification assessment includes the preference for local vessels to reduce IMS risks.	This control ensures that only vessels with appropriate biofouling controls are used, reducing the risk of pest introduction by excluding unsuitable vessels at the planning stage.
OVID-style inspections	These inspections occur pre-port entry and provide assurance that marine pests are not present on vessels or associated subsea equipment. They include visual and documentary checks, cleaning verification, and adherence to vessel-specific mitigation procedures.	Real-time verification of vessel condition and cleanliness, including immersible equipment, significantly reduces the chance of live organisms being transported and introduced.
Operational Area Controls	Survey operations are excluded from zones of heightened sensitivity such as the Twelve Apostles Marine Park. Ballast water exchanges will be conducted outside of Marine Protected Areas. This reduces the potential for invasive species to enter high-value conservation areas and addresses specific concerns raised by regulators and stakeholders.	This measure eliminates the risk of IMS introduction into a nearby protected area and was adopted due to regulator and stakeholder concern.
Activity Design	The survey method avoids seabed contact by prohibiting anchoring and requiring all equipment to be stored on deck. This eliminates a major vector of pest translocation from vessel to marine habitat.	Equipment remaining on deck and absence of anchoring significantly reduces translocation opportunities for pests to reach the benthic environment.

The outcome of the risk assessment for invasive marine species was that the likelihood was ranked as Rare (1) and the consequence ranked as Major (4). Therefore, the residual risk after the application of baseline measures is Medium (4).

The quantum of sacrifice for complying with the baseline has been calculated and includes the following:

- Pre-deployment and port inspections: These require scheduling vessel access and personnel time, conducting physical inspections, and reviewing documentation for all vessels prior to mobilisation. This draws on internal resources, introduces potential delays, and requires coordination with port authorities and contractors.
- Survey design restrictions and procedural controls to minimise IMS introduction risk: These include route planning that avoids sensitive areas, procedural limitations on anchoring and equipment deployment, and dry-deck stowage requirements. They result in operational

limitations, require pre-mobilisation planning effort, restrict flexibility during operations, and may extend overall survey duration.

- Contractor management overheads: Additional effort is required to vet, select, and liaise with contractors that meet marine pest mitigation expectations. This includes clarifying standards, managing compliance documentation, and enforcing pre-qualification requirements.
- Regulatory compliance checks and documentation: Ensuring all necessary documentation for ballast water, biofouling, and other marine pest-related compliance is obtained, validated, and stored imposes administrative burden and coordination time.
- Internal coordination and assurance: Interdisciplinary coordination across environmental, operations, and logistics teams is needed to implement and oversee baseline controls, adding planning and review hours.

These combined costs and efforts form the cumulative baseline sacrifice, which is assigned a unit value of 1.0 in the ALARP assessment. This allows subsequent discretionary control measures to be evaluated proportionally.

7.3.2 Assessment

Table F2-22 shows the step-by-step process followed for the ALARP assessment of invasive marine species. The reasons to support assigning percentage values for the intrinsic effectiveness (or environmental benefit) and the incremental sacrifice are provided in Table F2-22.

Table F2-22 - Step-by-step ALARP Assessment – Invasive Marine Species

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
1	Baseline Measures	See baseline table and discussion	-	-	-	4	1.0	1.0	See baseline table	See baseline discussion
2	Anti-fouling Systems	All contracted vessels must have properly maintained anti-fouling systems in compliance with international standards	4	80%	3.2	0.8	0.2	1.2	The 80% effectiveness rating reflects that anti-fouling systems, when properly maintained and certified, provide a significant barrier to marine pest settlement and survival on vessel hulls. This high rating accounts for their broad coverage of vessel surfaces and prolonged effectiveness in limiting fouling if regularly inspected and reapplied. The increased rating reflects confidence in newer technologies and the industry's maturity in applying them.	The sacrifice is rated moderate (0.2) because antifouling is already a regulatory requirement for international shipping and most petroleum vessels. Additional cost comes from ensuring records are up-to-date, maintenance is current, and periodic inspections and certifications are maintained beyond standard operating requirements.
3	CGG Marine Assurance System	Governance framework ensuring implementation and verification of vessel and operational biosecurity controls through prequalification, inspections, and record keeping	0.8	65%	0.52	0.28	0.2	1.4	The CGG Marine Assurance System provides a structured governance mechanism to confirm that vessel-based controls (e.g., biofouling management, inspection regimes) are being properly implemented. A 65% rating reflects its central role in verifying compliance and integrating assurance into the planning cycle, though its effectiveness depends on the quality of oversight and the willingness of contractors to comply.	The incremental sacrifice is moderate (0.2), reflecting the effort involved in administration, audits, documentation, and corrective actions. However, much of the infrastructure is already embedded in CGG systems and represents an extension of existing assurance functions.

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
4	IMS Risk Assessment Procedure	Structured assessment aligned with national standards, ensures inspections of vessels and immersible equipment	0.28	70%	0.20	0.08	0.3	1.7	A 70% effectiveness rating is justified because the IMS Risk Assessment Procedure systematises checks across vessels and immersible equipment, ensuring compliance and reducing the likelihood of oversight or inconsistency. This structured process adds discipline and repeatability, particularly in complex multi-vessel operations.	A moderate sacrifice value of 0.3 is assigned, reflecting the resources needed to develop, administer, and audit the procedure across operations. While the cost is non-negligible, it delivers a proportionate benefit through improved assurance, documentation, and rigour.

7.3.3 Consideration of Alternative, Additional, or Improved Control Measures

A structured feasibility scan was conducted as part of the IMS risk review. Additional or alternative measures such as deploying IMS-detection technologies or stationing a dedicated marine pest observer onboard were considered but found to deliver negligible additional benefit relative to their cost and operational burden.

Ballast water and biofouling compliance checks were considered at Step 4 and have been adopted as part of the IMS Riak Assessment Procedure. These checks ensure vessels comply with national and international legislation (e.g., Ballast Water Management Convention). The inclusion ensures discharge and hull fouling risks are actively managed in line with regulatory obligations and industry best practice. These checks directly prevent common vectors of marine pest transmission, including ballast water discharge and unmanaged hull biofouling, and provide coverage across all key pathways.

Hull cleaning and/or new antifouling coat application to vessel hull and niche areas prior to the Regia MSS was also considered. While this measure offers some environmental benefit, it was rejected on the grounds that the benefit is marginal when extensive existing measures are already in place. The cost of undertaking inspections and hull cleaning could range from tens to hundreds of thousands of dollars, depending on vessel size and operational logistics. Implementing this requirement uniformly across all vessels was considered disproportionate to the residual level of risk, especially where vessels already demonstrate low IMS risk profiles. The sacrifice associated with this measure was estimated at 2.0, well beyond what is considered reasonably practicable given the minor additional effectiveness.

Improved IMS risk assessment procedure specific to the Regia MSS was also considered. The existing procedure already mandates that an IMS risk assessment be conducted on vessels and immersible equipment by a qualified IMS inspector prior to mobilisation to the operational area. As such, creating a procedure specific to the Regia MSS was assessed to provide no additional environmental benefit. The associated cost was modest, estimated at 0.01, but the measure was still rejected as unnecessary given the strength of the existing risk management process.

The control measures assessed were found to achieve an overall risk reduction from medium to low and were assessed as reasonably practicable. No further measures were found to offer proportionate environmental benefits to justify their adoption at the current residual risk level.

7.3.4 Results

Figure F2-15 presents the risk reduction achieved through the implementation of control measures for the invasive marine species risk pathway, plotted against the cumulative sacrifice incurred. The baseline measures deliver the largest initial reduction in risk and represent mandatory compliance with biofouling and ballast water management requirements. Additional control measures—including the CGG Marine Assurance System, use of anti-fouling systems, and an Invasive Marine Species (IMS) Risk Assessment Procedure—deliver smaller incremental improvements in risk reduction. However, all measures are adopted prior to the point of diminishing returns, with the IMS Risk Assessment Procedure sitting just before the ALARP threshold. The curve remains downward sloping, indicating continued effectiveness, though with reduced marginal gains per unit of sacrifice.

Figure F2-16 validates the assessment of the pathway by displaying residual risk reduction (bar) alongside the cumulative sacrifice (line) for each successive control measure. The greatest reduction is delivered by the baseline measures, while the incremental environmental benefit of anti-fouling systems, the CGG Marine Assurance System, and the IMS Risk Assessment Procedure is modest by comparison. The cumulative sacrifice increases with each additional measure, but all adopted controls remain below the ALARP threshold, confirming their proportionality and value in further

reducing risk. This is despite a significant disproportion between the final measure and the cumulative sacrifice.

Based on this evaluation, and considering the high cumulative effectiveness of baseline and adopted control measures, the pathway is assessed to be reduced to ALARP.

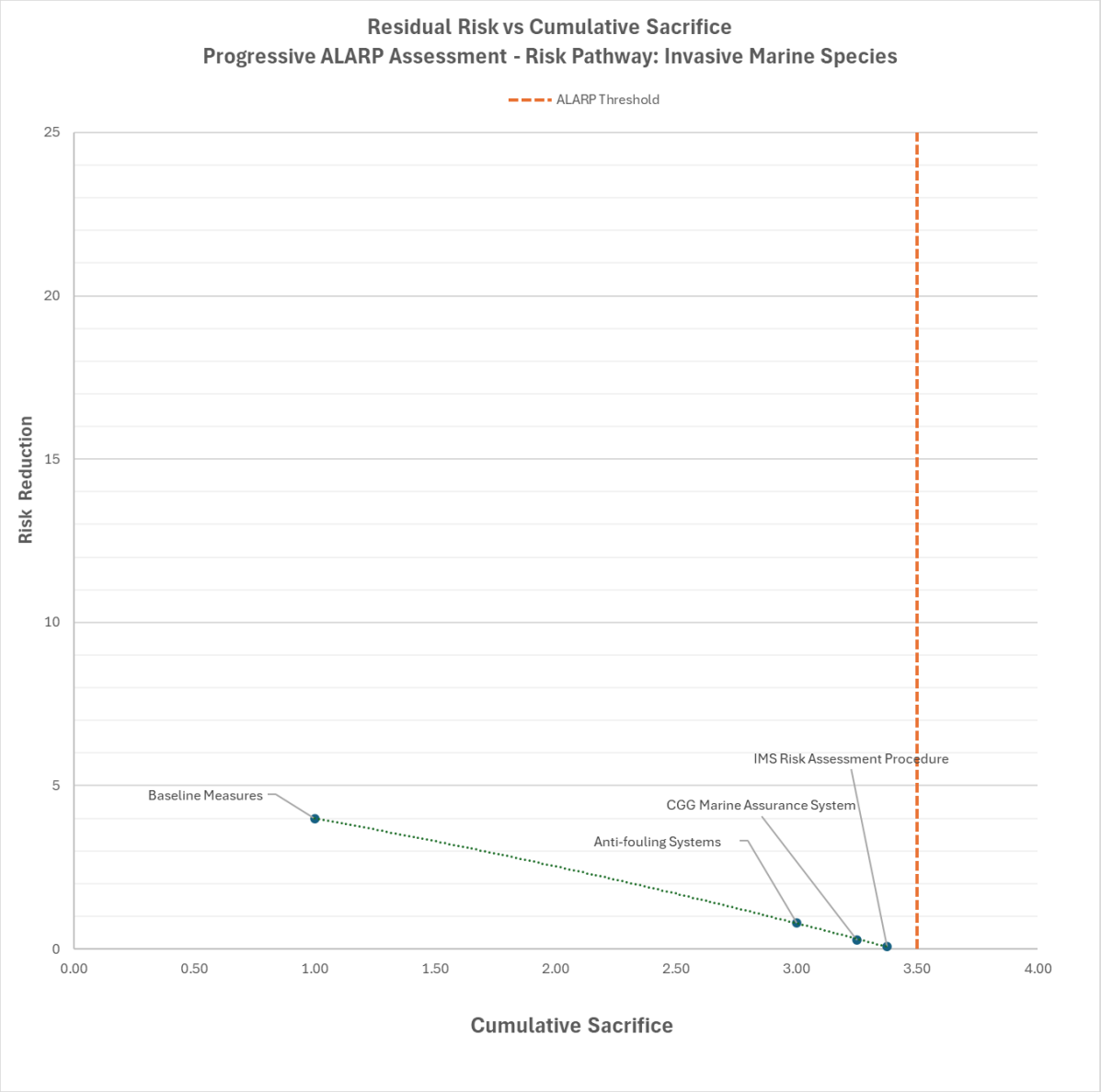

Figure F2-15 - Progressive ALARP assessment for the Invasive Marine Species risk pathway showing residual risk reduction versus cumulative sacrifice.

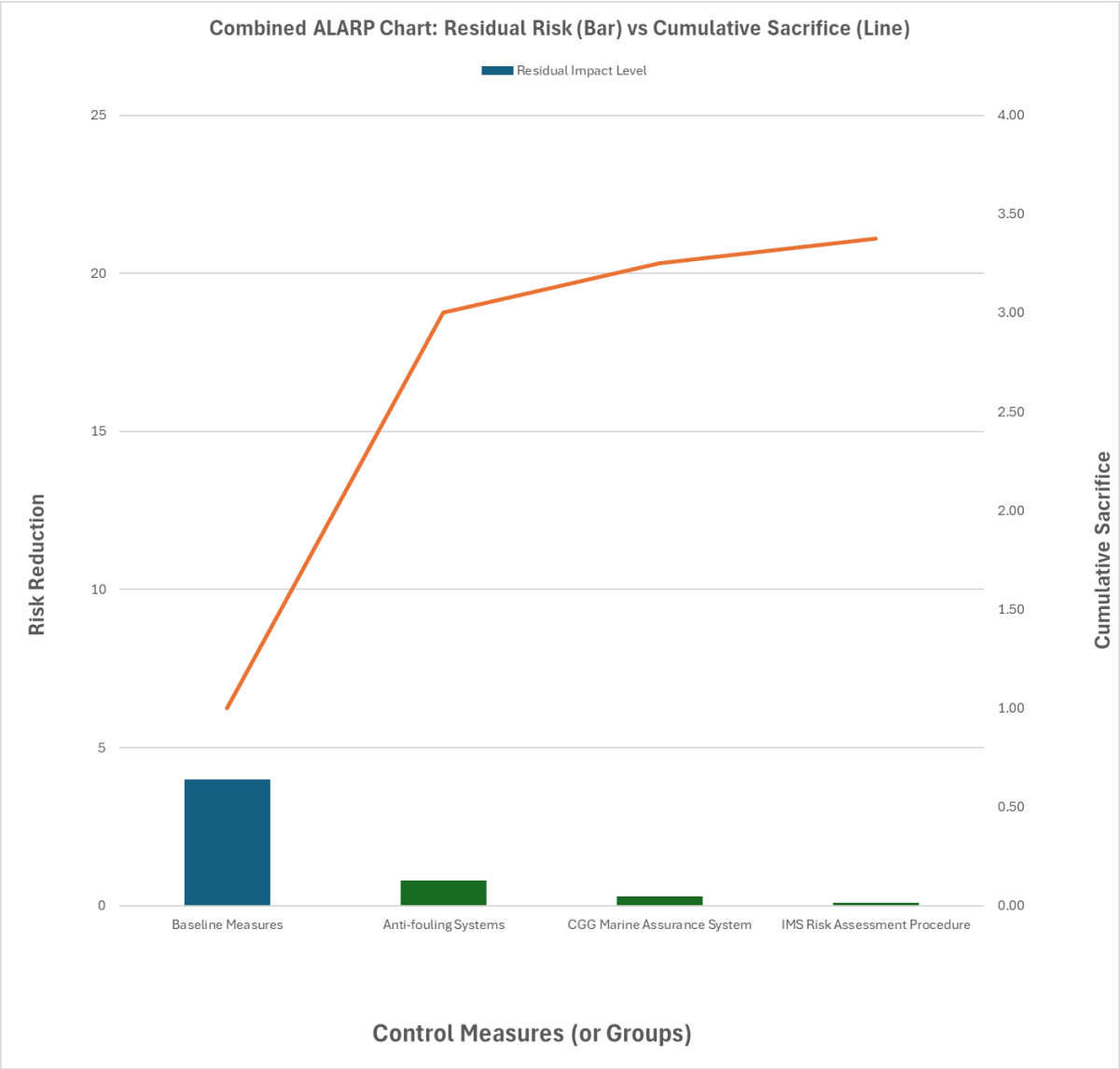

Figure F2-16 - Combined ALARP chart showing residual risk reduction (bars) and cumulative sacrifice (line) for the Invasive Marine Species risk pathway.

7.4 Accidental Release of Fuel

7.4.1 Baseline

Table F2-23 specifies the activity limitations, legislative requirements, and components of the implementation strategy that have been considered in the establishment of a baseline risk level and baseline quantum of sacrifice.

Table F2-23 - Baseline Measures – Accidental Release of Fuel

Baseline Measure	Inclusion Rationale	Intrinsic Effectiveness
Fuel inventory capped at 250 m³	Fuel tank inventories limited to 250 m³ to reduce maximum credible spill volume.	Limiting the fuel tank inventory directly constrains the worst-case volume of spill in the event of a loss of containment, reducing potential impact footprint and aiding spill response effectiveness.
No bunkering within 50 km of marine parks	Bunkering restrictions reduce the risk of fuel exposure to sensitive marine environments in the unlikely event of a spill.	Limiting bunkering locations spatially near marine parks protects biodiversity values and minimises the consequence of a potential release.
Compliance with marine legislation	Compliance with Navigation Act, MARPOL, COLREGS and Marine Orders ensured by CGG Marine Assurance System.	Legislative compliance is critical in ensuring industry-accepted safe vessel operation standards are adhered to, thereby minimising the risk of vessel incidents that could lead to fuel spills.
Use of dry-break couplings during refuelling	Use of dry-break couplings during refuelling to limit maximum credible release. Whilst this is an item of equipment it is also a legislative requirement for at-sea bunkering.	Dry-break couplings minimise the volume of release in the event of a refuelling hose failure, offering both preventative and containment benefits.
Spill response equipment and crew training	Vessel spill response equipment and training in place for immediate containment and response.	Readily available response equipment and trained personnel provide the ability to quickly contain a spill, minimising its spread and potential impact.
Emergency Plans	The Shipboard Oil Pollution Emergency Plan (SOPEP) and Oil Pollution Emergency Plan (OPEP) are legislative requirements detailing the role of vessel masters, CGG and AMSA in the event of an oil spill.	The SOPEP and OPEP ensure a coordinated and compliant emergency response in line with national expectations, ensuring roles, communication, and resourcing are clear during an incident.
Operational and Scientific Monitoring Plan (OSMP)	Operational and Scientific Monitoring Plan (OSMP) developed to identify effects of a fuel release. It is a legislative requirement.	Monitoring allows for timely detection of environmental effects and informs escalation or remediation actions, supporting environmental protection outcomes.

The outcome of the impact assessment for accidental release of fuel was that the likelihood was ranked as Rare (1) and the consequence ranked as Moderate (3). Therefore, the residual risk after the application of baseline measures is Medium (3).

The quantum of sacrifice for complying with the baseline has been calculated and includes the following:

- Engineering, design, and operational constraints to limit fuel tank capacity to 250 m³, ensuring that potential spill volume remains within manageable limits.

- Development, acceptance, and ongoing implementation of a NOPSEMA-compliant Oil Pollution Emergency Plan (OPEP), including scenario planning, response escalation, and stakeholder coordination protocols.
- Procurement and installation of dry-break coupling systems across relevant fuel transfer lines, minimising potential release volumes during hose or valve failure.
- Purchase, placement, and maintenance of vessel spill response kits, including absorbents, booms, and portable containment, along with regular crew training in their deployment.
- Integration of fuel containment and transfer risk controls within the CGG Marine Assurance System, encompassing routine inspections, audit procedures, and contractor compliance obligations.
- Design and deployment of an Operational and Scientific Monitoring Plan (OSMP) tailored to hydrocarbon release scenarios, supported by contingency arrangements for escalation to AMOSC and/or scientific advisors.

The baseline for this risk pathway is intentionally set at a high level because any accidental release of fuel is considered unacceptable. In this context, investment in preventive controls delivers the highest environmental return and is a necessary foundation for achieving ALARP. These baseline measures represent a comprehensive package of activity limitations, legally mandated requirements, and established good practice measures. As a result, the additional controls assessed in this ALARP process build upon an already low residual risk. This means their relative incremental sacrifices appear small in comparison. However, this does not mean they are low-cost or trivial to implement. The cumulative quantum of baseline sacrifice is normalised to 1.0. All further control measures will be evaluated relative to this.

7.4.2 Assessment

Table F2-24 shows the step-by-step process followed for the ALARP assessment of Accidental Release of Fuel. The reasons to support assigning percentage values for the intrinsic effectiveness (or environmental benefit) and the incremental sacrifice are provided in Table F2-24.

Table F2-24 - Step-by-step ALARP Assessment – Accidental Release of Fuel

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
1	Baseline Measures	See baseline table and discussion.	-	-	-	4	1.0	1.0	See discussion above.	See discussion above.
2	Support Vessel	Additional vessel support prevention of collision	4	95%	3.80	0.20	0.4	1.4	The support vessel provides navigational safety by front-running the seismic vessel, clearing potential hazards and actively communicating with oncoming traffic. It also holds the capability to tow the seismic vessel in case of mechanical failure, significantly reducing the likelihood of a scenario that could lead to an accidental release of fuel. This high intrinsic effectiveness score (95%) reflects its proactive role in avoiding both collision and loss-of-position incidents.	The sacrifice reflects the high operational cost of chartering, crewing, fuelling, and maintaining a dedicated support vessel for the duration of the survey. Although it provides multiple safety functions, the investment is substantial, particularly as the risk has already been reduced through previous procedural controls. However, the full cost of the support vessel wouldn't be the correct allocation as it functions to reduce other impacts and risk. A score 0.4 has been assigned to this sacrifice.
3	CGG Marine Assurance System	Contractor vessel vetting system for safety, pollution, and refuelling standards	0.20	50%	0.10	0.10	0.2	1.6	The CGG Marine Assurance System introduces a structured vessel vetting process focused on pollution prevention and refuelling safety. The environmental benefit is modest, given overlap with baseline legal obligations, but it strengthens consistency and quality assurance across contractors. It is highly effective because it must always be applied by CGG and includes pre-survey audits and inspections but due to the overlap with legislative measures only receives a score of 50%.	The associated sacrifice includes moderate administrative and financial burdens such as audit coordination, vessel pre-qualification, and potential scheduling delays if vessels fail assurance. This is not a one-off or periodic investment relative to operational scale, justifying a small sacrifice rating of 0.2.

Step	Short Title	Detail of Control Measures	Res Previous	IE (%)	MR	Res After	Incremental Sacrifice	Cumulative Sacrifice	Intrinsic Effectiveness	Sacrifice Quantum
4	Vessel Bunkering Procedure	Procedure for supervision and hose integrity checks during fuel transfers.	0.10	90%	0.09	0.01	0.3	1.9	The Vessel Bunkering Procedure introduces formal checks for hose integrity, spill trays, and supervision during all refuelling activities. It significantly reduces the likelihood of small operational spills, which represent the most credible release scenario for this pathway. Its high effectiveness score (90%) reflects its clear and targeted function, ease of implementation, and strong compatibility with baseline controls.	The sacrifice primarily arises from additional crew time during refuelling, adherence to procedure, and minor scheduling adjustments. These are modest increases in operational burden and are easily absorbed by vessel crews. Given its high effectiveness and practical implementation, a moderate incremental sacrifice of 0.3 is justified.
5	Petroleum SIMOPS Plan	Requires coordination across all petroleum activities in the region.	0.01	20%	0.002	0.008	0.3	2.2	The Petroleum SIMOPS Plan sets out procedures for managing simultaneous operations between vessels, with specific attention to coordination during refuelling. While its effectiveness (20%) is lower than previous measures due to its indirect role, it helps reduce confusion and human error in multi-vessel operations, particularly during bunkering. It integrates well with the baseline measures and supports procedural clarity during higher-risk transfer activities.	The sacrifice is associated with upfront planning effort, crew training, and inter-vessel communication protocols. While not resource-intensive, it requires alignment between different operational teams and regular updates, especially during dynamic offshore campaigns. The procedural overhead and ongoing coordination needs justify a moderate sacrifice rating of 0.3. For this risk alone the measure would be grossly disproportionate. However, it is adopted for management of other impacts and risks so will be useful for management of this risk too.

7.4.3 Consideration of Alternative, Additional, or Improved Control Measures

One additional control measure was considered:

Double-Walled or Internal Fuel Tanks

Double-walled or internal fuel tanks offer an additional barrier against fuel loss in the event of a hull breach or collision. These are increasingly found on modern vessels and can materially reduce the likelihood of a release due to external damage. However, retrofitting vessels with such tanks is not reasonably practicable due to prohibitive costs and technical complexity. Therefore, this measure has only been partially adopted by giving preference to vessels with double-bottomed or double-walled tank configurations during vessel selection as part of the CGG Marine Assurance System. The associated sacrifice was estimated at 4.4, reflecting the significant financial and scheduling implications of requiring double-walled tanks. This approach achieves a partial benefit by incorporating the measure at the procurement stage without imposing retroactive modification obligations.

7.4.4 Results

Figure F2-17 illustrates the results of the progressive ALARP assessment for the risk pathway accidental release of fuel, plotting residual risk reduction against cumulative sacrifice. The baseline measures deliver most of the risk reduction, with the addition of the support vessel, CGG Marine Assurance System, and the vessel bunkering procedure offering further reductions. The Petroleum SIMOPS Plan contributes only marginal additional reduction, with increasingly disproportionate costs. The trendline confirms the presence of diminishing returns, with the inflection point reached prior to adoption of the final measures. Due to small additional benefit, the SIMOPS Plan falls just below the ALARP threshold and is retained due to their broader impact and risk management utility. The analysis shows that most of the effective risk reduction is achieved early, reinforcing the efficiency of the baseline controls.

Figure F2-18 shows a combined ALARP chart for the accidental release of fuel risk pathway validates the results of the progressive assessment by displaying both residual risk reduction (bar) and cumulative sacrifice (line) for each control measure. The baseline measures deliver the largest reduction in risk, while successive measures such as the support vessel, CGG Marine Assurance System, and vessel bunkering procedures contribute incremental improvements. The Petroleum SIMOPS Plan, while offering minimal additional reduction, incurs a substantial cumulative sacrifice. The vertical reference line indicates where costs become grossly disproportionate, confirming that this final measure lies at the margin of acceptability and should be scrutinised carefully. The chart supports the earlier finding that diminishing returns are reached quickly and reinforces the value of early-stage control measures.

Based on this evaluation, and considering the high cumulative effectiveness of baseline and adopted control measures, the pathway is assessed to be reduced to ALARP.

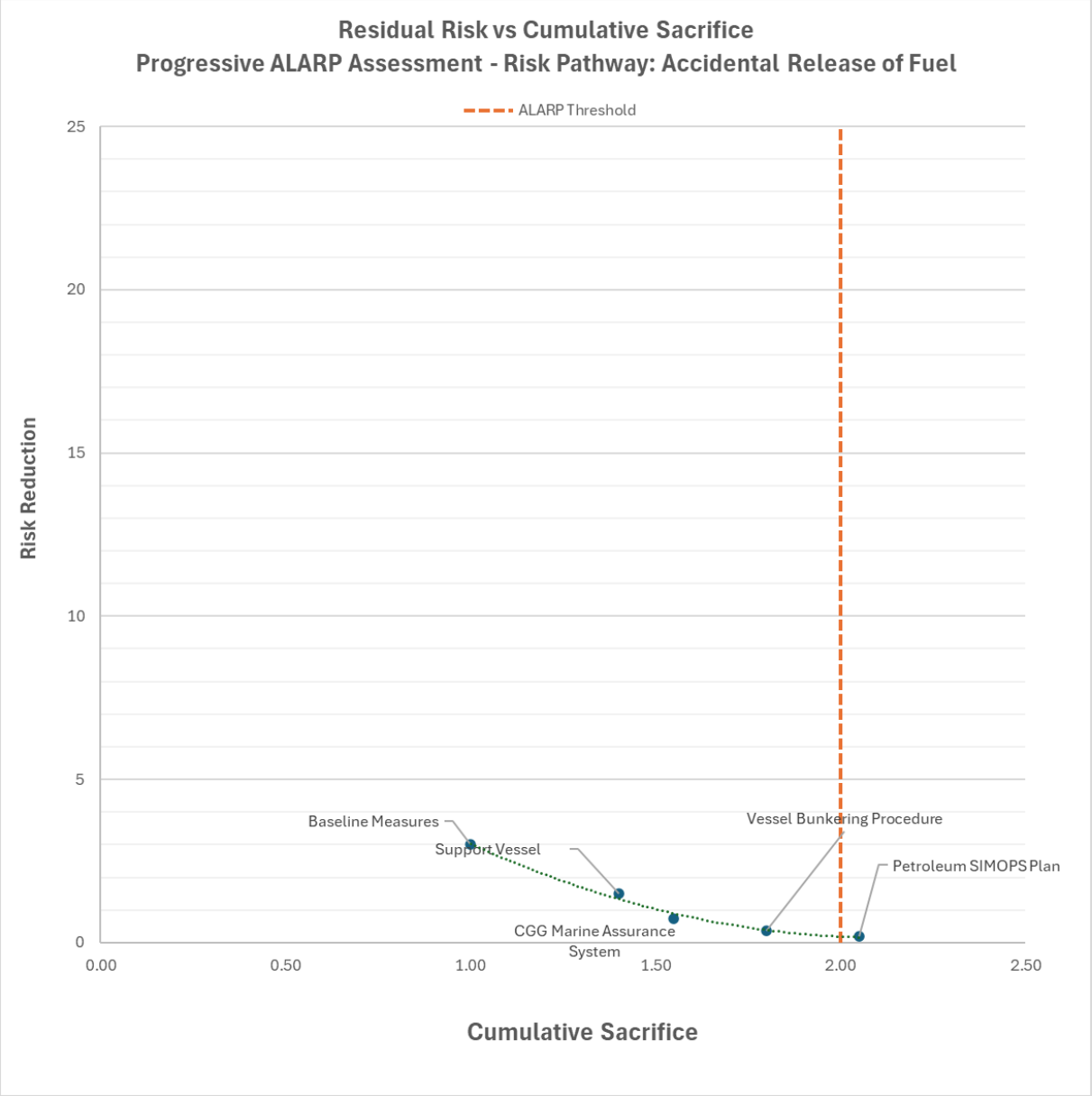

Figure F2-17 - Residual Risk vs Cumulative Sacrifice for the Accidental Release of Fuel risk pathway, demonstrating that most of the risk reduction is achieved through baseline and early-stage controls, with later measures yielding marginal gains approaching the ALARP threshold.

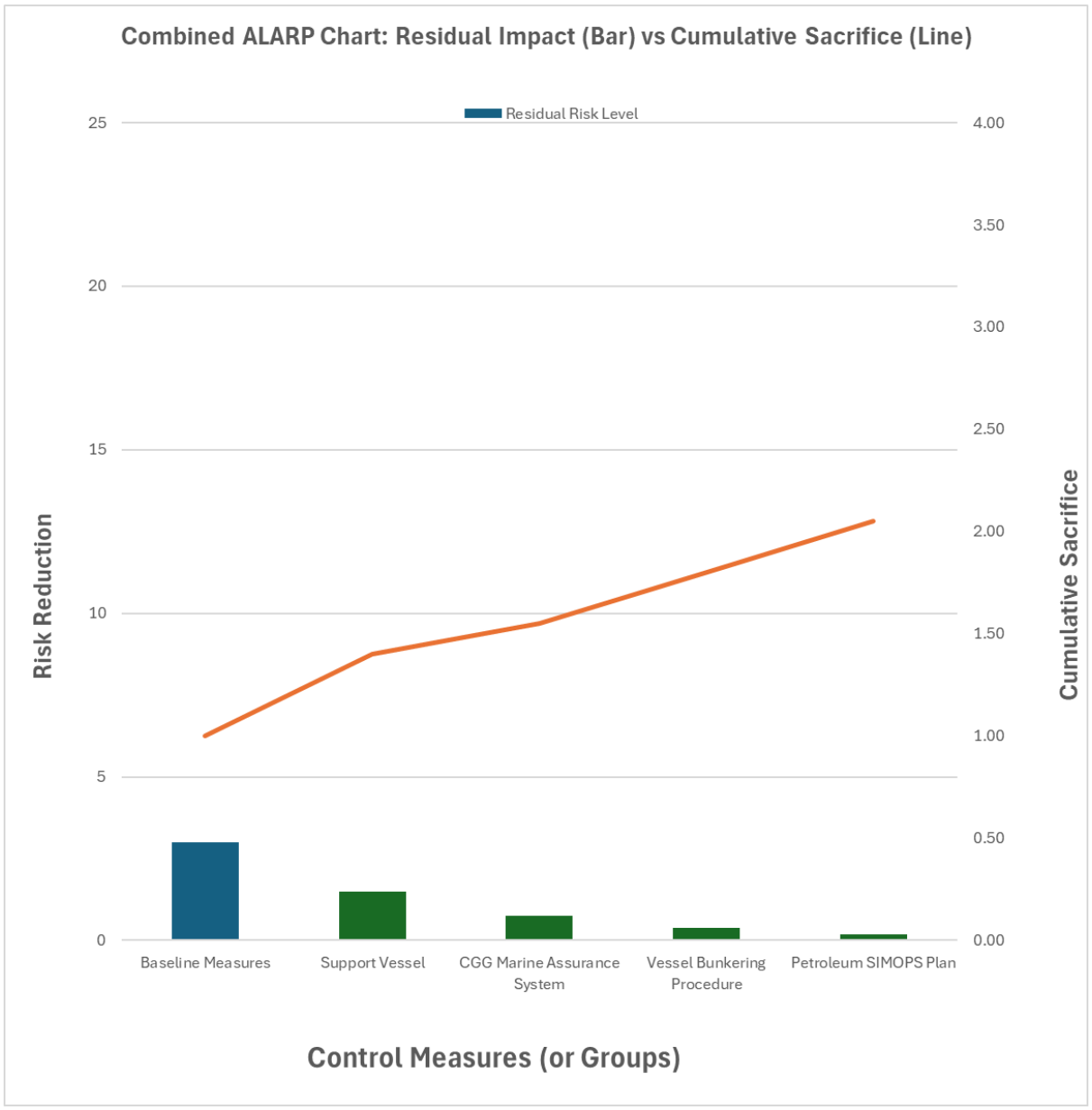

Figure F2-18 - Combined ALARP chart showing residual risk reduction (bar) and cumulative sacrifice (line) for the Accidental Release of Fuel risk pathway, highlighting diminishing returns and validating the ALARP threshold for identifying grossly disproportionate measures.

8 Conclusion

CGG have used a semi-quantitative approach that shows how much environmental benefit is achieved for every unit of sacrifice we invest - reduction per unit of sacrifice. In simple terms this is like the term '*return on investment*', but for environmental performance. It allows us to compare across all the different environmental impact and risk pathways and present a strong demonstration that each is managed to ALARP.

Figure F2-19 presents the environmental impact/risk reduction per unit of sacrifice across all assessed cause effect pathways. The value is calculated by dividing the total reduction in residual impact or risk by the cumulative sacrifice (expressed as a relative unit) associated with the implementation of adopted control measures. This metric highlights the relative return on investment for each pathway in terms of environmental benefit per unit of cost, time, or operational complexity.

Higher values indicate pathways where significant environmental improvements were achieved with a commensurately higher degree of sacrifice. For example, Planned Discharges and Atmospheric Emissions show low returns (i.e. a lower reduction per unit of sacrifice) because the baseline measures achieved almost complete mitigation with minimal additional sacrifice. Conversely, Underwater Sound and Physical Presence exhibit higher returns due to the large reduction per unit of sacrifice required to reduce impacts that are inherently difficult to manage, reflecting both the complexity and the uncertainty involved.

This analysis complements the ALARP assessments completed for each pathway by illustrating the comparative efficiency of mitigation efforts, helping to validate that resources were allocated in a proportionate and defensible way.

The calculation of impact/risk reduction per unit of sacrifice (i.e. total reduction divided by cumulative sacrifice) provides a normalised measure of efficiency across different impact and risk pathways. It tells you how much environmental benefit is being gained for every unit of effort, cost, or time invested.

This is especially valuable because:

1. It allows for comparison across pathways: Each impact or risk pathway is different in scale, consequence, and complexity. By normalising the return on sacrifice, this calculation shows where investments in control measures are most efficient — and where they may offer diminishing returns.

2. It validates proportionality: ALARP assessments must demonstrate that impacts and risks are reduced in proportion to their significance. This metric helps show that greater effort has been applied where potential harm is greatest, aligning with the core principle of focusing resources where they matter most.

3. It supports decision-making: When determining whether further control measures are warranted, this value helps to identify when additional effort would result in marginal benefit — a key consideration in recognising the point of gross disproportion.

4. It's defensible: If challenged, this ratio helps explain and justify why some measures were adopted and others were not. It shows that decisions were not arbitrary but grounded in a consistent, semi-quantitative framework.

5. It is visually communicative: When plotted in a figure, it provides a compelling illustration of where value was achieved — and helps non-technical audiences understand the logic used in environmental protection.

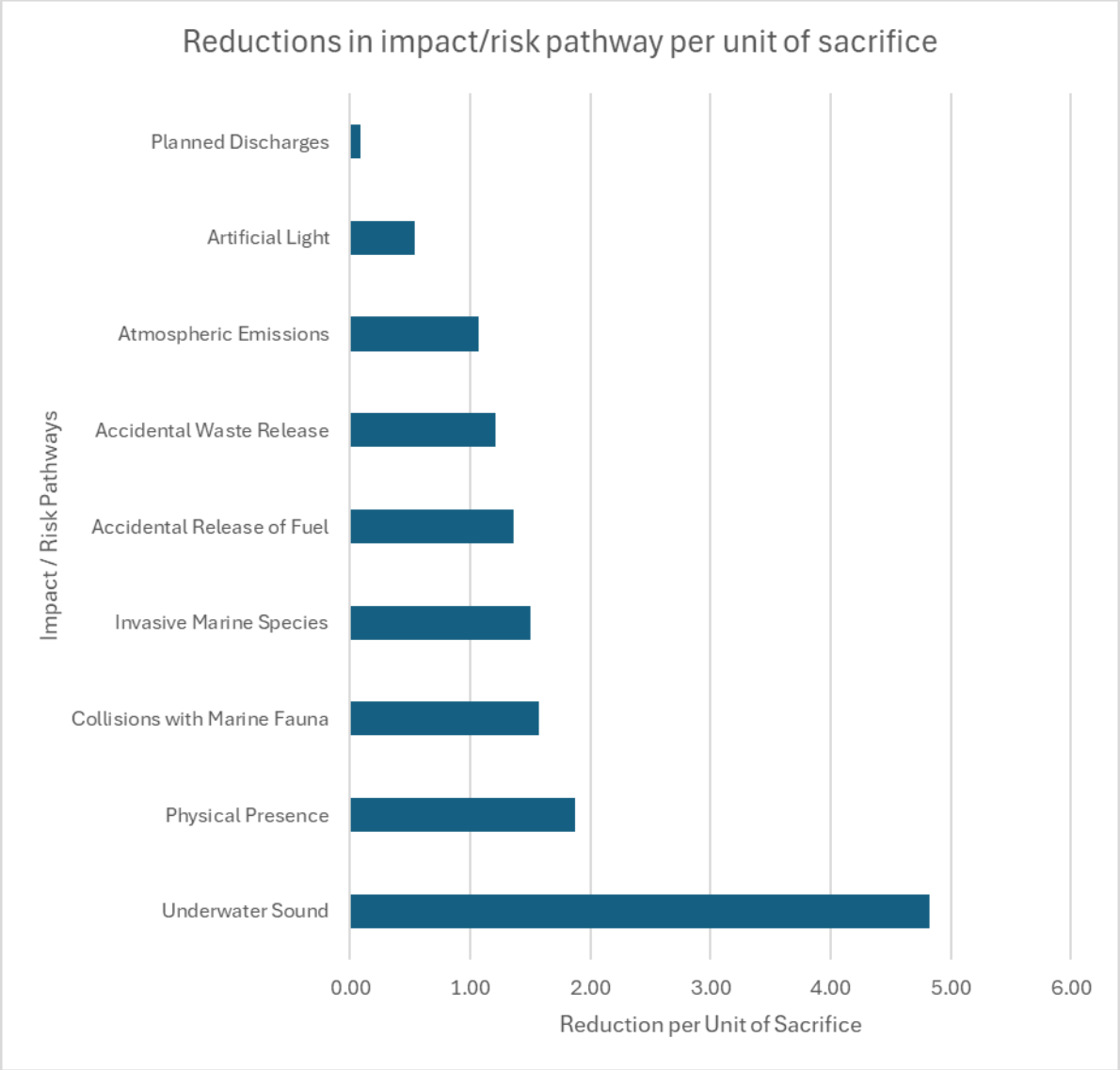

Figure F2-19 - Environmental Impact/Risk Reduction per Unit of Sacrifice for Each Assessed Pathway.

The ALARP assessments presented in this report demonstrate that control measures have been applied with appropriate proportionality across all impact and risk pathways. The analysis shows that pathways associated with the greatest potential for environmental harm — such as underwater sound and physical presence — received the most significant investment and yielded the highest levels of risk and impact reduction per unit of sacrifice. Conversely, for pathways where residual impacts / risks were already very low after baseline measures, further reduction would have required disproportionate sacrifice for limited benefit and was therefore not pursued.

This outcome reflects a systematic, thorough, disciplined and evidence-based application of the ALARP principle, ensuring that each control measure adopted contributes meaningfully to impact and risk reduction and that cumulative effort has been directed where it matters most. The framework applied throughout this assessment supports a conclusion that impacts and risks have been reduced to a level that is as low as reasonably practicable.

9 Document Control

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	29 June 2023	MS	Template created.
0.1	1 October 2023	MS	Updated with control measures from impact and risk assessments.
0.2	6 October 2023	SJ	Reviewed for consistency with the impact and risk assessments.
1	29 December 2023	MS	Updated following consultations and polished for submission to NOPSEMA.
2	15 May 2024	RH/AC/MS	Updated after public comment to include adoption of a dedicated spotter vessel and MFOs for marine fauna detection.
3	7 November 2024	MS	Updated following NOPSEMA assessment.
4	16 April 2025	MS	Updated following NOPSEMA assessment to include all the background data and methodology that underpinned previous work. Reset baselines to accommodate differences across each impact/risk rather than one anchor point baseline to allow comparison.
5	9 December 2025	MS	Updated following NOPSEMA assessment.

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Annex 1- Public Comment

The completed EP was published for public comment on the NOPSEMA website on 25 Jan 2024 for a 30-day period, closing 26 February 2024. Table F2-25 shows how this feedback has been incorporated into the environmental assessments.

Table F2-25 - Public comment input into the preparation of the EP.

Matter	Matter ID	Changes made arising from public comment
Matter: Consideration of alternative survey technology	O01	CGG acknowledges claims regarding the consideration of alternative survey technologies and EP Appendix F2 (ALARP Assessment) has been updated to include additional information on this assessment.

Annex 2- Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table F2-26. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table F2-26 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4137	Mention of installing sound curtains underwater to reduce destructive sound.	Bubble curtains are not suitable for a moving activity, nor are other measures such as acoustic blankets. This has been included in the ALARP assessment.	2830
4297	The stakeholder requested to know the total cost of the MSS so they could ascertain if ALARP had been reached, as a cost-benefit analysis. The information provided by the titleholder to date was deemed insufficient to know if ALARP had been achieved.	Outlined the concept of 'costs' is more than the narrow interpretation of a monetary value, it includes money, time and trouble. Outlined that the 'cost' of a control measure could be weighed against total costs of the survey for context but that this point of reference fails to consider the environmental benefit of adopting the control. Agreed that the current presentation of ALARP could be improved and that CGG would prepare a dedicated report explaining how we have reached decisions about what measures needed to be adopted (Event ID 4062).	4062
4339	What new technologies are CGG considering for reducing impacts?	Provided the reasons that these technologies are currently not proposed, however acknowledge that they aren't explicitly excluded and if they become viable as the design of the activity is refined, they'll be considered (Event ID 4280).	3705
4359	Request for seismic blasting to be limited to 12 hours out of any 24-hour period and not carried out at night	The titleholder acknowledged this concern, however undertaking the seismic survey only in daylight hours would have a disproportionate cost without a significant environmental benefit. The survey would take twice as long, potentially resulting in cumulative effects to sensitive species.	2821
4178	Seismic should not be used; use alternative methods to seismic blasting to map the seabed.	No measures were adopted because of this claim. Utilising acoustic sources for marine seismic surveying provides a framework grounded in extensive research and practical experience. Their environmental impacts, both short-term and long-term, have been studied, facilitating the development of effective mitigation strategies. On the other hand, marine vibriosis, while holding promise as a newer technology, is not only more expensive but also shrouded in technical and environmental uncertainties. Its long-term effects, particularly concerning particle motion and its potential impact on marine ecosystems and sensitive aquatic species, remain inadequately explored. Exploring these environmental impacts is unlikely until the technology is commercially competitive. Until we have a comprehensive grasp of these implications, it is prudent to rely on technology with known and manageable impacts rather than embracing potentially riskier avenues	3145

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		with unforeseen or highly uncertain environmental impacts.	
4375	Claims that threats from the survey to SRW and their migration routes and HCTS means that impacts from the Regia survey are not ALARP.	Event ID 6529 - ALARP (As Low As Reasonably Practicable) is a criterion used to determine whether control measures should be implemented by balancing the environmental benefit with the sacrifice required for their adoption. NOPSEMA guidance and the Regia MSS EP provide details on how to demonstrate that environmental impacts and risks are reduced to ALARP. The stakeholder claims that "such threats do not pass the ALARP test," but its statements about SRWs and the eastern SRW population, some of which are directly copied from the SRW National Recovery Plan, fail to address control measures, their benefits or costs, or critique the ALARP demonstration presented in the Regia MSS EP. As a result, this claim is unclear in its application of the ALARP concept. CGG is open to further educating the stakeholder on the ALARP concept, assuming they are trying to provide information that might lead CGG to reconsider the control measures implemented or rejected, which have already demonstrated that environmental impacts and risks of the proposed Regia MSS have been reduced to ALARP.	6410
4488	Claims that CGG has not incorporated effective control measures to reduce impacts and risks to ALARP or to ensure those impacts will be acceptable. It maintains that several control measures in the Environment Plan (EP) are inconsistent or conflicting, making them difficult or impossible to implement. GMTOAC further contends that CGG has weakened its mitigation framework compared with the November 2024 EP by replacing required sound-source shutdowns with an undefined “low power zone” when Karntubul (Southern Right Whales) are present. Also, that CGG has not ensured its activity will avoid unacceptable impacts on Koorn Moorn, which feed in Nyamat Mirring waters extending 200 m around Deen Maar Island. It claims CGG has not used the best available science in its noise modelling and has relied on comparative analyses rather than updated models, making results difficult to interpret. Additionally, GMTOAC argues	CGG maintains that the Environment Plan (EP) incorporates effective control measures and satisfies the legal requirements for demonstrating that impacts and risks have been reduced to As Low As Reasonably Practicable (ALARP) and to an acceptable level. It asserts compliance with Regulation 34 and emphasises that its environmental performance outcomes and controls are grounded in the best available science and tailored to the identified ecological and cultural sensitivities. Culturally significant species and features, including Karntubul and Koorn Moorn, are included in impact and cumulative risk assessments using a methodology intended to reflect both scientific evidence and cultural. CGG argues that GMTOAC’s objections substitute personal disagreement for the regulatory test, noting that the legislation does not require stakeholder agreement or grant veto powers over EP design decisions. While GMTOAC criticises the revised ALARP assessment methodology (April 2025 EP), CGG reiterates that its approach satisfies the regulatory criteria. In response to claims that mitigation measures have “weakened”, particularly the shift from sound-source shutdowns to a “low power zone”, CGG characterises these changes as part of a normal, adaptive, and consultation-driven refinement process. It describes the evolution of the activity as a progressive reduction in operational footprint, increasingly targeted controls, and strengthened performance-based measures, noting that core protections such as timing restrictions to avoid Karntubul birthing seasons remain in place.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	that the revised ALARP assessment methodology introduced in the April 2025 EP, intended to address flaws in the November 2024 version, is inadequate, less systematic, and less defensible than the earlier approach.	CGG states that cultural and ecological sensitivities associated with Karntubul, Wuuloc, and Koorn Moorn have been integrated into the assessment, with Appendix F3 acknowledging their cultural significance and informing mitigation commitments. CGG reiterates that its control measures are based on contemporary scientific evidence and incorporate cultural and ecological sensitivities throughout the EP.	
4489	Claims that CGG cannot determine what constitutes an "acceptable" level of impact or risk to Gunditjmara cultural values in Nyamat Mirring. States the April 2025 Environment Plan contains flawed cumulative impact assessments due to this lack of consultation. GMTOAC identifies several shortcomings: CGG's interpretation of potential impacts to Gunditjmara and other First Nations cultural heritage is too narrow; CGG wrongly assumes that acceptable ecological impacts equate to acceptable cultural impacts; and CGG's cumulative impact assessment for Karntubul (Southern Right Whale), previously criticised by NOPSEMA in its February OMR, remains unchanged.	CGG rejects GMTOAC's claim that inadequate consultation prevents CGG from determining "acceptable" levels of cultural impact, asserting that it fully met its consultation obligations. CGG argues that the legal test is whether the Environment Plan demonstrates impacts and risks are reduced to ALARP and to an acceptable level. It maintains that GMTOAC's critiques conflate subjective opinion with the regulatory standard under Regulation 34 and emphasises that the law does not grant stakeholders a veto over design decisions. In response to the assertion that its interpretation of cultural heritage is too narrow, CGG maintains that GMTOAC has already articulated its cultural values clearly and extensively through published materials and received during consultation. These values, encompassing ceremony, obligations, kinship systems, spiritual relationships, and ecological connections are thoroughly integrated across the EP. The EP references the Nyamat Mirring Plan 2023–2033, incorporates cultural values and sensitivities into Appendix F3, and identifies culturally significant species and places as sensitive receptors with tailored management measures, for example, timing restrictions to avoid birthing seasons. CGG states that it has incorporated analysis of cumulative effects on Sea Country, including those arising from the survey in combination with other activities. It confirms that Karntubul is included in cumulative risk assessments with corresponding mitigation commitments.	EVT352
4507	GMTOAC objects to the ALARP methodology used in CGG's April 2025 Environment Plan (EP). In that EP, CGG adopts a "semi-quantitative" approach that begins with a baseline of assumed controls, including legal requirements and activity limitations, and then applies additional measures to which CGG assigns its own "effectiveness scores." GMTOAC argues this framework is even less systematic, transparent, or reproducible than the ALARP method rejected by NOPSEMA in 2024, as it allows CGG to define both the starting level of predicted impacts and the magnitude of their reduction.	GMTOAC's critique of the Regia MSS ALARP assessment is based on misunderstandings of the regulatory framework, the ALARP principle, and the methodology set out in Appendix F2. CGG clarifies that the ALARP baseline includes all legally required control measures and activity limitations, which cannot be altered or removed. Assertions that the baseline is arbitrarily constructed or manipulable are therefore incorrect. CGG also notes that GMTOAC's arguments are internally inconsistent, for example, claiming the baseline is both too rigid and too flexible. CGG rejects GMTOAC's claims that only measures reducing source noise can reduce noise impact, explaining that acoustic impact management relies on avoiding exposure through detection tools, shutdown zones, and real-time monitoring. Similarly, CGG clarifies that support personnel and the Whale Expert Panel are not "double counted" but serve as additional assurance mechanisms beyond baseline staffing.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	GMTOAC notes that CGG's selected "baseline" already incorporates key operational controls, shutdown procedures, exclusion zones, and seasonal timing restrictions, that CGG itself has full discretion to modify or strengthen. By embedding these controls in the baseline rather than treating them as adjustable mitigation measures, CGG effectively limits the scope for further impact reduction and risks underestimating the true level of harm. Despite this favourable baseline, CGG still predicts "High" impacts on marine mammals from underwater sound. The reduction of these impacts to "acceptable" levels is achieved by applying effectiveness scores to additional measures such as increased personnel, enhanced detection equipment, or expanded monitoring. GMTOAC argues this is flawed because these measures do not physically reduce noise exposure; they only increase the likelihood of detecting whales. In several cases, CGG appears to "double count" controls, treating them as part of the baseline while also awarding them separate effectiveness scores, which artificially reduces the predicted level of harm. GMTOAC highlights particularly problematic examples, such as CGG assigning an 80% effectiveness rating to "support personnel" and then reducing predicted harm by 80%, even though those personnel merely enable measures already included in the baseline. Similarly, CGG gives towed passive acoustic monitoring (PAM) a 50% effectiveness score and cuts predicted impacts in half, even though PAM cannot detect silent whales and has no ability to reduce noise levels themselves. Overall, GMTOAC concludes that the ALARP methodology	CGG notes that PAM is appropriately assessed and contributes to reducing exposure risk, with effectiveness ratings justified in the EP. Overall, CGG concludes that GMTOAC's critique lacks evidentiary support and overlooks the structured, transparent, and regulator-aligned approach presented in Appendix F2.	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	used by CGG lacks scientific defensibility and systematically underestimates risk. GMTOAC expresses deep concern that this approach may not genuinely reduce impacts to Nyamat Mirring, its ecosystems, culturally significant species, or cultural values to acceptable or legally required levels.		

Annex 3- Ensuring Integrity in ALARP Assessments

Guidance for Assessors

Assessors are responsible for ensuring that ALARP assessments are conducted with transparency, conservatism, and discipline. While the methodology provides structure, it still relies on subjective judgments, particularly when assigning intrinsic effectiveness and estimating sacrifice. These areas are vulnerable to manipulation, whether intentional or inadvertent. To ensure the assessment remains robust and credible, assessors should:

- **Avoid Overestimating Intrinsic Effectiveness:** Resist the temptation to assign high effectiveness scores without strong justification. When there is uncertainty in the measure's performance (e.g. due to operational limitations, environmental variability, or limited evidence), a conservative estimate should be used. This ensures that the assessment does not prematurely conclude that further control measures are unnecessary.
- **Strengthen and Clarify Sacrifice Justifications:** Sacrifice should be expressed in clear, comparable terms—ideally in monetary value, but also in time and operational effort where appropriate. Avoid vague or speculative estimates. Ensure it is clear whether the sacrifice is incremental to the baseline and whether all relevant costs (e.g. training, maintenance, or implementation complexity) have been considered.
- **Document the Rationale Clearly:** Intrinsic effectiveness and sacrifice are not standalone numbers. They must be supported by detailed justification that references functionality, availability, reliability, independence, and compatibility (for effectiveness), or cost components and practical implications (for sacrifice). If a value cannot be substantiated, reassess its inclusion.

Guidance for Reviewers

Reviewers play a critical role in ensuring the ALARP assessment is applied with rigour and that conclusions are genuinely justified. When reviewing an assessment, be alert to signs of poor discipline or potential manipulation. These include:

- **Repeatedly High Effectiveness Scores:** Be cautious where multiple measures are assigned very high intrinsic effectiveness (e.g. 80–90%) without clear justification. This pattern may indicate that the assessment has been structured to reduce residual impact/risk too quickly, limiting the evaluation of other reasonable measures.
- **Vaguely Justified or Inflated Sacrifice:** Sacrifice estimates should be well explained and broken down into their component parts. Watch for measures rejected with minimal or speculative reasoning, or costs that seem out of proportion to the control measure and baseline sacrifice described.
- **Rapid Plateauing of Impact/Risk:** If the residual risk or impact drops sharply within the first few measures and the trendline flattens early, this may suggest an overly optimistic treatment of effectiveness or sacrifice. Review whether the residual values and polynomial trendlines genuinely reflect diminishing returns.

By applying these checks, reviewers can verify that the ALARP conclusion is based on a balanced and evidence-based assessment and not the result of subjective inputs skewed to justify doing less.

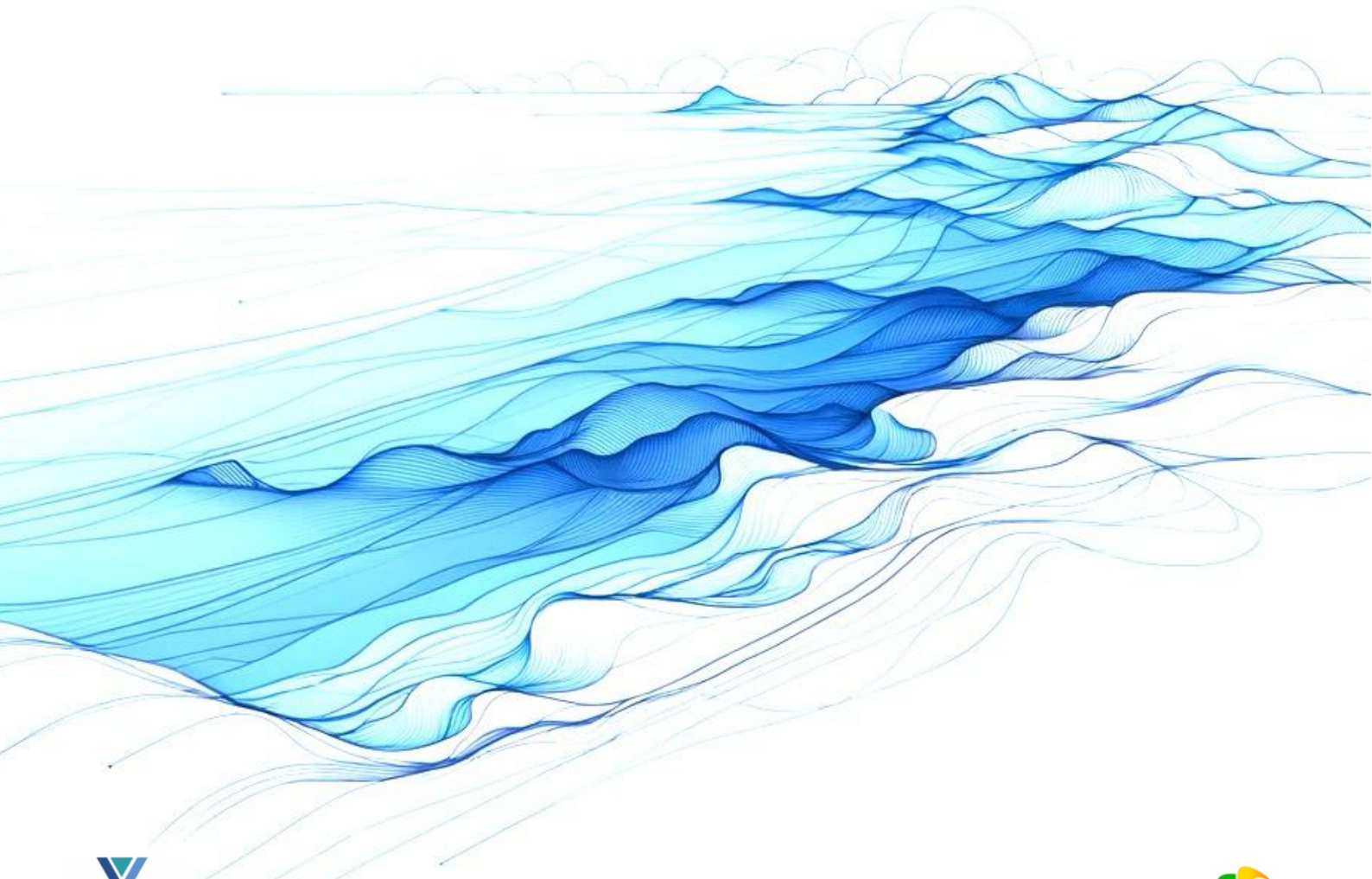
REGIA
Marine Seismic Survey

Further Assessment of Key Environmental Values and Sensitivities

Appendix F3: REG-EP-032-F3

Rev 5

December 2025



Klarite

Table of Contents

1 Introduction ***3***
2 Purpose ***3***
3 Further Assessment of Key Environmental Values and Sensitivities ***5***
3.1 Southern Right Whales / Koontapool (*Eubalaena australis*) 6
3.2 Blue Whales / Wuulok (*Balaenoptera musculus*) 24
3.3 Australian Sea Lion (*Neophoca cinerea*) 27
3.4 Little Penguin (*Eudyptula minor*) 29
3.5 Southern Rock Lobster (*Jasus edwardsii*) 37
3.6 Giant Crab (*Pseudocarcinus gigas*) 46
3.7 Short-finned Eel / Kooyang (*Anguilla australis*) 50
3.8 Gould's Squid (*Nototodarus gouldi*) 54
3.9 Pale Octopus (*Octopus pallidus*) 56
3.10 Blacklip Abalone (*Haliotus rubra)* 57
3.11 Pink Snapper (*Chrysophrys auratus*) 59
3.12 King George Whiting (*Sillaginodes punctatus*) 61
3.13 Plankton Communities and the Bonney Upwelling System 64
3.14 Spawning Patterns 68
3.15 Budj Bim Cultural Landscape 74
3.16 Cultural Features of the Environment 77
4 Temporal Alignment of Key Environmental Values/Sensitivities ***96***
4.1 Results 96
5 Consultation Input ***99***
6 Environmental Assessment Modifications Required ***100***
7 References ***101***
8 Revision History ***113***
Annex 1 ..... ***114***
Public Comment 114
Annex 2 ..... ***116***
Objections or claims raised through consultation 116

1 Introduction

This document is part of Stage 3 of CGG's assessment of the environmental impacts and risks arising from the Regia Marine Seismic Survey (**Regia MSS**). This document records further assessment of key environmental values and sensitivities. The key environmental sensitivities have been selected following a self-assessment by CGG of whether the preliminary and secondary assessments have resulted in all environmental impacts and risks being reduce to ALARP and an acceptable level, and the criteria for acceptance being met. A further assessment was also undertaken if there was significant interest from relevant persons, or high levels of predictive uncertainty remaining after the secondary assessment.

2 Purpose

The purpose of this document is to further assess environmental impacts and risks and support the demonstration that environmental impacts and risks arising from the activity will be of an acceptable level. This additional assessment was either required because:

- CGG self-identified that the result of the environmental assessment:
  - Had some residual uncertainty about whether impacts or risks were of an acceptable level; and/or
  - Contained environmental values and sensitivities (species) of key importance due to their protection status or commercial value; and/or
- Consultation with relevant persons revealed a particular value or sensitivity required further attention and material to support the consultation.

The content aims to demonstrate that a thorough assessment of environmental values and sensitivities that may be affected by the activity has been undertaken in accordance with the environmental assessment methodology (Appendix B3). Further assessments have been undertaken for the reasons outlined in Table F3-1.

Once these further assessments have been completed, any modifications required to the originating environmental assessments will be briefly described in Section 6 and any modifications required shall be made in the relevant impact or risk assessment.

Table F3-1 - Further assessments undertaken in stage 3 of the Regia assessment process.

Further Assessment Topic	Reasons for Further Assessment
Southern Right Whales / Koontapool (*Eubalaena australis*)	The species is listed as threatened (Endangered) under the EPBC Act. The species was identified as culturally important.
Blue Whales / Wuulok (*Balaenoptera musculus*)	The species is listed as threatened (Endangered) under the EPBC Act. The species was identified as culturally important.
Australian Sea Lion (*Neophoca cinerea*)	The species was identified to be of concern to relevant persons.
Little Penguin (*Eudyptula minor*)	The species was identified to be of concern to relevant persons.
Southern Rock Lobster (*Jasus edwardsii*)	The species was identified as of key commercial value. The impacts of elevated levels of sound were identified as one of the few to have permanent physiological effects. The species was identified to be of concern to relevant persons.
Giant Crab (*Pseudocarcinus gigas*)	The impacts of elevated levels of sound were identified as one of the few to have permanent physiological effects. The species was identified to be of concern to relevant persons.
Glass Eels / Kooyong (*Aquilla australis*)	The species was identified as culturally important.
Gould's Squid (*Nototodarus gouldi*)	The species was identified to be of concern to relevant persons.

Further Assessment Topic	Reasons for Further Assessment
Pale Octopus (*Octopus pallidus*)	The species was identified to be of concern to relevant persons.
Blacklip Abalone (*Haliotus rubra*)	The species was identified to be of concern to relevant persons.
Pink Snapper (*Chrysophrys auratus*)	The species was identified to be of concern to relevant persons.
King George Whiting (*Sillaginodes punctatus*)	The species was identified to be of concern to relevant persons.
Plankton Communities and the Bonney Upwelling System	The impacts of elevated levels of sound were identified as one of the few to have permanent physiological effects. The species was identified to be of concern to relevant persons.
Spawning Patterns	The value was identified to be of concern to relevant persons.
Budj Bim Cultural Landscape	This sensitivity was identified as culturally important by relevant persons.
Cultural Features of the Environment	This sensitivity was identified as culturally important by relevant persons.

3 Further Assessment of Key Environmental Values and Sensitivities

This part of the demonstration underscores the importance of conducting a thorough evaluation of key environmental values and sensitivities as part of our overall assessment of impacts and risks associated with the Regia MSS. Focusing on key values and sensitivities enables us to:

- Continue the assessment of higher order impacts and risks.
- Change perspective to increase confidence in the assessment process.
- Put the magnitude of impacts and risks into their proper context.
- Address specific concerns raised by relevant persons.

The following detailed evaluations not only enhances the robustness of our overall environmental assessments but also serves to test and validate the appropriateness of our preceding analysis. For each of the key values and sensitivities identified through the environmental assessment process this evaluation will address:

- **Species-Specific Sensitivity:** Assess the vulnerabilities of each species to the seismic activity, including breeding, feeding, migration patterns, and habitat preferences.
- **Magnitude of Effect:** Evaluate the potential scale of impact on each key value and sensitivity, considering both direct and indirect effects.
- **Cumulative Impacts:** Consider the combined effects of the seismic survey with other existing or planned activities in the area.
- **Recovery Potential:** Assess the ability of species or ecosystems to recover from potential impacts.
- **Conservation Status:** Factor in the conservation status of species, especially those that are endangered or protected.
- **Mitigation Effectiveness:** Evaluate the effectiveness of proposed mitigation measures specific to each key value and sensitivity.

3.1 Southern Right Whales / Koontapool (*Eubalaena australis*)

In the assessments completed to date (Appendix E7), CGG have used a defined threshold as the basis for understanding when a behavioural response may occur and predicted an effect distance. To demonstrate that any elevated sound exposures beyond this predicted distance are of an acceptable level assumes that no behavioural response occurs beyond the predicted distances. In other words, the traditional dose-response model assumes that above a certain SPL threshold, animals will exhibit predictable behavioural responses.

However, real-world observations do not support this assumption. For example, in Ellison et al. (2012), Gray whales altered their migration paths in response to a sound source only when it was positioned within their typical travel corridor, even when sound exposures remained similar across different trials. This suggests that context matters more than a fixed threshold. Similarly, Southall et al. (2023) emphasise that vulnerability varies between species and populations, meaning that different species can react differently to the same exposure regime depending on their ecological and physiological characteristics.

A recent study by Darias-O'Hara et al. (2025) derived a median behavioural threshold of 139 dB for low-frequency cetaceans using expert elicitation informed primarily by humpback whale data and adjusted for other species. The authors emphasise substantial uncertainty due to limited data, a lack of global consensus on appropriate behavioural thresholds, and the context-specific nature of their findings, figure

Considering that the thresholds apply only under the assumptions and Antarctic scenarios assessed. While the values provide a conservative indication of where behavioural responses may begin, their biological significance depends on multiple external factors, and the study is positioned as an early step requiring further research to strengthen regulatory assessment.

Southall 2024 demonstrated that simple received-level thresholds are inadequate for predicting behavioural responses of marine mammals to noise. This paper highlights that all-or-nothing thresholds fail to account for the substantial variability observed between species, individuals, and contexts. Instead, a probabilistic, context-dependent approach has emerged as more scientifically robust, reflecting the reality that behavioural responses are influenced not only by received sound levels but also by factors such as behavioural state, exposure history, and proximity. This shift supports the development of more ecologically meaningful noise exposure criteria, particularly for acute noise events, and lays the foundation for improved assessment of both individual and population-level impacts.

Another flaw in selecting a fixed behavioural response threshold is that it ignores chronic noise effects. The dose-response model focuses on acute, immediate responses, but does not account for cumulative impacts from prolonged exposure, such as communication masking, stress-related physiological changes, or gradual displacement from key habitats. Even at relatively low levels, if noise is persistent, it can disrupt essential behaviours over time. This means that using a single threshold to predict behavioural impacts could be misleading, as it fails to capture these long-term effects.

Instead of relying on a single threshold, both Ellison et al. 2012, Southall et al. 2023, and Southall 2024 advocate for a multi-factor assessment that includes various threshold levels alongside context-dependent variables. This means incorporating species-specific sensitivity assessments, evaluating exposure severity relative to background noise conditions, and considering behavioural context to determine the likelihood and severity of responses. This approach allows for more accurate and ecologically meaningful assessments of how noise affects marine mammals, rather than assuming a universal threshold applies across all situations. Therefore, this further assessment will focus on the residual uncertainty from the impact assessment on marine mammals (Appendix E7), namely on whether impacts to any SRW within the reproduction BIA are of an acceptable level and what additional measures may need to be incorporated to increase predictive certainty.

3.1.1 Acoustic Species-Specific Sensitivity

Baleen whales, which include SRW, are categorised as low-frequency cetaceans. The acoustic repertoire of right whale species is similar, comprising of a variety of short, low frequency (<1 KHz) vocalisations (DCCEEW 2023, DOSITS 2023). Vocalisations have a fundamental frequency range of 50 to 500 Hz, with modelled hearing range between 10 Hz to 22 kHz (functional range of 15 Hz to 18 kHz), and source levels ranging from 132 to 192 decibels (Parks & Tyack 2005, Parks et al. 2007, Nielsen et al. 2019).

SRW mother-calf pairs on a Western Australia breeding ground were found to produce low amplitude vocalisations; acoustic tags measured received levels between 123 and 134 decibels at low rates (< 10 calls per hour, 1 call per dive) (Nielsen et al. 2019a). Calls were more likely to occur during dives, indicating that these signals function to coordinate movements between mothers and calves.

SRW mothers tend to bring their calves close to the shore into the surf zone as the higher levels of ambient noise from crashing waves provides a refuge from potential predators (Nielson et al. 2019a).

The frequency of the sound produced from each seismic pulse is primarily less than 2 kHz, with the highest levels at frequencies in the range of 10-500 Hz (McCauley 1994). Thus, there is an overlap with low-frequency cetaceans hearing frequencies.

Interestingly, the SRW source level of 132 to 192 decibels means that SRW calls can be louder than the current noise assessment criteria for behavioural disturbance of 160 decibels.

The National Recovery Plan for SRW (DCCEEW 2024) assessed threats to SRWs through a risk assessment process. For the eastern population of SRWs, which are relevant to the Regia MSS, the consequence of seismic surveys was assessed as moderate, which is defined as population recovery slows or stalls. The risk assessment outcome for threats to the eastern population of SRWs from underwater noise from seismic surveys stated, "the likelihood of occurrence was assessed as likely, expected to occur at least once every five years, resulting in a risk level of high, requiring additional mitigation action and an adaptive management plan required; the precautionary principle should be applied."

The risk assessment is deemed to be conservative as the National Recovery Plan for SRW (DCCEEW 2024) details there is an increase in long-term population trend for SRW, albeit slowly for the eastern population.

Other threats assessed as having a moderate consequence and a likelihood of occurrence of almost certain are:

- Anthropogenic underwater noise; industrial noise.
- Habitat degradation; infrastructure of coastal development.
- Habitat degradation; infrastructure of offshore development.

Other threats assessed as having a major consequence and a likelihood of occurrence of almost certain are:

- Entanglement: active fishing or aquaculture equipment.
- Collisions; vessel strike.
- Anthropogenic climate variability and change.

3.1.1.1 Behavioural Ecology in the Reproduction BIA

Observations of female southern right whale births are rare, Christiansen et al. (2022) noted in many cases large, fat females are observed pregnant, and days later, they are resighted with a calf.

During the last month of gestation, southern right whale foetuses' grow between 3 and 4 cm per day (Christiansen et al. 2022). At birth, calves can typically range from 4.5 to 5 meters in length, with the largest calves being born to the largest mothers, measuring approximately 35% of the mother's total length (Christiansen et al., 2022). Giving birth to such sizable offspring requires a significant energy investment from the females. The primary energetic demand during pregnancy is generating the heat needed for gestation (74%), followed by foetal growth (21%) and the placenta's energy requirements (5%). This overall energy expenditure continues to rise during the 12-month gestation period and is at its highest during the last 4 months (Christiansen et al. 2022).

Christiansen et al (2018) examined the relative cost of lactation in female southern right whales in relation to growth rates in their calves over a breeding season, at the Head of the Bight in South Australia. They found over the first 3 months of lactation, females lost around 25% of their body volume. This suggests females invest as much energy as they can into their calves.

Nielson et al (2019b) studied the developmental behaviour in SRW calves over a period of 2.5 months on their breeding grounds, at the Head of the Bight in South Australia. SRW calves were in the nursing position for 10% of their time on the breeding grounds, and this increases with calf size, back-riding composed ~5% of the total observation time in SRW mother– calf pairs. This behaviour decreased by 9% during the 2.5 months of observations (Nielson et al. 2019b). Surface active behaviours such as tail

and pectoral fin slapping, breaching and rolling remained low and did not increase with calf size. Calves were within an adult body length to its mother for 90% of the time (Nielson et al. 2019b).

For the Regia MSS, detecting the departure of SRW from the reproduction BIA at the end of their utilisation of the area is important. Dickenson (2018) investigated the factors that influence the migration of SRW calf cow pairs from their wintering breeding grounds at the Head of the Bight, South Australia. Diurnal period was the best indicator of migration timing for SRWs leaving the wintering grounds. Diurnal periods are consistent year to year; therefore, it is logical for taxa to align their internal rhythms and crucial life history stage with this predictable environmental cue. Most mother calf pairs departed the wintering grounds at a mean day length of 11.6 hours. The authors suggest calf length was the second-best predictor of migration timing, the mean length of SRW calves at the time of migration was 7.63m. Sea surface temperature was a poor indicator of SRW migration and surprisingly, maternal body condition was the poorest indictor of migration (Dickenson, 2018). Although the author acknowledged the limitations of this study, understanding the factors that trigger southern right whale migration is crucial for the recovery of the species. Due to the proximity of SRW to the coast when they are utilising the reproduction BIA, there is a high degree of certainty that, with the appropriate measures in place, CGG will be able to monitor the presence of SRW within the BIA prior to the survey and detect the departure from the reproduction BIA, into the migration BIA. Once departure is confirmed, it becomes certain that sound exposures from the Regia MSS will be of an acceptable level.

3.1.1.2 Timing of Residence in BIA

A recent study by Charlton et al. (2025) examined SRW residency and site fidelity along the south coast of Australia. Mean residency for female and calf pairs at the Head of the Bight was approximately 3.5 months and site fidelity remained consistent with 57.6% of females identified between 1984–2019 resighted in multiple years (Charlton et al. 2025).

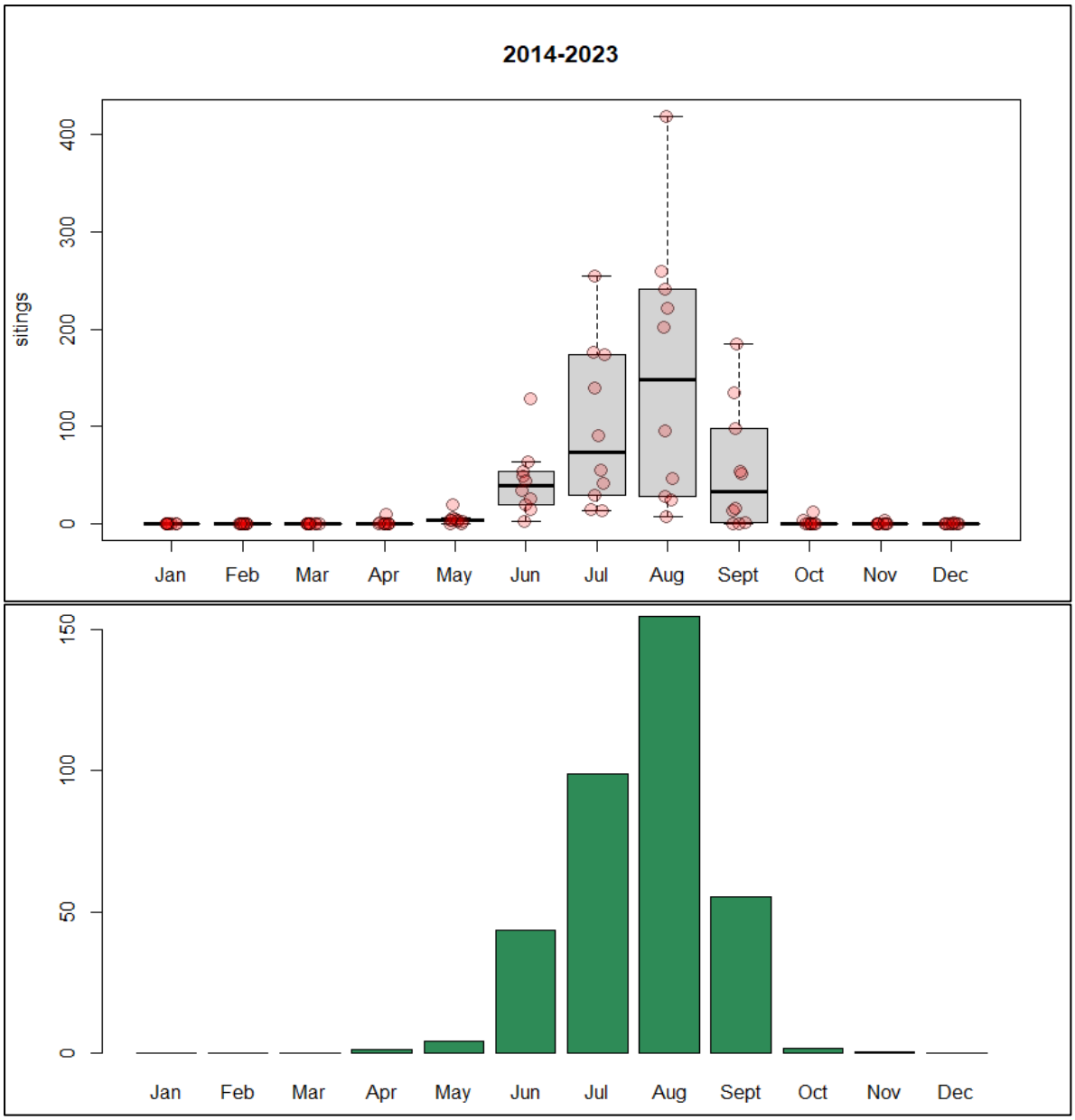


Figure F3-1: Monthly sightings of SRW along the Otway coast for the 10 years between 2014-2023. Top - boxplots illustrating the range of counts for each month, Bottom – Bar plot of 10 year average of sightings for each month.

CGG examined long term sighting records of southern right whales recorded in the WhaleFace Southern Right Whale photo identification project, located on the SWIFFT website. The data underlying these observations was extracted from the NatureKit online database (https://maps2.biodiversity.vic.gov.au/Html5Viewer/Index.html?viewer=NatureKit). This database contains observations of SRW presence along the entire Victorian coastline for over 40 years and has been used for multiple published scientific studies (e.g. Stamation et al 2020, Watson et al 2021). CGG extracted a spatial subset of the data encompassing all observations between Apollo Bay and 30km NW of Cape Duquesne off Portland. From this data it can be seen that June – September is the core period for SRW residence along the Otway coast. Arrival is predominantly in June while their migration from the BIA is usually complete by September. SRW have only been seen in October twice over the past 10 years with no sightings for the previous 5 years (see Figure F3-1). The SRW Research and monitoring Project hosted on the SWIFFT website has stated that there were no sited SRW after 26th August for the 2024 season. The sightings data are demonstrating that migration out of the BIA is usually complete by October but will often be complete weeks earlier.

In 2025, Klarite undertook a SRW monitoring program from Cape Otway Light Station to Cape Bridgewater as Whaleface data for 2025 may not be available for 2 years.

The monitoring program resulted in just over 466 hours of observation effort from July through to October 2025. Most SRWs observations were at Logans Beach Whale nursery. The 2025 reproduction season concluded with a total of four confirmed SRW calf-cow pairs utilising the south-west portion of the Victorian SRW reproduction BIA between July and September 2025. These calf-cow pairs were identified at Logans, Beach, Cape Bridgewater and Portland Bay, with Logans Beach being the most visited site by one calf-cow pair in particular. The calf-cow pair at Logans Beach was identified as a regular breeding female named Tripod and her calf. Tripod was first identified at Logans Beach in 1995 (Whaleface, 2025). No calf-cow pairs seemed to remain resident in any one location with detection being sporadic and often weeks between sightings.

Klarite tested the tested the feasibility of using onshore MFO's to detect SRWs in the Reproduction BIA and found this to be a successful detection method. Klarite also found the use of local citizen science platforms provide near real time alerts of SRW detections and SRW movements in the BIA.

3.1.1.3 Behavioural Effects to SRW From Other Stressors

Sprogis et al. (2023) examined the behavioural impacts to Southern Right Whales from whale-watching activities in South Australia at 300 m from the mother-calf pairs. No significant reduction was observed on the whales' respiration rate, swim speed, nursing rate and duration, maternal rate of active behaviours, tactile contact or calf pectoral fin contact. There was a significant reduction in resting during some phases of the study, for both mothers (halved) and calves (to near null). The rate of active behaviours for calves was also observed to be significantly higher prior to the whale-watching vessel approaching. This was noted as may having been due to the calf hearing the whale-watch vessel upon approach and reacting to the vessel in the before phase, and/or due to other external factors. Sprogis et al. (2023) suggest that whale resting behaviours may have been disturbed in the presence of the vessel and this disturbance was sustained once the vessel departed. It is unknown if this cumulative reduction in resting on mother and calf pairs is sustainable, or could lead to long-term energy deficits (by increasing energy expenditure). Sprogis et al. (2023) suggest it might also be possible for mothers and calves to compensate for this disturbance by resting at other times in the day, and/or at night.

An exclusion zone is in place from 1 June until 31 October to protect migrating Southern Right Whale mother-calf pairs in the Logans Beach Nursery. Recreational boaters must remain 200 metres from whales during this period (GoV 2022). Evidence exists however to suggest that behavioural impacts from recreational activities occur within 300 m from the mother-calf pair.

Currently, there are no noise standards for whale-watching vessels, thus, a loud vessel is able to approach whales at the same distance as a quieter vessel, even though there are known disturbance effects from louder vessels (Arranz et al. 2021; Sprogis et al. 2020)

Short-term negative impacts from behavioural responses to whales can include bioenergetic consequences like reduced energy intake or increased energy expenditure, associated with altered respiration rates, nursing, and resting due to the disturbance (Arranz et al. 2021; Sprogis et al. 2020; Christiansen et al. 2013). If resting is frequently disturbed by anthropogenic impacts, the cumulative effects could have significant long-term consequences on the bioenergetics of the whales (Sprogis et al. 2023).

Charlton et al (2023) studied the impacts associated with implantable tagging SRWs at their wintering grounds at the Head of the Australian Bight in South Australia. They noted there was no observed difference in body condition between two tagged and non-tagged females. Nielson et al (2019) tagged female calf cow pairs at Flinders Bay and found the typical behavioural response to be a slow dive, with the calf moving into a back-riding position, while the pair moved slowly away from the tagging boat. After a short period of time (about 15 min) during which the whales were diving slowly, the mother–calf pair resumed their original behaviour. Christiansen et al (2020) examined behavioural responses from southern right whale calf cow pairs of using a UAV (Unmanned Aerial Vehicle). They found flying the UAV at 5m altitude for 10 minutes, elicited no behavioural responses from mother calf pairs as they likely did not hear the UAV.

3.1.2 Magnitude of Effect

3.1.2.1 Behavioural Impacts of Seismic on Baleen Whales and Calf Cow Pairs

Dunlop et al (2017a) noted 'for a change in behaviour to be considered biologically significant, it should have an effect on one or more life functions (e.g. migration, survival, mating), affecting individual vital rates (e.g. maturation, reproduction) and ultimately leading to population effects. For example, an animal that is under stress can exhibit behaviours outside their normal behavioural repertoire and/or cease to exhibit typical behaviours. If this stressor is chronic, then the animal is likely to have a reduced likelihood of surviving and reproducing.'

Richardson et al (1999) examined the effects of seismic on migrating bowhead whales and found migrating bowhead whales avoided the seismic source within 20km of the operating guns with received sound levels of between 120–130 dB re: 1 μ Pa. Wood et al (2012) defined behavourial response categories for sensitive species and migrating mysticetes using the Richardson et al (1999) study. Wood et al (2012) proposed a graded probability of response for impulsive sounds using a frequency weighted SPL metric, and graded the probability of mysticetes to respond at 140 dB re: 1 μ Pa as 90%.

Robertson et al (2016) sought to determine the extent to which analyses of the distribution of bowhead are affected by changes in visual 'availability' caused by seismic operations. Roberston et al (2016) found no evidence of changes in distribution of whales exposed to sound levels up to ~150 dB re 1 μ Parms, whereas Richardson et al. (1999) found evidence of avoidance behaviour. The authors suggested earlier analyses of displacement by bowhead whales of seismic operations are likely to have overestimated displacement because the numbers of whales in areas ensonified by seismic operations may have been as much as 33–68% higher than were previously estimated, implying some whales are not avoiding those areas as previously suggested.

McCauley et al. (2003) found resting humpback female-calf pairs showed avoidance responses at a considerably lower level 11km from the array. The calf cow pairs moved 3km to the south of the array (mean of 140 dB re 1 µPa). There were no indications of increased stress on a cow-calf pair which allowed the operating seismic vessel to pass three km to the North. This contrasts with migrating humpbacks which showed clear course changes at received levels of 144–151 dB re 1 µPa.

From 2010 to 2015, BOEM funded the Behavioural Response of Australian Humpback Whales to Seismic Surveys (BRAHSS) to investigate the effects of seismic surveys on humpback whales. Studies were conducted off the coast of Queensland at Peregian Beach on the southeast coast of Australia. Humpback whales were likely to avoid airgun arrays within 3km when the received level was greater than about 140 re. 1 µPa2 s (Dunlop et al 2017b). Another study as part of the BRAHSS project used a 3130 cubic inch airgun array to examine effects of seismic on migrating humpback whales. The authors found none of the groups exhibited any behaviours that were outside their normal repertoire of behaviours (e.g. continuous surface activity, female–calf separation) and none of the groups ceased to migrate or turned and continued to head northwards after the trial was over. Groups continued to generally move southwards and socially interact during active and control treatments (Dunlop et al 2017a). There were also no abnormal behaviours, such as instances of a female separating from her calf or sustained bouts of high energy surface behaviours (which are considered abnormal behaviour indicative of a stress response in humpback whales), were observed (Dunlop et al 2017b). The authors continued to observe typical behaviours including singing, socializing with conspecifics, using social signals such as surface slapping, and general migratory travel southwards. Since no abnormal behaviours were observed and there was no clear evidence that the whales were experiencing stress, humpback whale behaviours seemed to be primarily influenced by social interactions and their need to migrate, with minimal impact from the seismic vessel and airguns (Dunlop et al 2017a).

Bröker et al (2015) developed and examined the effectiveness of an extensive monitoring program to investigate the effects of a 4D seismic survey on a critically endangered population of foraging gray whales off Sakhalin Island, Russia. The authors used a behavioural threshold of 156 dB re μ Pa2-s. They found with a monitoring program and mitigation measures in place, some individual responses in movement patterns were observed, however the results from the behavioural analysis suggested the seismic survey did not have a large impact on the movement or respiration patterns of the population of gray whales as a whole.

3.1.2.2 Acute and Chronic Noise Exposure

Southall et al (2021) sought to make distinguishes between acute and chronic noise exposures. Southall et al (2021) defined acute exposure as short term, often high noise events with identifiable exposure to known individuals or groups (e.g. Military sonar, seismic airguns, pile driving, and sudden

vessel pass-bys. Southall et al (2021) noted behavioural responses from acute noise can range from brief orientation to prolonged avoidance, or separation of mother-calf pairs. Acute exposure responses can be studied using Controlled Exposure Experiments (CEEs) or direct observations.

Chronic exposure as defined as sustained or repeated exposure over weeks, seasons, or years—usually at lower intensity but over longer durations (e.g. whale watching operations, ongoing vessel traffic, long-term seismic surveys, and industrial coastal activities) (Southall et al 2021). To study the effects of chronic noise exposure, Southall recommends using ecological models, UAVs and energetic modelling and systematic reporting of exposure context, species traits, and potential stressors.

The Regia MSS will only occur during one season when SRWs are present in Australia waters, the noise exposure associated with the survey is acute. The Regia Operational Area does not overlap with the SRW Reproduction BIA. The Regia MSS has been planned to ensure there is only a 20% overlap with the SRW calving season. The Regia MSS will only overlap with half of the migration period for SRWs in one season. The survey will not lead to long term sustained repeated exposures to SRWs.

3.1.2.3 Thresholds and Criteria for Behavioural Disturbance

The 160 dB re 1 μ Pa SPL threshold for behavioural disturbance is a commonly applied regulatory benchmark derived from empirical studies, particularly those examining mysticete responses to seismic sources. This threshold is widely recognized in national (NOAA) and international guidelines, including the National Marine Fisheries Service (NMFS) criteria. However, emerging research challenges the universality of this fixed threshold. Southall et al. (2021) and Ellison et al. (2012) argue for a contextual interpretation of behavioural responses, highlighting that the same sound exposure level (SEL) can result in different behavioural outcomes depending on factors such as behavioural state (e.g., nursing vs. migrating), group composition (e.g., mother-calf pairs), and habitat importance (e.g., reproductive BIAs).

Another major flaw in selecting a fixed behavioural threshold is that it ignores chronic noise effects. The dose-response model focuses on acute, immediate responses, but does not account for cumulative impacts from prolonged exposure, such as communication masking, stress-related physiological changes, or gradual displacement from key habitats. Even at relatively low SELs, if noise is persistent, it can disrupt essential behaviours over time. This means that using a single SEL-based threshold to predict behavioural impacts could be misleading, as it fails to capture these long-term effects.

The dose-response approach, while useful for predicting the likelihood of a response based on exposure level, fails to account for these ecological nuances. It assumes a uniform reaction to sound across individuals and settings, which does not reflect observed variability. The context-based model proposed by Ellison et al. (2012) considers behavioural ecology and situational variables, offering a more precautionary and biologically relevant framework. This is particularly important for SRWs, where low-level disturbances in critical reproductive habitats may still have significant energetic and developmental consequences.

This approach, whilst complex and not yet adopted by regulators, CGG believes that the behavioural context assessment approach does have greater merit than the more simplistic dose-response approach. This is particularly true in circumstances such as those found for the Regia MSS and the reproductive BIA for SRW.

Additional work has been commissioned by CGG to provide some further analysis and discussion around the application of the 160 dB threshold in project contexts and its overall suitability. They also consider the continuing relevance of the 160 dB threshold in contemporary acoustic modelling applications, evaluating whether it remains an appropriate benchmark considering current scientific understanding and technological advancements. See Appendix B7c. for this report.

3.1.2.4 Behavioural Disturbance Within and Adjacent to the SRW Reproduction BIA

Behavioural disturbance to Southern Right Whales (SRW) within or adjacent to the reproduction Biologically Important Area (BIA) is a central consideration of the National Recovery Plan for the Southern Right Whale (DCCEEW 2024). The requirements placed on CGG's actions have been adopted as defined acceptable levels of the Regia MSS and they establish two clear and measurable expectations near the reproduction BIA:

1. SRWs must be able to continue utilising the area, and
2. Behavioural disturbance must be minimised.

While modelled thresholds for behavioural disturbance are informative, the scientific literature shows that behavioural responses can still occur at received sound levels below 140 dB re 1 µPa SPL(e.g. Southall et al. 2016). Studies indicate that responses at these lower levels tend to be of low severity, but may still occur (Affatati & Camerlenghi 2023), although SRW-specific studies remain limited.

For the Regia MSS:

- Modelled results show no exceedance of the 140 dB threshold in the SRW reproduction BIA (See MAP-REG-EPM-188).
- Modelled results show sound levels within the BIA fall within ~120–140 dB re 1 µPa SPL (See MAP-REG-EPM-187, MAP-REG-EPM-188 and MAP-REG-EPM-189).
- Modelled sound level results within the BIA overlap with natural ambient sound levels in the Otway region, which have been found across multiple studies to vary between 90–158 dB, with a mean around ~110 dB (Beach Energy 2022 and references therein).

This overlap means that modelled effect thresholds alone cannot reliably distinguish natural variability from activity-related sound within the BIA. SRW mothers and calves may occupy the BIA for extended periods, where even low-severity behavioural responses could compromise the Recovery Plan requirement that utilisation be maintained and behavioural disturbance minimised.

To meet the Recovery Plan obligations and the defined acceptable levels, the management approach must ensure that SRWs can continue to utilise the reproduction BIA and that the risk of behavioural disturbance is minimised in practice – not just in modelling. Given the uncertainties described above, CGG has adopted a precautionary approach based on the following principles:

1. Where natural ambient levels and modelled results overlap, modelled thresholds alone may not ensure behavioural disturbance is minimised.
2. An ambient sound management framework to monitor sound in the reproduction BIA provides a more reliable, real-time assurance of protection.
3. Real-time monitoring of SRWs within the BIA provides a direct, species-specific control measure that is fully aligned with the Recovery Plan.

To operationalise these principles, CGG will manage to an EPO whereby, 'No behavioural disturbance will occur to any SRW within the reproduction BIA as a result of the Regia MSS.

To support this approach, CGG will:

- Characterise ambient (~baseline) sound levels within the reproduction BIA recognising natural variation across weather, sea state, biological activity and anthropogenic activities not associated with the MSS
- Conduct sound source verification as close as practicable to the reproduction BIA to confirm that activity-related sound does not elevate received levels above defined ambient-based ranges during sampling periods.
- Use this verification to guide real-time decision-making, providing a direct, measurable basis for ensuring behavioural disturbance is minimised.

By adopting the measured ambient seascape as our reference for the management framework, CGG removes reliance on modelled behavioural effect distances as the primary control measure. This increases predictive certainty and strengthens confidence that SRWs within the reproduction BIA will not be exposed to sound levels capable of causing behavioural disturbance.

To inform this approach CGG will deploy a suite of monitoring measures including shoreline observations, offshore monitoring platforms, aerial surveys, and acoustic detection systems.

Under this framework:

- If any SRW is detected within the reproduction BIA, the seismic source will be shutdown,
- Restart of the seismic source will only occur once monitoring confirms that SRWs have departed the reproduction BIA, ensuring actions must not prevent whales from utilising the area.
- Uncertainty regarding behavioural thresholds is removed entirely, ensuring that the activity is conducted in a manner that minimises behavioural disturbance.

More detail on mitigation effectiveness is discussed below.

3.1.3 Recovery Potential

The life history traits of Southern Right Whales such a long-life span, low reproductive output, late sexual maturity, and strong fidelity to calving areas, make them vulnerable to anthropogenic threats. These life history traits mean that any long-term response to disturbance and impacts from threats that may affect recovery are unlikely to be detectable, or even reliably identified to a specific threat, over short timescales (i.e., 1 to 3 years).

As SRWs recover from commercial whaling and their distribution and abundance increases, anthropogenic underwater noise may have the potential to displace and/or deter SRWs from habitats critical to the species or currently unused but historically important areas (DCCEEW 2023).

Based on the magnitude of effect from the Regia MSS to SRWs, which is limited to behavioural avoidance for migrating SRWs for one season, no long-term disturbance are impacts that may affect their recovery are predicted.

3.1.4 Conservation Status

The SRW is listed as threatened (*Endangered)* under the EPBC Act because population numbers have been severely reduced by historical commercial whaling (DCCEEW 2024). SRWs are also listed as Migratory. The National Recovery Plan for SRW (DCCEEW 2024) identifies the Commonwealth legislation and management arrangements that relate to the protection of SRWs in Australian waters.

Two populations of SRW occur in Australian waters: the western and eastern. SRW occur seasonally in all State coastal waters, with sightings ranging from Hervey Bay in Queensland on the east coast, along the entire southern coastline and including Tasmania, to Exmouth Gulf in Western Australia. The geographical boundary between the Australian populations is unclear. For management purposes, the western population includes Western Australia and South Australia waters, whereas the eastern population comprises the coastal waters of Victoria, Tasmania, New South Wales, and Queensland (DCCEEW 2024).

SRWs predominantly occur in aggregations in coastal water reproductive areas where they calve and nurse their young from May to October, primarily occupying shallow waters (< 10m depth) within 1 km of the coastline (Charlton et al. 2019).

Is there serious or irreversible harm to SRW from the Regia MSS requiring action under the Precautionary Principle?

In evaluating the threat (impacts) of seismic surveys on marine species, it is crucial to distinguish between different levels of harm—specifically, what constitutes serious or irreversible harm. The Regia MSS EP has shown that only behavioural effects are predicted to occur and that those effects are below the threshold for underwater level B harassment.[1]

The full range of possible behavioural effects has been acknowledged and shown to likely be at the lower end of the severity scale proposed in Southall et al 2021. These behavioural effects often do not meet the threshold for serious or irreversible harm for several reasons:

1. Behavioural changes in marine species in response to acoustic disturbances are typically reversible. Once the sound source ceases, the affected species are predicted to return to their normal behavioural patterns. This reversibility indicates that the changes do not result in long-term detrimental effects on any individual nor at the population level.
2. Behavioural effects are distinct from physical injuries that can cause immediate and lasting harm to individuals. Physical injuries can directly impact the health, reproductive capabilities, and survival of marine animals. In contrast, behavioural changes are less likely to have direct physiological consequences that could be considered serious or irreversible, particularly in circumstances such as the Regia MSS where sound exposures are impulsive (i.e. not continuous) and episodic due to survey downtime and the location changes of survey sail lines.

[1] Level B harassment is a defined term from the Marine Mammal Protection Act (MMPA) 1972 (US) which Southall 2007 et al state "would almost certainly not constitute biologically significant disturbance (or consequently level B harassment under the MMPA)."

3. Marine species often exhibit adaptive behaviours that allow them to cope with and adjust to changes in their environment, including sound. These adaptations can mitigate the potential negative effects of behavioural disturbances, further reducing the likelihood of serious or irreversible harm.
4. The scientific consensus (i.e. excluding outliers or adopting worst-case scenario thinking) indicates that while behavioural responses can be significant, they rarely translate into population-level impacts that would be considered serious or irreversible. This distinction is critical in applying the precautionary principle appropriately; the principle is intended to prevent significant harm, and its application must be supported by evidence of potential serious consequences (i.e. not hypotheticals, worst-case thinking, or scientific outliers).
5. Effective management and mitigation measures, including real-time monitoring and adaptive management strategies, are in place and are designed to reduce the intensity and duration of disturbances, thus preventing them from reaching a threshold that could be considered serious or irreversibly harmful.
6. The precautionary principle requires a proportionate response. Applying the highest level of precaution—reserved for preventing serious or irreversible damage—to relatively low-risk behavioural effects can lead to unnecessary restrictions and may divert resources from addressing more significant environmental threats. Thus, while precaution is necessary, it must be balanced with the actual level of harm presented by the behavioural effects.

CGG has shown in the impact and risk analysis documents that regulatory requirements relevant to the Regia MSS and SRW will be met. Relevantly, the National Recovery Plan for SRW (DCCEEW 2024) has significant weight in CGG's assessment due to the involvement of Commonwealth and State regulatory agencies, threatened species managers, and scientific experts in the development of the recovery plan. As such, recommended actions from the plan relevant to the Regia MSS have been implemented as detailed in Section 3.1.5 Mitigation Effectiveness.

3.1.5 Mitigation Effectiveness

CGG has already adopted a suite of mitigation measures that address most of the impact pathways for effects to SRW. These have been detailed in Appendix E7. However, no one measure is entirely effective and there are uncertainties in the assessment which will be addressed in this section.

Assessment of Uncertainty

This section explains how CGG has identified the key sources of uncertainty relevant to predicting and managing the environmental impacts and risks of the Regia MSS on SRW, and how those uncertainties are reduced through a structured suite of activity limitations, monitoring programs, detection platforms, and strict procedures for managing to below acceptable levels.

The tables presented in this section serve a specific function. Each Commitment is an activity limitation or management measure adopted to remove or materially reduce a defined source of uncertainty, and each Rationale explains why that measure ensures impacts remain within defined acceptable levels.

Where uncertainty exists, CGG will implement activity limitations, monitoring programs, validation mechanisms, and conservative procedures that remove or materially reduce that uncertainty. This demonstrates that CGG is managing uncertainty proactively so that environmental impacts and risks are maintained below acceptable levels.

Identifying Types of Uncertainty

A range of uncertainties are inherent when trying to predict environmental responses to offshore seismic activities, particularly for SRW and other cetaceans in the Otway region. We have categorised these uncertainties as follows:

1. *Ecological uncertainty*- reflects natural variability in whale arrival timing, utilisation of the reproduction BIA, migration pathways, and behavioural sensitivities to sound.
2. *Model uncertainty* or *Predictive uncertainty* - arises because underwater sound propagation models rely on assumptions and environmental inputs that are not always clearly defined or easily measured. Factors such as source-level variability, bathymetry resolution, and sound-speed structures can influence model accuracy. In addition, there is

inherent uncertainty in how well modelled thresholds translate to real-time sound fields during survey operations.

3. *Detection uncertainty,* - relates to the likelihood of observing whales reliably across multiple detection platforms. All detection systems have inherent probabilities of false negatives, especially when weather or sea-state conditions reduce visibility or acoustic performance. Spatial and temporal gaps in coverage can also occur, particularly during migration peaks or poor weather windows, creating uncertainty in whether cetaceans are present but undetected.
4. *Operational uncertainty* - arises from variable conditions and vessel behaviour during the survey. Weather-driven changes in sailing patterns, line turns, vessel repositioning, and equipment handling can influence sound propagation or detection system performance. Contractor variability and operational constraints also contribute to this uncertainty, requiring robust procedures and real-time adaptability.

Management of Uncertainty

The most effective way to reduce uncertainty in the impact assessment is to reduce the nature and scale of the activity itself. CGG acknowledges that maintaining two potential acquisition windows (April–June and September–December) creates operational uncertainty, particularly because these windows overlap with periods of high SRW sensitivity. The April–June period is especially critical, as it coincides with the arrival of pregnant females and mothers with newborn calves. For this reason, CGG has eliminated the April–June window entirely, representing a major reduction in ecological uncertainty. This change is now formalised as a new activity limitation in Appendix A2 (Description of Activity).

Additional activity limitations adopted through this further assessment to reduce uncertainty include:

- *24-hour shutdown for any SRW detections within the migration or reproduction BIA*: In the September window, SRWs observed in the BIA are typically preparing for southbound migration. A shutdown for every confirmed detection, regardless of distance, is a highly precautionary measure that provides sufficient time for the animal to move naturally away from the area. Given the long sail lines and racetrack acquisition pattern, there is high confidence this approach prevents interference with migration and ensures SRWs are not displaced from using the BIA.
- *Extending the northern activity limitation from the most northerly 20 lines to the most northerly 30 lines while SRWs are using the reproduction BIA*: This restriction is strongly protective, as it ensures received sound levels in the reproduction BIA stay within the ambient statistical window, well below 140 dB re 1 µPa SPL and far below the NMFS 2024 recommended 160 dB re 1 µPa SPL behavioural threshold. These refinements have been implemented across the relevant EP appendices.

Below summarises the specific measures adopted by CGG to reduce key ecological, detection, modelling and operational uncertainties relevant to SRW management. The commitments are structured as a stepwise sequence that begins prior to the survey and progressively builds the evidence base required to validate modelling assumptions, strengthen detection performance, and confirm operational readiness. Early-season activities focus on establishing empirical baselines and verifying SRW presence, distribution and behaviour, while subsequent phases apply validated thresholds, precautionary shutdown procedures and real-time monitoring to actively prevent unacceptable impacts. Each stage builds upon the information obtained in the previous one, reducing uncertainty and enabling CGG to progressively tighten environmental control measures as biological sensitivity increases, thereby supporting a robust demonstration that impacts and risks will be of an acceptable level.

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Pre-Survey – In Season SRW Detection and Management Program (May 2025 – October 2025)			
Ecological Uncertainty	Commence Season 1 of a SRW monitoring program	Real-time, on-country monitoring reduces ecological uncertainty by validating suitable SRW observation locations and independently corroborating citizen-science sighting information, which cannot be relied upon alone because publicly available databases (e.g., Whaleface) are updated post-season and therefore provide no in-season verification capability.	This commitment has been completed. This document (F3) has provided a summary of the findings.
	Carry out SRW monitoring in the season prior to the survey.	This pre-survey dataset reduces ecological and detection uncertainty by establishing verified SRW presence and distribution patterns for the 2025 season, identifying suitable locations for shore-based MFOs and drone deployment, and assessing the reliability of local citizen-science sighting platforms as real-time information sources.	
Pre-Survey – Out-of-season Monitoring Program (October 2025 – April 2026)			
Model Uncertainty	Undertake extended logging of underwater sounds between Cape Otway and Cape Bridgewater.	Long-term pre-survey ambient sound recordings reduce modelling uncertainty by providing empirically derived baseline distributions of central tendency, variability, and upper-tail levels across relevant spatial and temporal scales. These baselines enable accurate differentiation between natural soundscape conditions and any MSS-related contributions, and are required to establish defensible, acceptable thresholds for deviation during operations. This aligns with the SRW Recovery Plan action to "Improve understanding and characterisation of marine soundscapes, including the application of new technologies for data processing, within southern right whale BIAs to facilitate quantification of anthropogenic noise in the marine soundscape"	This commitment is captured in the Sound Source Verification Procedure (Appendix G6). As this is a procedural control measure the relevant performance standards can be found in Appendix G1.

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Detection Uncertainty	Aerial surveillance preparation.	Finalising the aerial surveillance strategy reduces detection uncertainty by ensuring that all permitting, operator competencies, and platform capabilities are validated prior to operations, thereby confirming that aerial surveillance methods and technologies can reliably detect SRW at the ranges and conditions required for effective environmental management.	This commitment occurs before commencement of the activity, so it is captured in the Implementation Strategy (Appendix B3) and in the Coastal SRW Monitoring Programme Implementation Plan (Appendix G5).
Pre- survey – In Season SRW Monitoring Program (1 May 2026 – 30 July 2026)			
Ecological Uncertainty	Commence Season 2 of monitoring of SRW presence between Cape Otway and Cape Bridgewater	This monitoring reduces ecological and detection uncertainty by generating current-season data on SRW presence and abundance within the scope area, ensuring CGG is accurately informed leading up to and throughout the acquisition period, and providing empirical validation of improvements made to SRW detection methods prior to commencement of the survey. This is best practice as required by the SRW Recovery Plan 2025: "Baseline surveys and monitoring undertaken during activity implementation are conducted in accordance with best practice standards and guidelines to ensure standardised datasets are obtained and suitable to inform environmental management decision making that can reduce the risk of threats to southern right whales."	This commitment is captured in the implementation strategy (Appendix B3) and has an associated implementation plan in Appendix G6.
	Pre-survey aerial surveillance of nearshore/SRW reproduction BIA.	This commitment aligns with, and directly implements, the SRW Recovery Plan requirement that "Baseline surveys and monitoring undertaken during activity implementation are conducted in accordance with best practice standards and guidelines to ensure standardised datasets are obtained and suitable to inform environmental management decision making that can reduce the risk of threats to southern right whales."	This commitment fits under the *Pre-survey and aerial surveillance procedure* control measure. Performance standards that reflect this commitment can be found in Appendix G1.

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Model Uncertainty	Undertake ongoing sound logging of nearshore/SRW reproduction BIA.	Ongoing nearshore sound logging reduces modelling and ecological uncertainty by quantifying ambient sound levels within areas routinely used by SRW, providing empirical reference conditions necessary to distinguish natural variability from any survey-related contributions during operations.	This commitment is captured in the Sound Source Verification Procedure (Appendix G6). As this is a procedural control measure the relevant performance standards can be found in Appendix G1.
Pre survey – In Season SRW Monitoring Program – Pre-Activity Operations Phase (1 August – 15 September)			
Ecological Uncertainty	Expand monitoring of SRW presence between Cape Otway and Cape Bridgewater to commence all platforms and programs.	Expanded pre-activity monitoring reduces ecological and detection uncertainty by providing up-to-date information on SRW presence and abundance during the expected peak period, thereby validating the survey start criteria and confirming that all detection programs and platforms are performing effectively before acquisition begins.	This commitment is captured in the implementation strategy (Appendix B3) and has an associated implementation plan in Appendix G6.
Detection Uncertainty	Deploy and calibrate Sound Source Verification Buoys (SSV Buoys)	Deployment and calibration of the SSV buoys reduce modelling and operational uncertainty by confirming correct buoy operation, quantifying and adjusting for any mooring-related noise, verifying reliable communication pathways between the buoys and shore, and ensuring each buoy can continuously transmit full-spectrum acoustic data via satellite/4G, and Wi-Fi prior to the commencement of acquisition.	This commitment is captured in the Sound Source Verification Procedure (Appendix G6). As this is a procedural control measure the relevant performance standards can be found in Appendix G1.
Operational Uncertainty	Run the Acquire Seismic On Paper (ASOP) workshop	The ASOP workshop reduces operational and management uncertainty by ensuring all teams have a shared understanding of roles, expectations, and decision pathways across a range of credible survey scenarios, and by testing and validating the response actions required for SRW detections before the activity commences.	This is an existing component of the Implementation Strategy (Appendix B3) and contributes directly to the management of uncertainty.
Ecological Uncertainty	Conduct pre-survey aerial surveillance (likely by onshore drones)	Pre-survey aerial surveillance reduces ecological and detection uncertainty by extending visual coverage beyond the limits of land-based observers, improving the accuracy of SRW presence and abundance estimates, and validating the reliability of existing monitoring datasets before acquisition begins. This aligns with the SRW Recovery Plan action to "Establish effective monitoring techniques for the eastern population and implement a targeted long-term monitoring program capable of measuring and evaluating population recovery."	This commitment is captured in the implementation strategy (Appendix B3) and has an associated implementation plan in Appendix G6.
During survey – In Season SRW Monitoring Program – Activity Operations Phase (16 September - 31 October)			

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Ecological Uncertainty	Continue monitoring of SRW presence between Cape Otway and Cape Bridgewater.	Ongoing in-season monitoring reduces ecological and detection uncertainty by providing current information on SRW presence and abundance within the scope area, thereby ensuring that whale-related shutdown decisions are based on accurate, real-time data during acquisition.	This commitment is captured in the implementation strategy (Appendix B3) and has an associated implementation plan in Appendix G6.
Ecological Uncertainty	Shut down the sound source if impulsive noise levels exceeding 120 dB SPL are repeatedly detected by the SSV buoys. In October, if there have been 14 consecutive days without a confirmed SRW detection, the shutdown trigger for repeated impulsive-noise exceedances increases to 140 dB SPL.	Context is essential when considering behavioural disturbance. For the Regia MSS: • The NMFS (2024) threshold for behavioural disturbance is 160 dB SPL. • Existing shutdowns extend to 13km which corresponds to the 140 dB SPL threshold. • Shutdowns also occur for any confirmed detection of a single SRW. Despite these unprecedented control measures, CGG recognises that the scientific literature acknowledges some behavioural responses may occur at or below 140 dB SPL. Given the uncertainty in the literature, the data showing reducing numbers in September, and no observations in October since 2018, CGG will implement this ultra-precautionary shutdown measure. This approach will ensure that impacts to SRWs remain of an acceptable level also addressing uncertainties regarding behavioural responses and thresholds. The conditional part of this measure can only be applied in October if there have been no detections of SRWs from any detection platform for a period of two weeks. This two-week timeframe was determined to be appropriate based on the Whaleface sightings data, which shows that there have been no SRW sightings in October over the past five years. In the unlikely event that a SRW were to be detected in October, which has historically occurred, then the threshold for impulsive sound detection would return to 120 dB SPL for a minimum period of 2 weeks. Applying this conditional shutdown measure ensures that any remaining SRWs in the BIA can continue to utilise the area without experiencing behavioural disturbance because of the Regia MSS, thus ensuring impacts are of an acceptable level.	A new EPO will be adopted to address this uncertainty: *Underwater sound emissions from the Regia MSS are empirically measured and validated through the sound source verification procedure to ensure they remain within levels that do not cause injury or unacceptable disturbance to Southern Right Whale.* Additions have been made to the Environmental Performance for the survey including shutdown and restart procedures. They can be found in Appendix G1, in the Fauna Management Plan (Appendix G2). This procedure and metrics associated with this measure are defined in Appendix G6 (Sound Source Verification Procedure).

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Operational Uncertainty	Shutdown the sound source upon "confirmed detection" of any SRW from any detection platform. Soft restart of the survey can only commence when there have been no confirmed detections of a SRW across all the platforms for a period of 24 hours.	Applying an immediate shutdown for any confirmed SRW detection eliminates the potential for behavioural disturbance or TTS within the Reproduction BIA by ensuring that all shutdown triggers are based on verified detections, defined as observations confirmed by a qualified MFO, an expert scientist, or time- and date-stamped photographic evidence.	Additions have been made to the Environmental Performance Standards for the Shutdown and Restart Procedures. They can be found in Appendix G1 and in the Fauna Management Plan (Appendix G2).
Operational Uncertainty	Investigate all "unconfirmed detections" of SRW from any information platform or program within 12 hours.	Investigating all unconfirmed SRW detections reduces detection uncertainty by ensuring that any claimed sighting (defined as an observation not yet verified by a qualified MFO, an expert scientist, or time- and date-stamped photographic evidence) is rigorously validated before triggering a shutdown or extending an existing shutdown, thereby preventing false positives and ensuring that management actions are based solely on confirmed, reliable detections.	Additions have been made to the Environmental Performance Standards for the Shutdown and Restart Procedures. They can be found in Appendix G1 and in the Fauna Management Plan (Appendix G2).
Model Uncertainty	Gather ambient and received sound levels throughout the survey from locations just outside the reproduction BIA via SSV buoys.	Real-time SSV data reduces modelling and operational uncertainty by providing continuous empirical information on ambient and received sound levels adjacent to the Reproduction BIA, enabling informed management decisions about vessel positioning and line acquisition, and validating modelled sound predictions against measured field conditions.	This commitment is captured in the Sound Source Verification Procedure (Appendix G6). As this is a procedural control measure the relevant performance standards can be found in Appendix G1.
Model Uncertainty	Investigate potential causes for pre-defined exceedances of ambient sound levels as detected by any SSV buoy.	Investigating any detected sound levels above the established historical maximums reduces modelling and operational uncertainty by confirming whether anomalous peaks are attributable to Regia MSS impulsive sound, triggering immediate shutdown where required, and providing empirical data necessary to test the hypothesis that acquisition along lines 31–67 will not produce statistically significant deviations from ambient sound levels within the Reproduction BIA while SRW may be present.	

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Operational Uncertainty	Soft (re)start of the survey can only commence if the sound source detected by SSV buoys is confirmed not to be from the Regia MSS and it is during daylight hours.	This requirement ensures that, irrespective of visual detection limitations within the Reproduction BIA, the survey will not elevate received sound levels above ambient conditions, thereby managing residual uncertainty in both the effectiveness of detection platforms and the predictive accuracy of sound-propagation modelling.	Additions have been made to the Environmental Performance Standards for the Start-up Procedure. This can be found in Appendix G1 and in the Fauna Management Plan (Appendix G2).
Operational Uncertainty	The spotter vessel will travel parallel to the seismic vessel, 20km away and on the northerly side, while it is acquiring lines 31-67.	Positioning the spotter vessel between the survey vessel and the expected SRW distribution within the Reproduction BIA reduces detection uncertainty by maximising the probability of visually or acoustically detecting migrating whales before they approach the survey footprint, thereby supporting timely and precautionary shutdowns.	Additions have been made to the Environmental Performance Standards for the Spotter Vessel Procedure. This can be found in Appendix G1 and in the Fauna Management Plan (Appendix G2).

Taken together, the measures in the tables form a conservative, multi-layered framework that progressively eliminates or controls uncertainty at every stage of the activity. High-uncertainty periods are removed entirely through temporal exclusions, and spatial buffers ensure that the highest-sensitivity zones remain insulated from potential exposure. Model assumptions are then validated in real time through the Sound Source Verification program and continuous comparison of measured and baseline ambient sound levels, ensuring that predictions remain accurate under operational conditions.

At the same time, detection probability is maximised by deploying overlapping, independent platforms across visual, acoustic, and aerial domains. This redundancy ensures that no single point of failure can compromise the system. Any residual uncertainty is absorbed through deliberately conservative procedures, including mandatory shutdowns, confirmation protocols, and relocation triggers that apply long before behavioural or auditory thresholds could be approached.

Collectively, these layers ensure that SRW are not prevented from utilising biologically important areas, and that no individual is exposed to sound levels capable of causing auditory injury or sustained behavioural disturbance. The approach also ensures that the activity is not inconsistent with the SRW National Recovery Plan. Most importantly, by managing uncertainty at its source and validating real-time conditions as the survey progresses, CGG ensures the predictions of the impact and risk assessments remain robust and reliable under real-world conditions.

Demonstration that behavioural impacts to SRW from underwater sound are of an acceptable level

Through application of the most up-to-date modelling, direct real-time sound management, and verification by calibrated SSV buoys, CGG can demonstrate that impulsive sound emissions from the Regia MSS will not exceed acceptable levels of impact for SRW, which are defined as:

1. Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate they do not prevent any southern right whale from utilising the area or cause auditory impairment.
2. Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that they minimise behavioural disturbance.
3. Sound exposures to southern right whales must be below a TTS per pulse and TTS 24 hr SEL threshold of 216 dB and 168 dB respectively.

The Environmental Performance Outcome states that:

> *As a result of the implementation of real-time monitoring and activity limitations, SRW are not exposed to sound levels that cause behavioural disturbance within or adjacent to BIAs or HCTS.*

The acceptable levels of impact can be demonstrably met because sound levels within the reproduction BIA will remain within the statistical window of ambient sound levels, as established by pre-survey baseline monitoring and verified through a running baseline during operations.

Moreover, this approach exceeds standard industry practice, provides a transparent and scientifically defensible basis for demonstrating environmental protection, and fully aligns with the Regulations, the SRW National Recovery Plan, and NOPSEMA's decision-making guidelines.

3.2 Blue Whales / Wuulok (*Balaenoptera musculus*)

3.2.1 Species-Specific Sensitivity

Blue whales are categorised as low-frequency cetaceans. Blue whales produce high-intensity, low frequency vocalisations which can be detected over large distances (Miller et al. 2021). Blue whale calls last up to 18 s and generally consist of three segments: a 9-s-long, 27-Hz tone, followed by a 1-s downsweep to 19 Hz and another, longer-lasting downsweep to 18 Hz (Širović et al. 2004, Rankin et al. 2005).

Antarctic blue whale source levels have been estimated to be 189 underwater decibels (Širović et al. 2007), although a more recent study has estimated source levels to be between 188-191 decibels (Miller et al. 2021).

Gavrilov and McCauley (2013) found pygmy blue whales in Australian waters display a diel pattern in vocalisation, noting pygmy whales are more vocally active during hours of darkness compared to daylight hours. Tripovich et al. (2015) noted Antarctic blue whales calls were more prevalent in the night to early morning.

The frequency of the sound produced from each seismic pulse is primarily less than 2 kHz, with the highest levels at frequencies in the range of 10-500 Hz (McCauley 1994). Thus, there is an overlap with low-frequency cetaceans hearing frequencies.

The blue whale source level of 188 to 191 decibels means that blue whale calls can be louder than the current sound effect criteria for behavioural response of 160 decibels.

The Blue Whale Conservation Management Plan 2015-2025 (DoE 2015c) assessed threats to blue whales through a risk assessment process. For both the pygmy blue whales and Antarctic blue whales, which are relevant to the Regia MSS, the consequence of seismic surveys was assessed as moderate, which is defined as population recovery slows or stalls. For pygmy blue whales the likelihood of occurrence was assessed as almost certain, expected to occur every year, resulting in a risk level of very high for which immediate additional mitigation action is required. For Antarctic blue whales the likelihood of occurrence was assessed as possible, the event might occur at some time, resulting in a risk level of high requiring additional mitigation action and an adaptive management plan required; the precautionary principle should be applied.

The risk assessment is deemed to be conservative as the Blue Whale Conservation Plan 2015-2025 (DoE 2015c) details that given the behavioural impacts of noise on blue whales are largely unknown, a precautionary approach has been taken regarding assignation of possible consequences.

Other threats assessed as having a moderate consequence and a likelihood of occurrence of possible are vessel collisions. Other threats assessed as having a major consequence and a likelihood of occurrence of possible are climate variability and change.

3.2.2 Magnitude of Effect

The Conservation Management Plan for Blue Whales (DoE 2015c) details that impacts from anthropogenic noise can include hearing impairment (e.g. permanent and temporary threshold shifts) masking of communication, displacement, and other significant behavioural changes (including to vocal behaviour). There have been no recorded mortal injuries to blue whales from seismic surveys.

The Conservation Management Plan for Blue Whales 2015-2025 (DoE 2015c) details the potential for impacts from anthropogenic underwater noise is of particular concern within biologically important areas at biologically important times. CCG will implement an activity limitation where the seismic source will only be operated in the pygmy blue whale foraging BIA from 16 September and during October, November and December.

During this time permanent or temporary hearing loss and/or displacement of blue whales is not predicted based on the implementation of detection systems and actions as described in the Fauna Management Plan (Appendix G2). Furthermore, it has been suggested that blue whales may

continue to forage within 2.5 km of an operating seismic survey if resources are abundant enough to outweigh the physical and energetic costs of acoustic disturbance (Burton et al. 2023).

As the Regia MSS will only occur during one season when blue whales are present in Australia waters, potential impacts to individual blue whales will not impact on the recovery of the population.

3.2.3 Recovery Potential

Blue whales exhibit long life history traits reaching sexual maturity at 10 years old and calve every 2 or 3 years, making their population recovery slow and vulnerable to anthropogenic threats, although it is thought that blue whale populations are recovering.

Estimates of pre- and post-whaling abundance of Antarctic blue whales indicate that they have been increasing in abundance since the cessation of whaling. The estimated original population size was 239,000 (95% interval 202,000 – 311,000) (Branch et al. 2004). A more recent estimate of the Antarctic blue whale population was 2,280 (95% interval 1,160 – 4,500) individuals in 1996 (estimated from the circumpolar International Decade of Cetacean Research, Southern Ocean Whale and Ecosystem Research survey conducted from the 1992/1993 to 2003/2004 season) (Branch 2007).

There is little knowledge of the pre-exploitation abundance of Australian pygmy blue whales, making it difficult to assess population recovery. Pygmy blue whales in the sub-Antarctic are estimated to have reduced from 7,598 at the start of the 1960/1961 season to 3,996 at the end of the 1971/1972 season, however this is based on out-of-date methodology and the population identity of these sub-Antarctic blue whales is unknown (Zemsky and Sazhinov 1982). Preliminary estimates of the number of pygmy blues caught are 13,022 though this encompasses all catches from South Africa to New Zealand and the northern Indian Ocean for which the extent of connectivity is unknown (Branch et al. 2008).

Based on the magnitude of effect from the Regia MSS to blue whales, no long-term disturbance impacts that may affect their recovery are predicted.

3.2.4 Conservation Status

The blue whale is listed as endangered under the EPBC Act as population numbers have been severely reduced by historical commercial whaling (DoE 2015c). The Conservation Management Plan for Blue Whales (DoE 2015c) identifies the Commonwealth legislation and management arrangements that relate to the protection of blue whales in Australian waters.

There are two sub-species of blue whale found in the Southern Hemisphere. The Antarctic blue whale *(B. musculus intermedia*) which occurs in the southern hemisphere and averages 27 m in length and the pygmy blue whale (*B. musculus brevicauda*), occurs in waters of the southern Indian Ocean, eastern South Atlantic Ocean and western South Pacific Ocean, and averages 22 m in length (Victorian State Government, 2009). The Pygmy Blue Whales give birth in the tropical waters of the Banda Sea migrating to and from this area to reach the cool temperate waters of the Southern Ocean.

Antarctic blue whales breed and calve in warm water (latitude 20° S) during the southern hemisphere winter. They then migrate to cold Antarctic waters (60 - 70° S) during the southern hemisphere summer to feed, mainly on krill. Pygmy blue whales occur only in the southern hemisphere (southern Indian Ocean, eastern South Atlantic Ocean and western South Pacific Ocean). They do not migrate as far south as Antarctic blue whales, and in summer are generally found north of latitude 55 °S (DoE 2015c).

Important foraging grounds for blue whales include the Great Australian Bight, South Australia, and off Portland Victoria. Research to date has found that Pygmy Blue Whales occupy the western area of the Bonney Upwelling system in the Eastern Great Australian Bight and adjacent to the Kangaroo Island canyons from November and December (DoE 2015c). Pygmy Blue Whales then move south-east to the Bonney Upwelling system off eastern South Australia and Victoria (e.g., between Robe, SA and Cape Otway, Vic). This occurs predominately between January to April (DoE 2015c) though they have been recorded in the Otway area as early as October and as late as June.

CGG has shown in the impact and risk analysis documents that regulatory requirements relevant to the Regia MSS and blue whales will be met. Relevantly, the Conservation Management Plan for Blue Whales (DoE 2015c) and Guidance on Key Terms within the Blue Whale Conservation Management

Plan (DAWE 2021) have significant weight in CGG's assessment due to the involvement of Commonwealth and State regulatory agencies, threatened species managers, and scientific experts in the development of the conservation management plan and guidance. As such, recommended actions from the conservation management plan relevant to the Regia MSS have been implemented as detailed in Section 3.2.5 Mitigation Effectiveness.

3.2.5 Mitigation Effectiveness

Mitigation of the Regia MSS effects can be best implemented with regards to blue whales by temporal exclusions to avoid the periods of time when blue whales are most likely to be present in the foraging BIA. Thus, CGG will implement an activity limitation where the seismic source will only be operated in the pygmy blue whale foraging BIA from 16 September and during October, November and December.

The Conservation Management Plan for Blue Whales (DoE 2015c) details the following in relation to marine seismic surveys:

- The risk of physical impacts to blue whales is minimised by implementation of the practical measures outlined in the *EPBC Act Policy Statement 2.1— interaction between offshore seismic exploration and whales*.

CGG will implement the requirements of *EPBC Act Policy Statement 2.1— interaction between offshore seismic exploration and whales* for the Regia MSS as detailed in the Fauna Management Plan. In addition, detection methods above typical industry standards, such as passive acoustic monitoring and in-water acoustic detection monitoring systems for low-frequency whales will be implemented. This will result in an effective mitigation system for detecting blue whales and taking actions to prevent acoustic injury or displacement to foraging blue whales in vicinity of seismic survey operations.

Additionally, the Conservation Management Plan for Blue Whales (DoE 2015c) identifies actions that are relevant to the Regia MSS and underwater noise. CGG has considered each of these actions in the completion of an assessment of the activity (action) according to the principle of ESD (Appendix F4), and the application of a Fauna Management Plan (Appendix G2) which includes minimising the risk of injury and displacement of blue whales.

3.3 Australian Sea Lion (*Neophoca cinerea*)

[Section added in response to Matter I17 and updated in response to Matter F17].

3.3.1 Species-Specific Sensitivity

The Australian Sea Lion is an otariid pinniped with Southall et al. (2019) categorising the species within the *other marine carnivores in water* hearing group. Otariid pinnipeds have a generalised hearing range of 60 Hz to 39 kHz (NMFS 2018). Little data exists on sounds produced by the Australian Sea Lion, or on the effects of noise on their behaviour (Pidcock et al. 2003) with available literature mostly referring to the California Sea Lion in the northern hemisphere. This species is considered to show some similar characteristics to the Australian Sea Lion. California Sea Lions make both airborne and underwater sounds, including barks, whinnies and buzzing associated with social interactions (Pidcock et al. 2003). The frequency of these sounds underwater is below 4 kHz. Most energy for these sounds is projected between 0.25 and 2 kHz (Richardson et al. 1995). Underwater source levels for the Australian Sea Lion are unknown as according to Erbe et al. 2017 there are no subsea recordings for the species.

The frequency of the sound produced from each seismic pulse from the Regia MSS is primarily less than 2 kHz, with the highest levels at frequencies in the range of 10-500 Hz (McCauley 1994). Thus, there is an overlap with the Australian Sea Lion hearing range.

The impacts to the Australian Sea Lion population which are relevant to the Regia MSS, were assessed as medium. The assessment predicted the Regia MSS to have some effect to seals and sea lions, but the effect is not considered significant or at a level to affect the population.

The Issues Paper for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013a) and Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013b) list noise as a secondary threat to the Australian Sea Lion. However, research into the vulnerability of the Australian Sea Lion to noise disturbance has not been undertaken with studies only conducted on similar species (e.g. harbour seal and grey seal) in the Northern Hemisphere (DSEWPaCa 2013b).

Historically, the main anthropogenic threat to the Australian Sea Lion was hunting and overharvest through sealing activities during the 1700s, 1800s and early 1900s. Although this activity was stopped in the 1920s, the Australian sea lion population has not recovered to pre-exploitation levels (AFMA, 2010). Estimating the abundance of the Australian Sea Lion is difficult. Techniques used are based on estimates of pup production and the use of population models. Using these techniques, the best estimate for the 2011 population was approximately 14,700 Australian sea lions, with most (86 per cent) occurring in South Australian waters (Shaughnessy, et al. 2011). Population trends at studied colonies varies with some showing decline, with others showing growth. No population data post 2011 could be sourced.

Primary threats to the Australian Sea Lion, (DSEWPaCa 2013a, 2013b) are not activities connected with the Regia MSS. In summary these are:

- interactions with commercial gillnetting operations resulting in drowning.
- interactions with commercial pot fishing for rock lobster resulting in drowning.
- entanglement in marine debris resulting in drowning or causing extensive wounds.

In addition, secondary threats to the Australian Sea Lion (DSEWPaC 2013a, 2013b) which are also not connected to activities during the Regia MSS are:

- loss of habitat due to marine aquaculture.
- entanglement in subsurface equipment from marine aquaculture.
- 32
- land based run-off causing habitat degradation.
- human disturbance from either deliberately or accidentally being near Australian sea lions.
- direct killing because of fishers or aquaculture operators shooting animals that are perceived to be a threat to their operations.
- disease.

- pollution (research is ongoing with to date no supporting evidence).
- oil spills leading to hypothermia if fur is affected and poisoning if toxic hydrocarbons are ingested.
- competition and prey depletion from resulting from human activities and other marine predators.
- climate change associated to events such as sea level rise and 'wave wash' resulting from extreme weather patterns.

3.3.2 Magnitude of Effect

The Issues Paper for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013a) and Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013b) details that anthropogenic noise can cause avoidance behaviour and/or hearing threshold changes in pinnipeds. In addition, seismic pulses may affect marine mammal prey species.

Permanent (PTS) or temporary (TTS) threshold shift (hearing loss) to otariid pinnipeds is not predicted based on underwater noise modelling (Appendix B7 – Sound Modelling Reports). The effect criteria for PTS for otariid pinnipeds was not reached. In addition, the per pulse effect criteria for PTS and TTs for these species was reached at 51m-55m and 63m-68m respectively, from the sound source. The PTS cumulative effect criteria for these species was reached at 50m-55m from the sound source and TTs cumulative criteria was reached at 660m-1.02 km from the sound source. It is highly unlikely that a seal or sea lion would stay within 1.02 km of the sound source for up to 24 hr, thus TTS impacts are not predicted.

The impacts to otariid pinnipeds, resulting from noise generated by the Regia MSS, are limited to avoidance behaviour within an area between 3.12 km-6.96 km depending on where in the Operational Area the Regia MSS is being undertaken. As Australian Sea Lions are not dependent on any specific area and typically forage up to 60 km and can forage up to 190 km from their colony, impacts may occur to individuals but not at a level to reduce fitness.

The Australian Sea Lion is a specialised benthic forager, primarily feeding on the sea floor (DSEWPaC 2013b). They typically feed on a range of prey including fish, cephalopods (squid, cuttlefish and octopus), sharks, rays, rock lobster and penguins (DSEWPC 2013b). Underwater noise modelling (Appendix B7 – Sound Modelling Reports) and assessment (Appendix E4 - Underwater Sound: Invertebrates) does not predict mortality or physiological damage to cephalopods. In addition, the predicted effect level to Southern Rock Lobster is assessed as minor as impacts are predicted to have some effect, but the effect is not considered significant or at a level to affect the population given.

Mortality of fish (both immediate and delayed) is not predicted based on lack of documented cases of mortality in free-swimming fish exposed to seismic source emissions under experimental or field conditions (DFO 2004; Boeger et al. 2006; Popper et al. 2014; Popper et al. 2016; Carroll et al. 2017; Popper and Hawkins 2019). Site-attached fish species are species that rely on the benthic habitat and demonstrate a very high degree of site fidelity to the extent that they are unlikely or unable to flee an approaching seismic source and are likely to remain and/or seek refuge within habitat structures. However, impacts to site-attached fish were studied by Woodside at Scott Reef during the Maxima 3D MSS activities (Miller and Cripps 2013) and no lethal or sub-lethal effects on fish were experienced nor any significant decreases in the diversity and abundance of fish after the seismic survey, compared with the long-term temporal trend before the survey.

As the Regia MSS will only occur during a limited period in Australia waters (maximum 60 days acquisition), potential behavioural impacts to individual Australian Sea Lions will not impact on the recovery of the population. Population impacts to prey species for the Australian Sea Lion are also not predicted.

3.3.3 Recovery Potential

Slow recovery of populations due to the extreme philopatry of females and limited dispersal of males between breeding colonies make Australian Sea Lions vulnerable to anthropogenic threats. The removal of only a few individuals annually may increase the likelihood of decline and potentially lead to the extinction of some of the smaller colonies (DSEWPaCa 2013b).

Based on the magnitude of effect from the Regia MSS to Australian Sea Lions which is limited to behavioural avoidance for the duration of the activity (maximum 60 days acquisition), no long-term disturbance that may affect the recovery of the species are predicted.

3.3.4 Conservation Status

The Australian Sea Lion is listed as endangered under the EPBC Act which was based on declining population trends, the life history characteristics of the species and the fact that the species was still under pressure from some sectors of the Australian commercial and recreational fishing industries at the time of listing. The Australian Sea Lion population underwent a massive decline in numbers caused by seal harvesting (DSEWPaC 2013).

The Australian Sea Lion is the only endemic, and least abundant, pinniped that breeds in Australia (DSEWPaC 2013). Breeding colonies for the Australian Sea Lion are found only in South Australian and Western Australian waters; however, the species is known to forage in Commonwealth waters adjacent to these states. The population can be broadly separated into three main metapopulations (Goldsworthy et al. 2009):

- one in SA accounting for ~84% of pup production
- one on the south coast of WA accounting for ~10% of pup production
- one on the west coast of WA accounting for ~6% of pup production.

The Australian Sea Lion uses a variety of shoreline types but prefer the more sheltered side of islands and typically avoid rocky exposed coasts (Shaughnessy 1999).

CGG has shown in the impact and risk analysis documents that regulatory requirements relevant to the Regia MSS and Australian Sea Lions will be met. Relevantly, the Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaC 2013) has significant weight in CGG's assessment due to the involvement of Commonwealth and State regulatory agencies, threatened species managers, and scientific experts in the development of the recovery plan. As such, recommended actions from the recovery plan relevant to the Regia MSS have been implemented as detailed in Section 3.3.5 Mitigation Effectiveness.

3.3.5 Mitigation Effectiveness

Mitigation of the Regia MSS effects can be best implemented with regards to Australian Sea Lions by limiting the spatial boundaries of the survey to avoid the sound source being discharged within 11.8 km of Lady Percy Julia Island / Deen Maar. This distance is the furthest distance to the sound effect criteria for pinnipeds (seals and sea lions). This criterion was used as Deen Maar is the largest Australian Fur Seal breeding colony in Australia with and the Australian Sea Lion may occur within the area.

The Issues Paper for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013a) and Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013b) lists noise as a secondary threat to the Australian Sea Lion. However, neither publication provides practical measures on the interaction between offshore seismic exploration and the Australian Sea Lion.

CGG has assessed potential cumulative noise impacts (Appendix F1) of other activities within the Otway Basin and identified additional mitigations to ensure cumulative noise impacts are within acceptable levels.

Assessment of the Regia MSS activities are consistent with the principles of ESD (Appendix F4).

3.4 Little Penguin (*Eudyptula minor*)

3.4.1 Species-Specific Sensitivity

Little penguins are found only in Australia and New Zealand where they are widely distributed along the coastlines of New Zealand and along the southern half of Australia. While the majority of little penguin colonies are located on islands - often cohabiting with other seabird species such as shearwaters and petrels – there are multiple colonies to be found on the mainland and this is the case

along the Otway Coast where up to seven colonies have previously been identified (Norman et al. 2017)(see Figure F3-2 below).

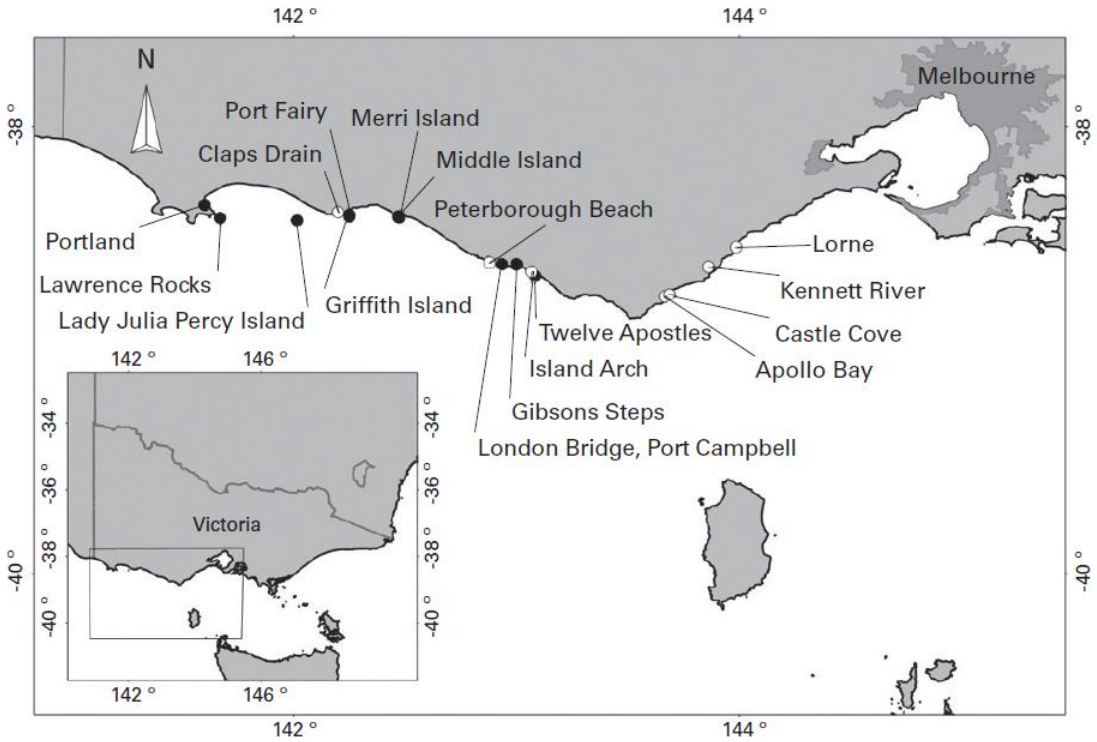


Figure F3-2 - Locations of past and present breeding sites across Western Victoria (from Norman et al 2017). Past or present breeding sites shown as ●, other sites as ○.

Mainland colonies are subject to large changes in the number of breeding animals which has been principally attributed to predation from foxes, dogs and cats (Norman et al. 2017). Most mainland colonies in New Zealand and Australia are in decline because of such impacts, while island colonies are faring much better. Food limitation has been seen previously with the collapse of the Anchovy population across southern Australia in the mid 1990's (Dann et al. 2000) however stocks of Anchovy and Sardines are currently considered healthy and not limiting (Grammer, Bailleul and Ivey, 2023). Philip Island remains the epicentre of the little penguin population in the region with current estimates of ~32,000 individuals (Philip Island Nature Parks; https://www.penguins.org.au/about/). Compare this with estimates of 7 individuals for Middle Island (` 2020-21; reports from 2021/22 and 2022/23 did not provide population estimates), 317 active burrows on Lady Julia Percy Island in 2000 (Dann et al. 2004) and 70 nests at London Bridge in 2012/13 (Berlincourt and Arnould, 2014)[2].

Norman et al (2017) updated estimates to 300 burrows in 1981 at Gibson Steps. There was a small colony in Portland located in clay cliffs on Henty Beach, however this colony decreased due to predation from dogs (Norman et al 2017). There were small colonies located at Lawrence Rocks (109 burrows, Harris and Norman (1981)), and Merri Rocks (5 burrows Dann and Norman 2006)), however they cannot be used to define current colony existence and/or size. It is understood the colony located at Griffiths Island has disappeared in recent times as a result of fox predation (Dann and Norman, 2006). CGG has contacted several government and local bodies but could not obtain more recent population estimates for these colonies.
Little penguins are resident central-place foragers that remain tied to their colony throughout the year, not just in the breeding season. They visit the colony to moult, breed and rest. Most little penguin colonies are located on islands where terrestrial predators are usually absent. It is these islands,

[2] These counts represent the most recent numbers we could find from the literature.

together with the food resources around them that limit and determine the distribution of colonies, population size of colonies and foraging ranges of penguins (Wiebkin 2012). Little penguins can store prey, which gives them the flexibility to forage for the entire day before returning to their chicks at dusk. Diet studies indicate that they are generalist predators that target whichever small schooling prey are abundant near their colony (Klomp and Wooller, 1988; Montague and Cullen, 1988; Gales and Pemberton, 1990; Cullen, Montague and Hull, 1991; Chiaradia, Costalunga and Kerry, 2003; Eberle, 2003). There is large variability in diet amongst colonies and even between years at the same colony. They feed mainly on clupeids, such as anchovy and sardines, when feeding chicks, but they may also feed on krill and several species of cephalopods at all stages of breeding (https://datazone.birdlife.org/species/factsheet/little-penguin-eudyptula-minor/text).

Studies into daily feeding range limits for nesting penguins have found forays out to 30+ km however the vast majority of feeding during this period is occurring within 15-20 km of their nesting sites and this has been confirmed across multiple studies from multiple locations (e.g. Montague and Cullen, 1988; Hoskins et al. 2008; Berlincourt and Arnould, 2014; Pelletier et al. 2014; Phillips et al. 2019, 2022). Feeding dynamics can be very different between locations and is correlated with prey abundance and distribution patterns. Feeding range limits can also change outside nesting season. When adults no longer need to return to the nest each day, they can venture out over 100km from the colony to feed. As has been demonstrated with references throughout the EP, the Otway region is well supplied with sardines and squid, with quality of food resources correlated with nearness to upwelling areas (Norman et al. 2017).

Because penguins feed on mobile prey species such as fish, squid and krill they must be able to regularly expend considerable searching effort and flexibility in foraging behaviour (Chiaradia et al 2007). Tagging studies conducted over three breeding seasons have revealed that little penguins are flexible in their foraging behavior and can adjust their activity budgets in relation to breeding stage and local environmental conditions (Berlincourt and Arnould, 2015). Little penguins tagged at London Bridge decreased their foraging efforts during periods of rough sea states and increases in wave heights, The authors suggested two potential reasons for this: high sea states and swells may increase foraging efforts of penguins or rough sea states may modify prey behavior, alternating the penguins ability to find prey (Berlincourt and Arnould, 2015). This study did note that although little penguins at London Bridge would have increased their foraging efforts, individuals at London Bridge did not vary in their body condition between breeding seasons. This suggests that individuals breeding at London Bridge may have more scope for increasing their foraging effort to compensate for reductions in prey availability. During the chick guard stage, close to their colony Little penguins at London Bridge mainly foraged at hotspots primarily located south-west of the colony. The maximum foraging distance during the chick guard stage was 16.9km (Berlincourt and Arnould, 2015). During the post guard stage, core foraging areas were located up to 15 km from the colony to south-west and south south-west, and in some instances, it was also very close to the shore. Maximum foraging distances in the post guard stage for the colony at London Bridge ranged from 12.5km to 25.9km (Berlincourt and Arnould, 2015).

A subsequent tagging study conducted on breeding colonies at Gabo Island and London Bridge confirmed little penguins are shallow divers and inshore foragers at these study sites (Camprasse et al. 2017). This study found a lack of short-term consistency in bearings to maximum distance, indicating that over subsequent days, little penguins foraged in different locations within their home range. These findings confirm that little penguins are behaviourally highly plastic (Camprasse et al. 2017). The study also found individual consistency in foraging metrics was only present over subsequent foraging trips, with no consistency detected for longer timescales. This suggests that little penguins are adapted to feed on prey that is temporally unpredictable on timescales longer than multiple consecutive days. This study concluded, although little penguins have a limited foraging range during their breeding season, foraging behaviour and its consistency varied extensively across sites, years, breeding stages and clutches, showing that little penguins are highly plastic and have high flexibility in foraging behaviour (Camprasse et al. 2017).

Egg-laying and chick raising covers the period from August to February which is the most critical time for obtaining sufficient food to sustain developing chicks (see Figure F3-3 below).

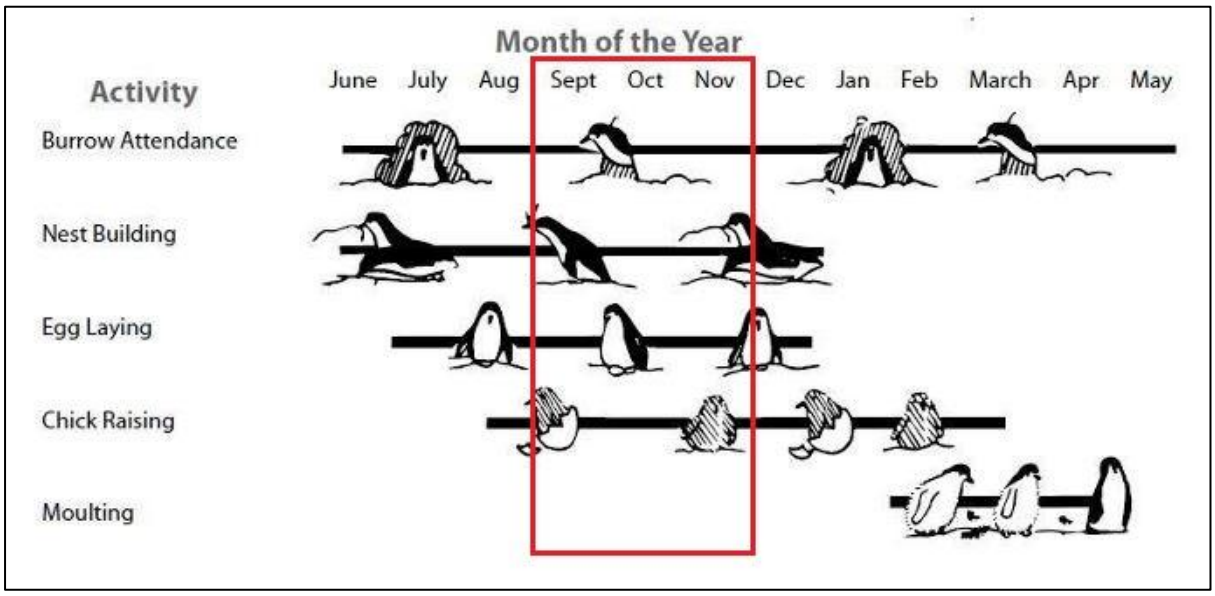


Figure F3-3 - Schematic of reproductive cycle in little penguins at Philip Island (from https://penguins.org.au/conservation/education/nature-notes/little-penguins/).

***** *Red box highlights the Regia MSS windows.*

During consultation with relevant persons, it was noted that as referenced by the Middle Island Project (Event ID 6412) there were instances of breeding cycles beginning as early as June.

There have been no studies looking at seismic effects on little penguins specifically, so we have looked for seismic studies on other penguin species. A study by Pichegru et al. (2017) investigated the behavioural response of endangered African penguins (*Spheniscus demersus*) before, during and after a seismic survey conducted within 100 km of their breeding colony in South Africa, using a multi-year GPS tracking dataset. They found penguins foraging within 100 km of the active seismic operations showed a change of foraging direction during seismic periods, increasing their distance between their feeding area and the location of the seismic vessel. While the avoidance behaviour observed in this study was unable to be definitively attributed it was most likely to have been due to penguins responding directly to the noise. Small-scale acoustic fish surveys assessing distribution and abundance of small pelagic fish in Algoa Bay around both penguin colonies did not however, show a significant change in distribution and/or abundance of small pelagic fish in the region in March 2013 compared to a few months prior to or after the seismic operations. Moreover, further monitoring as part of this study highlighted that the African penguins quickly reverted to normal foraging behaviour after cessation of seismic activities, indicating a relatively short-term influence of seismic activity on these birds' behaviour and/or that of their prey.

While no seismic studies exist for little penguins, recent research has modelled sound reception and hearing in little penguins through anatomical analysis of the head structures of deceased individual penguins (Wei and Erbe, 2024). They predicted the hearing capabilities of little penguins across a broad frequency range (100 Hz – 10kHz) (see Figure F3-4 below).

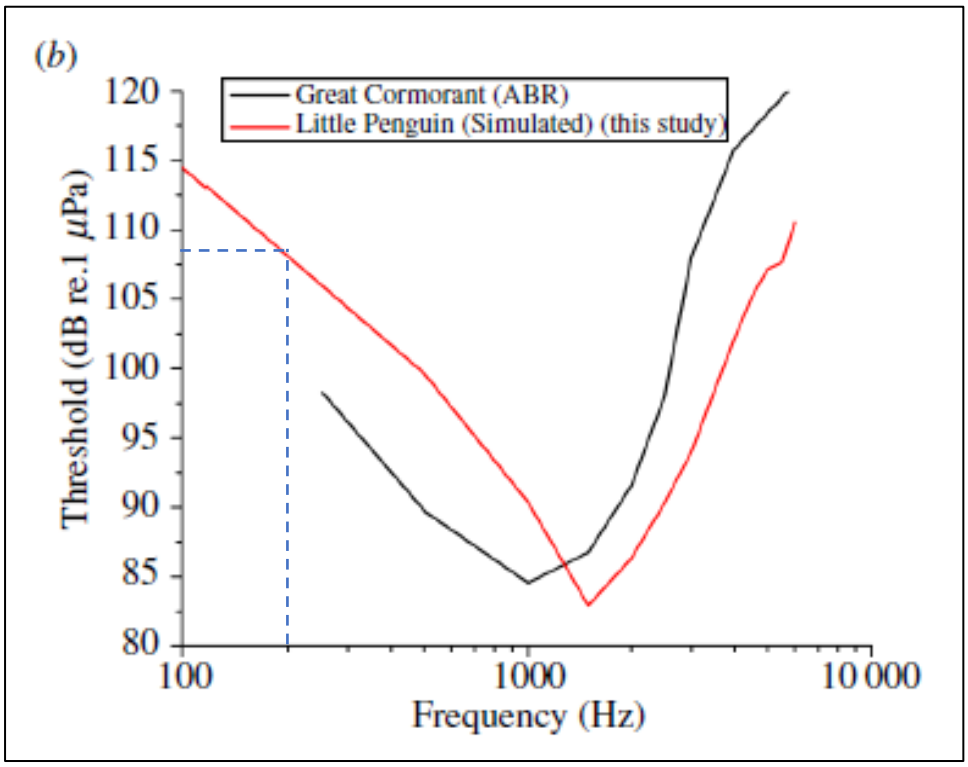


Figure F3-4: Predicted underwater audiogram of the Little Penguin (from Wei & Erbe 2024). Overlaid dashed lines represent the hearing threshold relative to the expected frequency level of the Regia MSS.

Sound modelling undertaken for the Regia MSS used 200kHz frequency for the MSS and extrapolating this from Figure F3-4 indicates a hearing threshold of ~107-112 dB re.1 µPa. Wei & Erbe (2024) indicate that humans have strong behavioural responses at 50dB above thresholds while for whales it is as high as 100dB above threshold hearing levels. Using this range as a guide and noting that little penguin hearing is most sensitive in the 1000-2000 Hz range we can extrapolate to a potential SEL TSS threshold of 170 dB re.1 µPa and this is the threshold level modelled for impacts by SLR. It remains the case that more research is needed into penguins and sound however it is reassuring to see that the modelled thresholds are in line with current research. With behavioural effects, Sorensen et al. (2020) found a response by Gentoo Penguins at 120 dB re.1µPa but this appears too low for Little Penguins given it is only 5dB above their calculated hearing threshold. It must also be highlighted that Sorensen et al. (2020) obtained their outcomes from penguins enclosed in a pool which is not reflective of normal conditions. Testing of seismic effects through caging of subjects remains a significant weakness of current experimental approaches and limits extrapolation of effects to real-life applications.

3.4.2 Magnitude of Effect

The limited science around Penguin responses to seismic surveys indicates they respond to the presence of active seismic by moving away from the area. The same science also indicates they return to previous areas once seismic moves away. The most recent study examining hearing thresholds based on skull morphology (Wei and Erbe, 2024) indicates a TTS hearing threshold in the region of 180 dB re. 1µPa is appropriate for understanding thresholds distances (i.e. an additive on top of the calculated minimum hearing threshold of ~115 dB re. 1µPa at 200Hz frequency). At this level penguins would have to be within 600m of the seismic source for 24 hrs to sustain temporary damage. Given the limited time that seismic will be active within the potential feeding halos of Little Penguins, the intermittent timing of seismic in those areas and the extensive nearshore feeding grounds available to Little Penguins we expect the magnitude of any effects to be small and temporary.

If the seismic survey occurs in the chick rearing stage (September to November), it is understood little penguins will be provisioning for chicks and foraging close to their colonies. CGG acknowledges some penguins may be behaviourally impacted and may have to extend their foraging times . However, there have been numerous studies on the foraging flexibility exhibited by little penguins and increasing foraging effort does not lead to impacts to the fitness and survival of penguins, CGG anticipates any potential impacts to little penguins during the chick provisioning stage to be temporary, localised and recoverable.

The Regia MSS is expected to collect seismic data for 60 days within a 90-day timeline, which provides flexibility to accommodate stoppages due to scheduled and/or unscheduled events. Such events may include adverse weather conditions or mitigation measures as part of the EP (see Appendix A2 for Description of Activity).

A seismic survey acquires data by running parallel sail lines towing streamers back and forth within the defined Activity Planning Area. The survey can be carried out in sections and the sail lines acquired in any order. Acquisition is a continuously moving process hence seismic sound levels are not static and will increase when moving to a point in space and then decrease as it moves away. This is strictly true for sessile animals but not for mobile ones. Mobile animals such as penguins can actively respond to seismic sources and will move away from the activity, as has been noted by researchers (Pichegru et al. 2017).

In response to concerns raised by a relevant person, CGG sought to conduct some analysis on how much of an overlap the Regia MSS has with little penguin foraging areas. By overlaying the proposed sail line plan with 20km core feeding halos centred around nominated penguin colonies (from literature and consultation) we can calculate the amount of time and proportion of core foraging habitat that the Regia MSS will intersect with. Of the 5 main colonies identified through community consultation only the colony on Deen Mar will intersect with active sail lines within the 20km feeding halo.

The area within the halo that will be traversed with active seismic is ~32km^2 which is ~3% of the total feeding halo area of ~1006km^2. There will be 11 lines that will be actively acquiring seismic within the halo for a portion of their path. However, because the acquisition process involves running parallel lines extending the length of the total acquisition area, the time each relevant line spends inside the Deen Maar feeding halo is very short and is not cumulative (see Figure F3-5 and Table F3- 2below).

Figure F3-5- Map illustrating core penguin foraging areas for all identified colonies (in red) relative to the location of the Regia MSS survey lines (green).

Table F3- 2: Proportion of time and distance that survey lines will be acquiring within the 20km Deen Mar core feeding halo. Line #'s corresponds to distance from shore, i.e. line 1 is closest to shore. The survey does not actually start at line #1 so number position in the table reflects the likely survey path to be taken.

Line #	High Power (km)	Time Acquiring (min@9.3kmh^{-1})	Return Time (hrs)
2	4.2	27	31
3	3.9	25	48
1	3.6	23	326
11	1.9	12	25
10	4.0	26	25
9	5.8	37	25
8	6.7	43	24
7	5.8	37	24
6	5.0	32	24
5	4.4	28	24
4	4.2	27	

For example, the first entry into the halo will be running at full power for ~4.2km (see Line # 2 in Table F3- 2) and will leave the halo after 27 min at an average speed of 4-6 knots. The second entry into the halo will not occur for another 31 hours. It will be running at full power for ~3.9 km (Line # 3) and will exit the halo after 25 min. The third entry into the halo will not occur for another 48 hours. It will be running at full power for ~3.6 km and will leave the halo after 23 min. The 4th entry will not occur for another 13.5 days as the MSS is operating further offshore. This process will continue like this for the other 8 entries into the halo. The very short time inside the halo followed by extended time away between each seismic line drastically reduces the likelihood of any impacts whether singular or cumulative in nature. Total time acquiring seismic in the Deen Mar feeding halo is only ~5.3 hours spread over 3.5 weeks.

With significant overlap of halos around each colony we suggest that all the habitat running parallel to the coast out to 20km will provide suitable feeding opportunities. This equates to ~ 3370 km2 of suitable area for fishing of which the seismic area constitutes < 1 %. CGG acknowledges some little penguins may be behaviourally impacted and displaced from their foraging areas which may impact the fitness of an individual. There have been multiple studies examining little penguin foraging behaviours. Camperasse et al (2017) examined tagged breeding little penguins at Gabo Island and London Bridge. This study revealed an absence of short-term consistency in bearings to the maximum distance, suggesting that over the following days, little penguins foraged in various locations within their home range. This confirms that little penguins exhibit high plasticity and flexibility in their foraging behaviours. The study also found differences in foraging behaviour across space and time arose from differences in the local distribution and abundance of Clupeiformes, thought to be associated with different environmental conditions, rather than from differences in prey types. Berlincourt and Arnould (2015) noted rough sea conditions caused little penguins at London Bridge to increase their foraging effort. These individuals did not vary in body condition suggesting breeding individuals at London Bridge may have a greater ability to increase their foraging effort in response to declines in prey availability. Little penguins have also been documented group foraging to increase foraging success (Sutton et al. 2015). Given that Little Penguins exhibit high flexible foraging behaviours and tend to prey on species that is temporally unpredictable, if little penguins are temporarily displace from foraging areas impacts to penguin fitness and survival are not expected.

A dedicated study of little penguin diving behaviours during nesting season and across their whole distribution range, clearly shows that they prefer to constrain their diving to shallow water (Chiaradia et al 2007). Across 4 widely separated colonies they found almost all Little Penguin dives were less than 50m deep with the overwhelming majority less than 30m deep (Figure F3- 6). When the bathymetry of the Otway coastline is examined, it can be seen that the 50m contour line lies within 15km of the coast and the 30m contour line lies within 5km of the coast.

While studies into daily feeding range limits for nesting penguins have found forays out to 30+ km the vast majority of feeding during this period is occurring within 15-20 km of their nesting sites and this has been confirmed across multiple studies from multiple locations (e.g. Montague and Cullen, 1988; Hoskins et al. 2008; Berlincourt and Arnould, 2014; Pelletier et al. 2014; Phillips et al. 2019, 2022).

The study by Chiaradia et al (2007) demonstrates that all chick-rearing Little Penguins face similar diving and dispersal limitations across their distribution range. These dispersal limitations are heavily influenced by the water depth and geographical features of the foraging zones. When applied to the Otway coast region encompassing known penguin colonies it can be seen that the majority of foraging will be occurring within 15km of the coast with less occasional forays out to 20km.

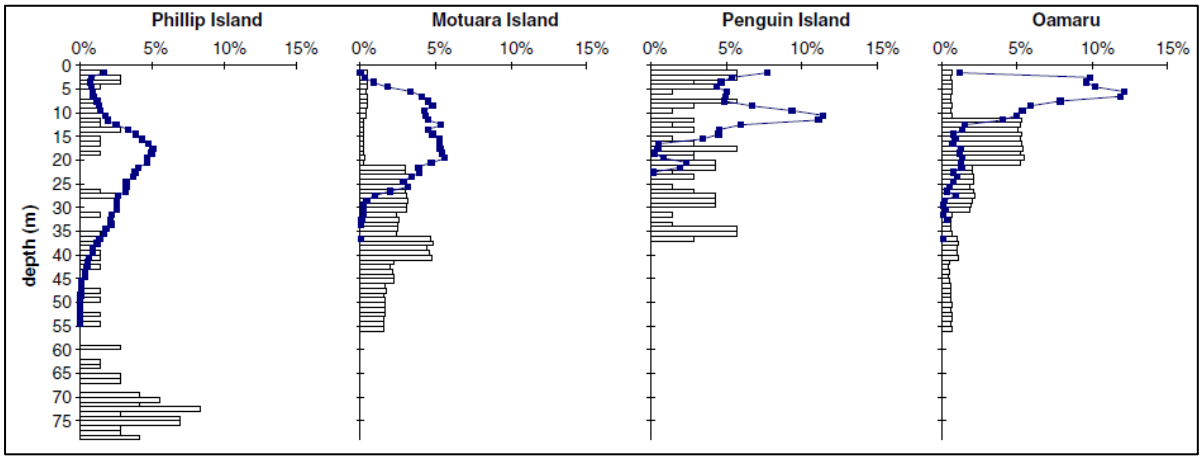


Figure F3- 6 - The proportion of foraging area depth (bathymetry, clear bars) and diving depths (dark squares and lines) per 1 m interval for Little Penguins in Australia (Phillip Island and Penguin Island) and New Zealand (Motuara Island and Oamaru). From Chiaradia et 2007)

Consequently, we assess the likelihood of any significant impact to food resources and feeding opportunities for little penguin colonies as low. CGG believe any behavioural impacts to little penguins are of an acceptable level as any knock-on effects from the survey will not impact the foraging success penguins, their ability to rear their chicks and their overall fitness.

3.4.3 Recovery Potential

While there is no research into seismic effects on little penguins there is enough parallel/ complementary research to make an informed assessment of the scale of any impacts to little penguin colonies from seismic activity. Coastal colonies in the region have undergone major fluctuations in abundance over the past 30 years which reflects the influence of a multitude of factors. Mainland colonies have faired poorly in most locations as they have succumbed to predation from feral animals and nearness to human populations. Multiple mass mortality events in the 1990's of their preferred food source, the Australian Anchovy, also caused substantial declines in colony sizes of little penguins across the south coast. Current anchovy stocks are in good health however and this species is commonly distributed along the shelf. There is also a very large coastal foraging area available so food limitation will not be an issue throughout the duration of the proposed Regia MSS. While behavioural responses can be expected, previous research has shown penguin species exposed to seismic will quickly revert to normal foraging behaviour after cessation of seismic activities, indicating a relatively short-term influence of seismic activity (Pichegru et al. 2017). Additionally, the specific

source used in the Pichegru et al. (2017) study had a total volume of 4,230 in^3 compared to the 2,630 in^3 proposed for the Regia MSS hence the size of the seismic source is ~45% less here.

3.4.4 Conservation Status

There is no conservation status assigned to little penguins (*Eudyptula minor*) as noted on the Species Profile and Threats Database (http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1085). They are considered a species of Least Concern under the IUCN Red List, with the last assessment undertaken in September 2020. The global population estimate at this time was 469,760 animals (https://www.iucnredlist.org/species/22697805/202126091)

3.4.5 Mitigation Effectiveness

There are multiple processes that will contribute to mitigation of any effects of seismic surveys on Little Penguins. They include, "soft start" procedures and timing the survey to avoid the most sensitive parts of their lifecycle e.g. summer months. The survey program avoids the core feeding areas with the exception of limited time within the outer edge of the Deen Mar zone. Additionally, the seismic within this area is being undertaken in short sections separated by at least 24 hrs between successive survey lines. There are also mitigation measures for feeding birds which will indirectly support mitigation for Little Penguins, namely reducing to low power within 500m of feeding birds.

3.5 Southern Rock Lobster (*Jasus edwardsii*)

3.5.1 Species-Specific Sensitivity

Substantial research on the interaction between seismic surveys and the Southern Rock Lobster (*Jasus edwardsii)* has confirmed that while lethal effects are not seen, sub-lethal effects are likely to impact all stages of their life cycle that are within ~700m of a seismic system when it is firing (see Appendix B8 and references therein). In adults/juveniles, these effects are principally manifest as an impaired righting reflex and/or delayed progression through the moulting cycle. However, due to seismic signal attenuation over distance, its interaction with variability in individual vulnerability, habitat complexity, and time spent within proximity to the seismic source points, these effects are neither ubiquitous nor consistent. The larval stage of *J. edwardsii* is long (up to 2 years) and subject to persistent and high natural mortality during this time. Any effects on individual animals will not be measurable against the natural mortality rates that exist, and which operate over far greater spatial and temporal scales than the intended MSS schedule.

A recent experimental study used cages to assess seismic effects on Western Rock Lobster (*Panulirus cygnus*) in shallow reef habitat adjacent to Dongera on the central WA coast (de Lestang et al. 2024). Juvenile lobsters were confined to cages and subject to seismic pulses from very close quarters (2-5m metres) after which they were released. A recapture program was followed to determine what effects seismic might have on catches. Results indicated a short-term reduction in catchability for the first month of the recapture program which subsequently disappeared. The recapture rates after the first month were very low (e.g. max of 1-3 animals per treatment) and not appropriate to draw any further conclusions from, as highlighted by the breadth of the 95% CI's associated with the analysis (6-68%). Treatment was not reflective of normal seismic activity nor normal activity and domiciles of WRL. Natural mortality rates of WRL are also very high with density-dependent mortality between the time that pueruli settle on inshore reefs and the time they move offshore as juveniles to recruit to the fishery estimated to be as high as 80–98% during the first year after settlement (Phillips et al 2003).

3.5.2 Magnitude of Effect

Individual adult and juvenile animals within proximity to a seismic system when firing is occurring will likely be impacted in a non-lethal way as described above and in Appendix E4. The effects will vary across individuals and reduce with distance from source of the disturbance.

Puerulus settle into their preferred benthic habitat from June – September each year so potential seismic effects on the most vulnerable stage of the life cycle can be drastically reduced by scheduling the MSS for outside this window. Most mortality happens in the larval stages of marine organisms that incorporate a planktonic phase in their life cycle. Estimates can vary widely however > 90% mortality is common (Morgan 1995 - Life and death in the Plankton) hence reducing or minimising impact at time of settlement will provide more powerful mitigation of any potential seismic effects.

All SRL (Southern Rock Lobster) located within the MSS operational area are considered part of a single genetic stock spread across southern Australia (Ovenden et al. 1992; Thomas & Bell 2013). The huge geographical spread of this species means that larval supply to any individual area, such as the MSS operational area, comes from many other areas and hence is not linked to the number of reproductively active animals in any one place. Research has highlighted the complex processes affecting settlement strength in SRL which indicate that environmental conditions that reduce settlement strength in one region of the fishery often increase settlement strength in other regions. A system such as this is extremely resistant to localised disturbances as it receives larvae each year from what is effectively, a 'bank' of SRL stretching across southern Australia. Output from modelling of larval supply as seen in Figure F3-7 and Figure F3-8 clearly shows the dispersal extent of larvae released from locations in Victoria and Western Australia.

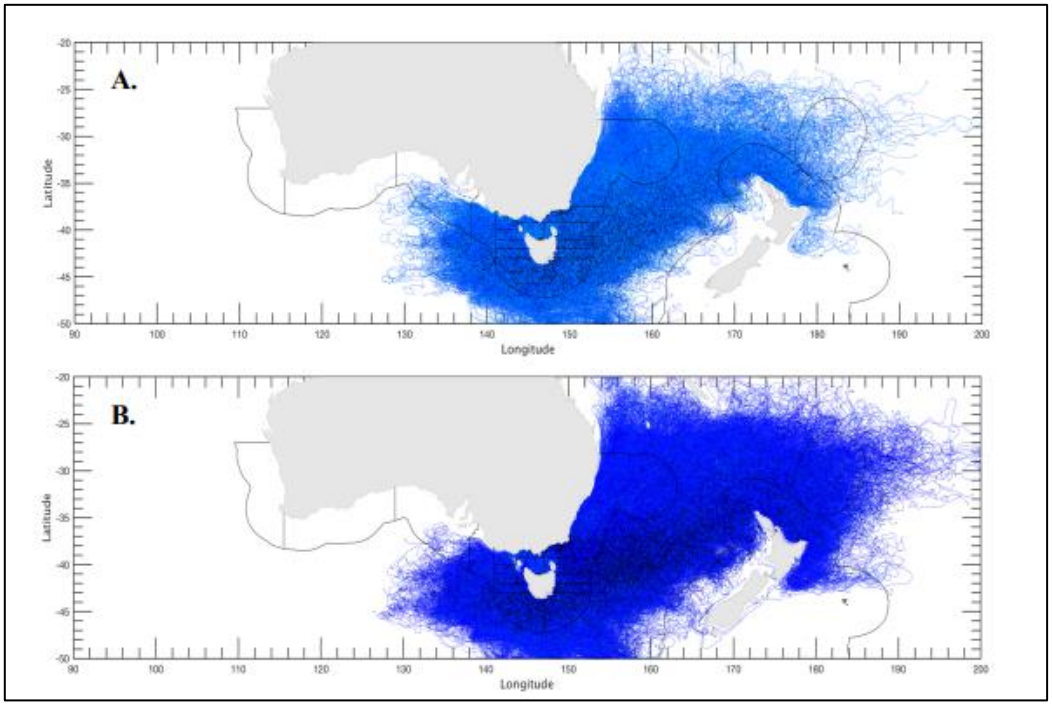


Figure F3-7 - Simulated trajectories of larvae released from Victorian fisheries: A. VIC_W fishery, B. VIC _ E fishery. The location of larvae at the end of the dispersal simulation is marked with black dots (from Vasile 2018 PhD thesis).

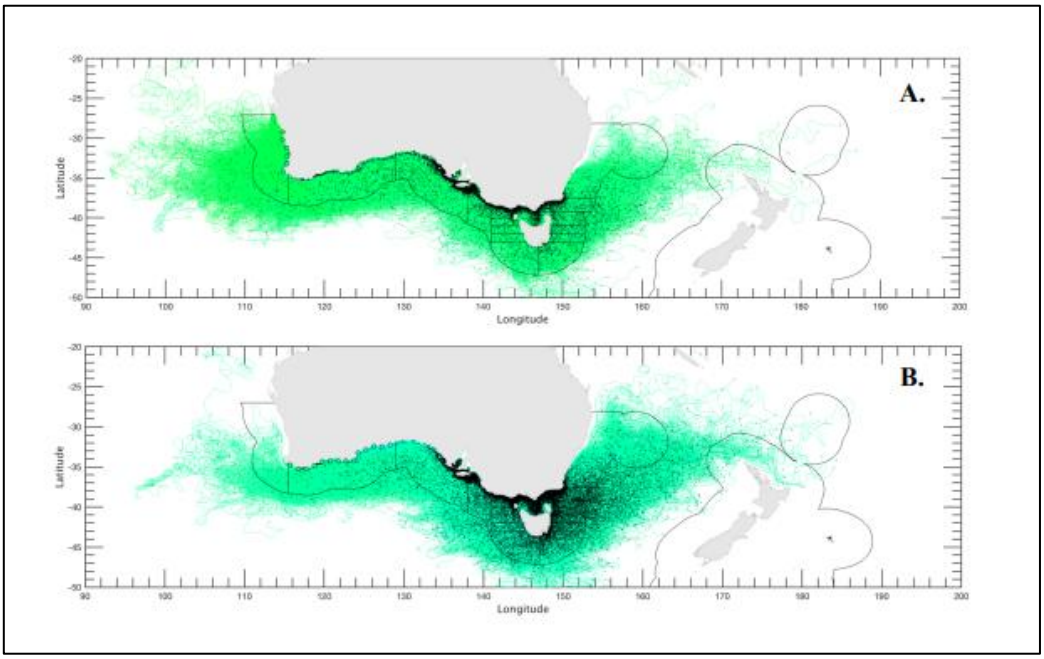


Figure F3-8- Simulated trajectories of larvae from Western Australia fisheries A. WA _ W fishery, B. WA_ S fishery. The location of the larvae at the end of the dispersal simulation is marked with black dots (from Vasile 2018 PhD thesis).

During consultations several commercial rock lobster fishers claimed there were cumulative effects from seismic surveys that were adversely affecting the Southern Rock Lobster stock. Following the first round of consultations, CGG agreed to undertake a case study on the effects of seismic activity on the Southern Rock Lobster population in the Victorian western rock lobster zone over time. Historical catch data would be used to look at the whole of the fishery over the last 20 years and determine if there was any correlation between the previous seismic surveys that have occurred in that timeframe.

CGG made an additional request from the Victorian Fisheries Authority to aggregate data over three previous seismic surveys which fishers identified as particularly damaging to their activities (Investigator in 1999; Enterprise in 2002/03; and Crowes Foot in 2016). The aggregated data was received by CGG however there were inconsistencies in the totals rendering the data unusable.

Instead, CGG obtained the records of monthly catch between 2006 and 2023 (to June) and completed an analysis of this data with respect to the following surveys:

- Astrolabe MSS
- La Bella MSS
- Enterprise MSS
- Flanagan MSS
- Crowes Foot MSS
- Schlumberger MSS
- Sequoia MSS

Both landed catch in kilograms was analysed as well as monthly catch rates. Table F3-3 and Figure F3-9 show the landed catch with the relevant surveys timing shown in the colour coded months. Table F3-4 and Figure F3-10 show the monthly catch rates for the western zone over the same period.

Table F3-3 - Monthly landed catch for western zone rock lobster 2006 to 2023 (kilograms).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Dec
2006	80,448	67,773	51,122	18,232	13,564	4,444	10,102	21,613	8,277	24,310	57,969
2007	58,420	60,874	48,526	35,566	15,459			23,622	12,629	30,250	52,531
2008	57,486	46,325	45,760	25,440	15,501			9,710	6,870	16,364	42,874
2009	50,832	38,302	32,925	16,721	12,935	7,380	4,665	8,652	4,403	17,678	40,534
2010	43,258	36,321	30,794	19,515	17,655	6,789	9,427	11,358	6,447	18,803	36,774
2011	51,010	32,071	31,007	23,973	11,098	2,857	14,362	22,781	9,452	20,588	46,788
2012	38,315	36,617	24,814	12,885	6,532	2,587	13,486	17,944	11,377	29,668	50,809
2013	49,542	33,937	24,786	13,506	9,922	3,471	16,131	14,725	11,695	23,051	47,961
2014	53,505	42,108	33,359	11,375	5,151	338	13,514	27,796	9,325	18,866	39,416
2015	35,959	44,462	19,222	13,341	5,214	2,349	7,401	22,587	15,611	14,419	47,935
2016	40,933	39,996	30,252	9,138	3,089	858	6,435	25,889	10,912	15,819	41,918
2017	43,708	18,171	22,373	16,607	6,293	1,770	9,566	25,336	9,302	22,729	49,403
2018	38,983	45,405	18,603	4,229	869	1,159	9,814	26,921	11,704	26,111	54,928
2019	55,358	35,562	13,571	3,391	4,102	3,300	11,489	29,124	16,532	15,052	39,247
2020	43,738	5,028	16,891	18,800	24,036	5,289	14,908	22,558	12,563	12,609	35,590
2021	28,203	35,457	41,889	33,517	14,169	3,148	11,413	22,856	9,413	24,030	54,098
2022	45,875	25,848	24,632	25,927	4,222	1,110	17,923	24,864	6,299	13,594	47,562
2023	51,752	25,591	25,522	27,004	5,511	306					

Astrolabe MSS
La Bella MSS
Enterprise MSS
Flanagan MSS
Crowes Foot MSS
Schlumberger MSS
Sequoia MSS

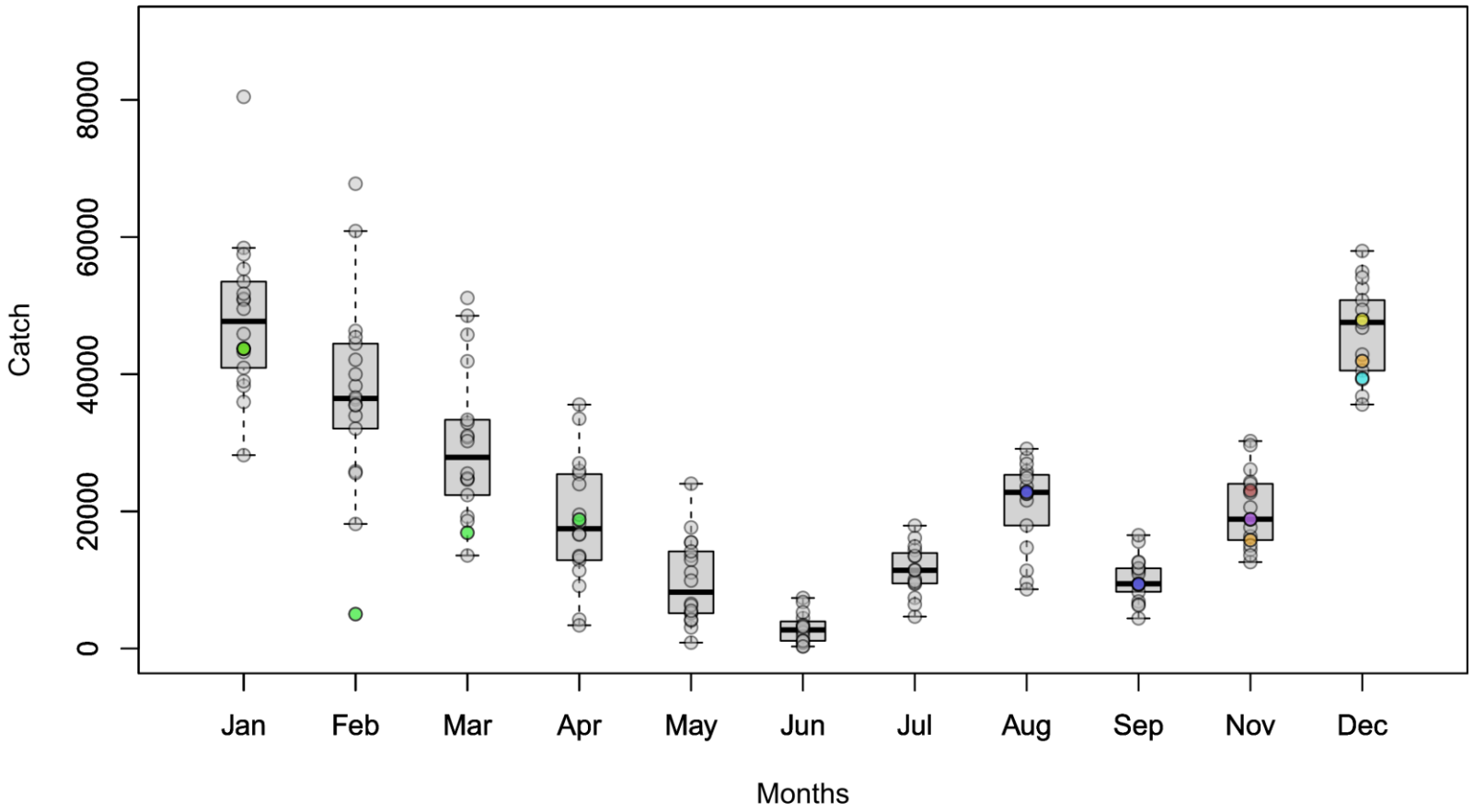


Figure F3-9 - Box plot of catch rates (kilograms) month by month with each year represented by a circle, coloured circles represent months seismic was acquired. Colour corresponds to the survey colour code in Table F3-3.

Table F3-4- Monthly catch rates for western zone rock lobster 2006 to 2023 (CPUE

2006	0.74	0.67	0.53	0.40	0.27	0.16	0.26	0.25	0.26	0.47	0.57
2007	0.56	0.64	0.54	0.41	0.25			0.28	0.26	0.57	0.49
2008	0.56	0.52	0.47	0.32	0.25			0.18	0.22	0.40	0.50
2009	0.51	0.44	0.40	0.25	0.20	0.12	0.18	0.19	0.15	0.40	0.40
2010	0.45	0.45	0.35	0.30	0.28	0.21	0.22	0.27	0.26	0.49	0.48
2011	0.59	0.56	0.50	0.40	0.29	0.22	0.36	0.32	0.34	0.57	0.61
2012	0.64	0.58	0.48	0.40	0.36	0.29	0.33	0.41	0.41	0.71	0.71
2013	0.69	0.60	0.56	0.42	0.33	0.28	0.41	0.35	0.34	0.58	0.67
2014	0.68	0.59	0.56	0.44	0.37	0.21	0.34	0.44	0.41	0.62	0.70
2015	0.66	0.68	0.45	0.49	0.41	0.32	0.28	0.44	0.51	0.61	0.89
2016	0.77	0.71	0.68	0.50	0.50	0.23	0.33	0.48	0.48	0.60	0.80
2017	0.83	0.65	0.69	0.68	0.47	0.37	0.40	0.52	0.55	0.79	0.96
2018	0.90	0.98	0.95	0.65	0.51	0.34	0.48	0.59	0.56	0.94	1.15
2019	0.99	0.97	0.82	0.52	0.60	0.41	0.53	0.64	0.64	0.74	0.99
2020	1.02	0.93	0.81	0.97	0.79	0.47	0.63	0.72	0.64	0.88	0.97
2021	0.96	1.07	1.07	1.22	0.87	0.44	0.52	0.62	0.59	1.18	1.24
2022	1.20	1.14	1.10	1.25	0.73	0.59	0.83	0.85	0.73	1.25	1.41
2023	1.43	1.24	1.24	1.26	0.89	0.61					

Astrolabe MSS
La Bella MSS
Enterprise MSS
Flanagan MSS
Crowes Foot MSS
Schlumberger MSS
Sequoia MSS

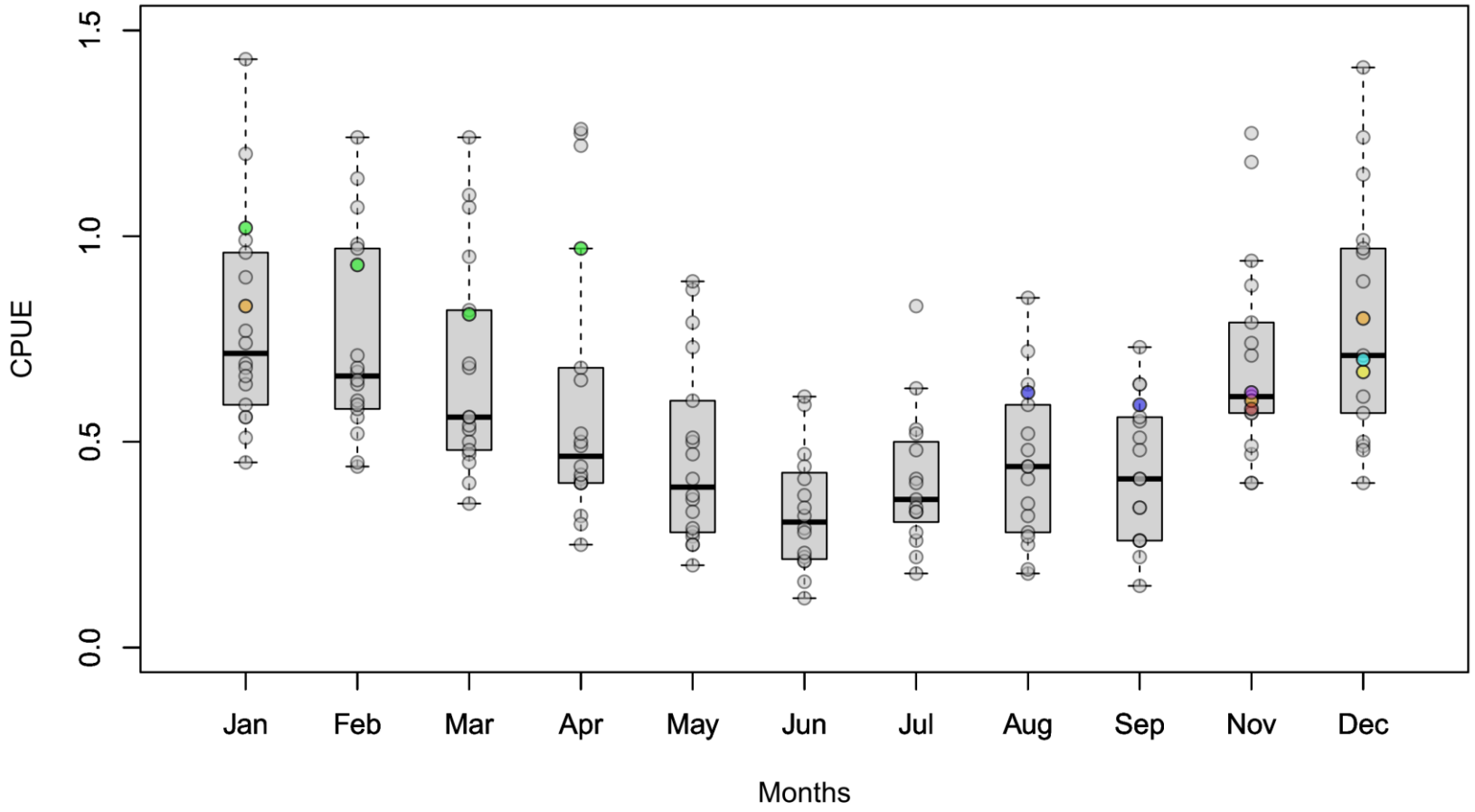


Figure F3-10 - Box plot of catch rates (CPUE) month by month with each year represented by a circle, coloured circles represent months seismic was acquired. Colour corresponds to the survey colour code in Table F3-4.

This analysis shows a general and unsurprising decline in catch in the winter months when males only may be taken, with a slight dip in September (note the fishery is closed on 16th September and opens on the 15th November). The data shows, at the whole of western zone level, the catch rates remain within normal distributions both in the month(s) of the survey and in the subsequent months, and in the subsequent years. This extends to more than 7 years post surveys, the timeframe claimed by fishers that catch rates and populations would take to recover.

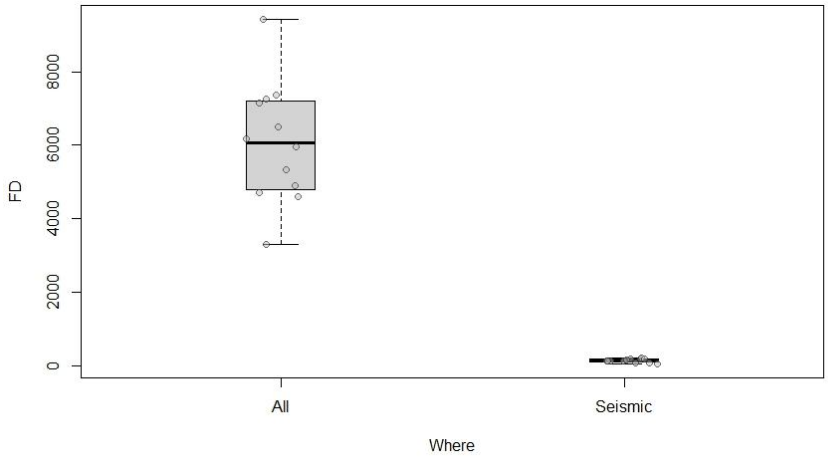
The data shows only one statistical anomaly in February 2020 in the landed catch. This is likely to be due to Covid-19 affects in Victoria and a subsequent reduction in fishing effort. The corresponding months CPUE shows that those who were able to fish did not suffer a reduction in CPUE beyond normal distribution. This data is conclusive that there are no detectable long-term effects to catch rates, and presumably the population of Southern Rock Lobster, in the western zone SRL fishery attributable to seismic surveys. Therefore, cumulative impacts to the SRL populations and the knock-on effects to fishers from sub-lethal effects are not measurable.

The MSS will be a pulse event with a timeline of 60 days within 90 days. For site attached SRL, individual animals will be exposed to high intensity seismic on a reducing exposure curve which will be defined by the closeness of the individual to the source, the depth of habitat where the individual is residing (defines the minimum distance from the seismic source), the complexity and density of the (limestone) habitat they are inhabiting and the direction and speed of the seismic survey. Hence impacts will be extremely varied and inconsistent. There will likely be a reduction in overall fitness of the population of animals exposed to the MSS which may influence adult mortality for a period, but the scale of any potential impact will be subsumed into the far larger natural and fishing mortality schedules that already exist.

Impacts to larval SRL will be confined to those animals in the plankton present in the area at the time the array is working. Plankton is highly variable in both space and time (Robinson et al 2021) which favours affected larvae being subsumed into a larger planktonic assemblage containing larvae not exposed to the MSS. The nett effect will be any affected larvae will be spread out within a greater pool of non-affected larvae, mitigating the probability of significant localised effects.

The Bureau's (BOM) long-range forecasts indicate warmer than average Sea Surface Temperatures (**SST**s) (up to around 2 °C warmer than average) off the coast of south-east Australia will likely continue through the southern hemisphere summer 2023–24 (http://www.bom.gov.au/climate/enso/). Such large-scale climate changes will exert a much greater influence on population dynamics than the Regia MSS given they can operate at the scale of the entire population. Warming temperatures attributed to climate change have already been shown to increase growth of animals in temperate waters and lead to larger-size-at-maturity (McLeay et al 2019).

Commercial fishing statistics from the VFA 20/21 season Stock Assessment Report highlight that CPUE has almost tripled from 2009/10. While some of these gains have come from fleet modernisation and associated efficiencies, standardised catches have continued to increase, reflecting a stable and relatively healthy fishery. Commercial fishing is a press disturbance and exerts a much greater and clearly quantifiable effect on populations than a pulse disturbance over a defined space. Despite this, the assessment concluded the fishery is stable with increasing recruitment over the past few years from a long-term trend of lower-than-average recruitment. Additionally, within the MSS operational area fishing effort is extremely low with only ~2% of total fishing days occurring within this area over the past 12 years (see Figure F3-11).



** Box encompasses 50% of the data points. Black line indicates median value. Whiskers encompass full range of values.*

Figure F3-11 - Comparison of the number of fishing days (FD) undertaken within all designated fishing blocks across Victoria (All) with number of fishing days undertaken within those blocks encompassed by the proposed MSS (Seismic). Individual data points are yearly.

While seismic operations have been shown to cause injury to SRL at the level of individuals there is no evidence that supports population level effects. A large part of this conclusion is based on the research base that exists for SRL and which clearly shows the size of the 'population' of SRL is very large and well connected. The MSS area is a very small component of this system and the SRL population within is resilient because of this.

3.5.3 `Recovery Potential

Research has indicated that some of the physical and chemical changes seen in SRL exposed to seismic may be permanent. For those individuals their fitness will likely be reduced and their susceptibility to predation may increase. For those animals whose exposure window is smaller there is evidence of recovery although there are no definitive time frames known.

The largest effects on SRL populations are from fishing and climate drivers such as increased water temperatures. Nevertheless, management of the fishery in the state indicates it is stable and improving over the past few years. This indicates a population that can recover even under sustained fishing pressure. Effective management underpinned by continued collection of appropriate data is key to this outcome.

3.5.4 Conservation Status

The Fisheries Research and Development Corporation (FRDC) recognises SRL *Jasus edwardsii* as a sustainable species found broadly across Southern Australia. Unlike the Western Rock Lobster in Western Australia whose habitat is a Key Ecological Feature (KEF), SRL have no elevated level of conservation protection.

3.5.5 Mitigation Effectiveness

Mitigation of MSS effects to SRL can best be implemented by limiting the spatial boundaries of the survey to minimise interaction with areas of high SLR density and fishing activity, which is predominantly located shoreward of the 40m depth contour. Additionally, timing the MSS to avoid the June-September period when peurulus are settling is also advisable. The period after release of fertilised eggs is the preferred window as this is when natural mortality is extremely high and localised seismic effects are likely to be subsumed into this mortality schedule.

3.6 Giant Crab (*Pseudocarcinus gigas*)

3.6.1 Species-Specific Sensitivity

Giant crabs are a long-lived slow growing species that inhabit soft sedimentary environments and feed on sessile or slow-moving benthic species including gastropods, asteroids, and other decapods. The species is found across all southern Australia and up into Southern NSW, generally occupying depths between 120-370m but can be found from 20-600+m. Key stages in the life history of *P. gigas* appeared to be synchronised across southern Australia suggesting that factors operating at a large scale are influencing the species' distribution and life cycle off southeast Australia (Levings 2008). These large-scale drivers are responsible for population level changes with small-scale disturbances buffered by connectivity and dispersal across large scales. Genetic studies have indicated that the species is effectively a single stock with little evidence of sub populations. This is likely due to the 3–4-month larval phase and the ability of individual adults to move up to 400km (Currie & Ward 2009).

Climate change is expected to cause a southerly shift of the austral subtropical high-pressure belt, with models predicting more upwelling-favourable winds. This would likely provide *P. gigas* with increased access to benthic food resources and their growth rate may increase in some regions (Levings & Gill 2010). This has the potential to increase productivity at the population level.

Multiple studies have looked at seismic effects on crustacean larvae amongst other taxa, and results have been mixed, with any mortality limited to very close proximity to the source. Adult crab species that have been tested have shown very little response to seismic pulses (Appendix E4 and references therein).

Based on the evidence available the sensitivity of giant crabs to the MSS is likely to be small and immeasurable relative to normal population variance. The species undergoes annual cross-shelf movements to align with favourable temperatures and feeding opportunities (see Figure F3-12 and Figure F3-13) which provides a temporal window for minimising any potential seismic effects.

Fishing for female crabs is banned between June 1st and November 15th to protect the peak timings of their reproductive cycle (see Figure F3-14). If Giant Crabs were the only receptor of concern, then potential effects from the MSS could be avoided by excluding activities over this period to align with fisheries protections already in place. However, the overlap of with female crabs is lessened because:

- The 200 m depth limitation for acquisition means only a partial overlap with depths female crabs are likely to be present.
- More than half of the period is already avoided because:
    - Two of the five-and-a-half period is already excluded due to weather limitations (July and August).
    - At least a further month of no overlap will occur because the Regia MSS cannot occur in both June and September to December.

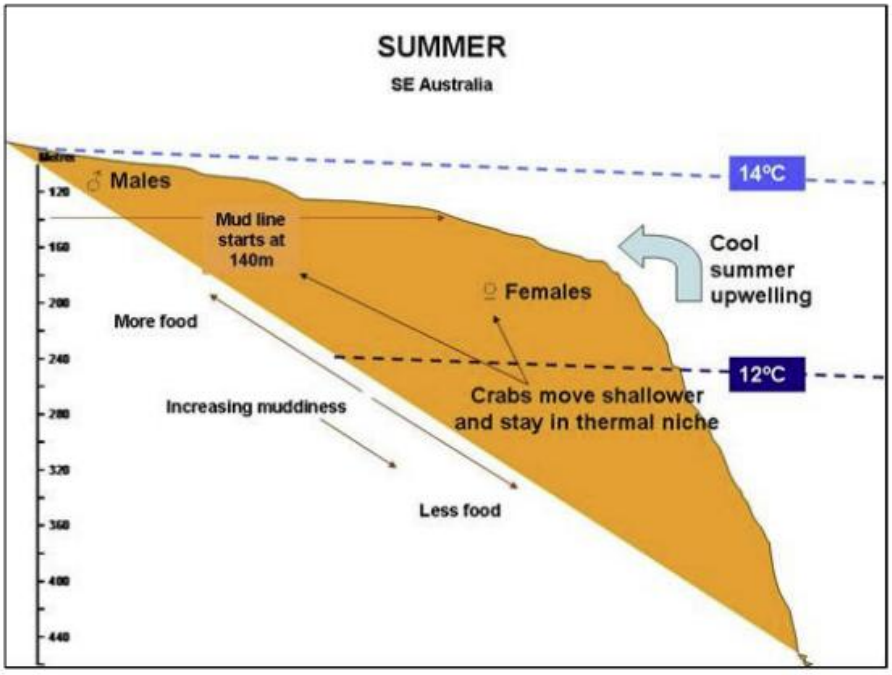


Figure F3-12 - Summer model for P. gigas off south-east Australia (Levings 2008).

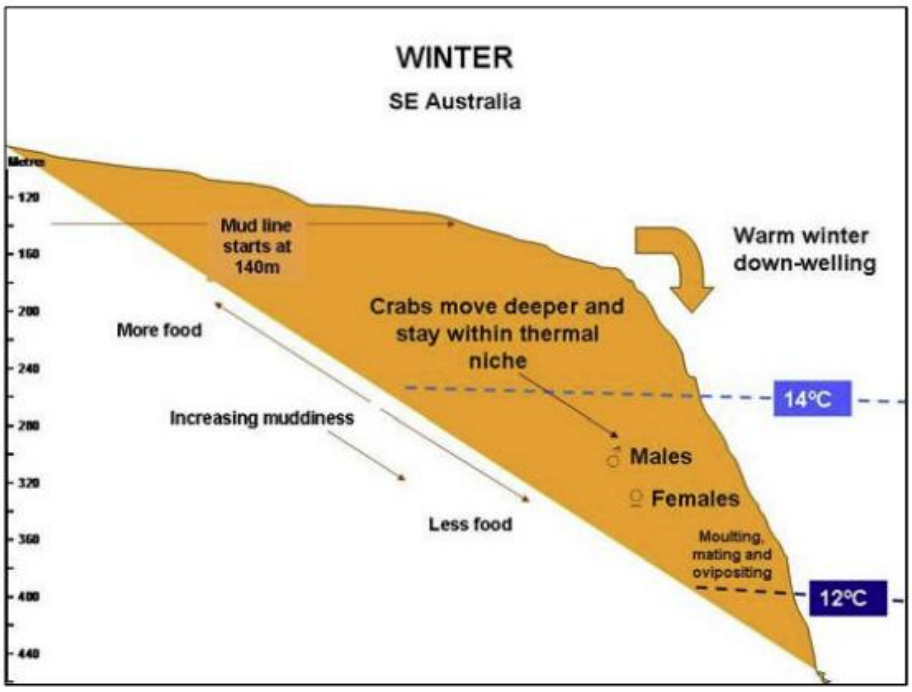


Figure F3-13 - Winter model for P. gigas off south-east Australia (Levings 2008).

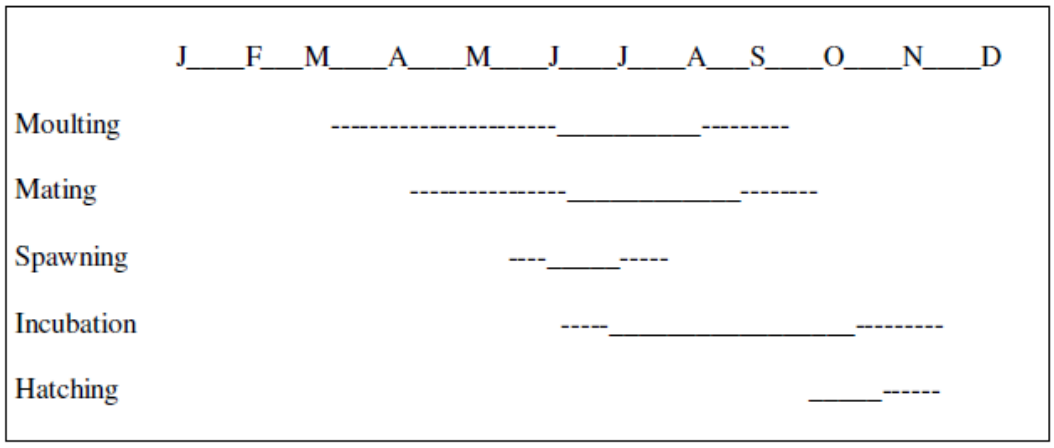


Figure F3-14 - Reproductive cycle of P. gigas based on extensive field observations. Solid lines represent peak periods, while broken lines represent temporal extent of observations (from Levings 2008).

3.6.2 Magnitude of Effect

Seismic effects on individuals have been shown to be limited to larvae within very close proximity to the discharge source.

Timing the MSS to avoid the peak period in the reproductive cycle period will mitigate any potential impacts.

Fishing days within the Regia MSS Active Source Area averaged out at 17.3 % of total fishing days from 2011-2022. However, fishing effort in the Active Source Area over recent times has shrunk to 7.5% of total fishing days from 2018-2022.

As discussed above there is no evidence to support an expectation of significant and measurable cumulative impacts to *P. gigas* because of the MSS. Large scale environmental drivers driven by a changing climate, and fishing effort, will continue to be the major influences on the population health of giant crab.

Regarding any impacts on the giant crab fishery, the targeted catch in 2021/22 of 0.95kg per 24 hour was a substantial reduction from 1.27kg/24-hour pot-lift in 2017–18 but still remained well above the limit reference point of 0.52 kg/24-hour pot-lift for the fishery (VFA 2022). Factors including the lack of fishery independent surveys, limited length frequency data, the significant decline in the number of operators targeting giant crab and a decrease in the spatial distribution of the fishery, all add to the uncertainty in the assessment of the Victorian component of the Giant Crab stock. More data is needed from the fishery to better understand the changes to catch rates and to better determine the size of the fishable stock available.

3.6.3 Recovery Potential

The population stocks of *P. gigas* have been declared sustainable across 75% of their range (WA, SA, Victoria) however the Tasmanian population is considered depleted and not sustainable at current fishing levels. Data collection remains insufficient to more accurately assess future trends (FRDC Report 2020 Giant Crab 2020 (fish.gov.au)). Fishing effort is the major anthropogenic driver of changes to populations, and it is this interaction with a changing climate that will drive population changes in the future.

3.6.4 Conservation Status

Based on the evidence presented above, the Giant Crab Fishery (Victoria) management unit is classified as a sustainable stock and there are no conservation concerns. Temperature is a primary driver of their life-history strategy and this, along with fishing effort will be the drivers of population dynamics of this species.

3.6.5 Mitigation Effectiveness

With most of the reproductive cycle occurring in the June-December period ensuring the MSS is undertaken outside this period would provide the most effective mitigation approach to minimising effects from seismic surveys.

3.7 Short-finned Eel / Kooyang (*Anguilla australis*)

3.7.1 Species-Specific Sensitivity

There are two species of freshwater eels that inhabit the southeast and east coasts of Australia, *Anguilla australis* and *A. reinhardtii* known colloquially as the short-fin and long-fin eel respectively. Only *A. australis* is relevant to the MSS because the westward edge of distribution for the long-finned eel is around Wilsons Promontory which is 300 km from the nearest edge of the MSS survey path (see Figure F3-15).

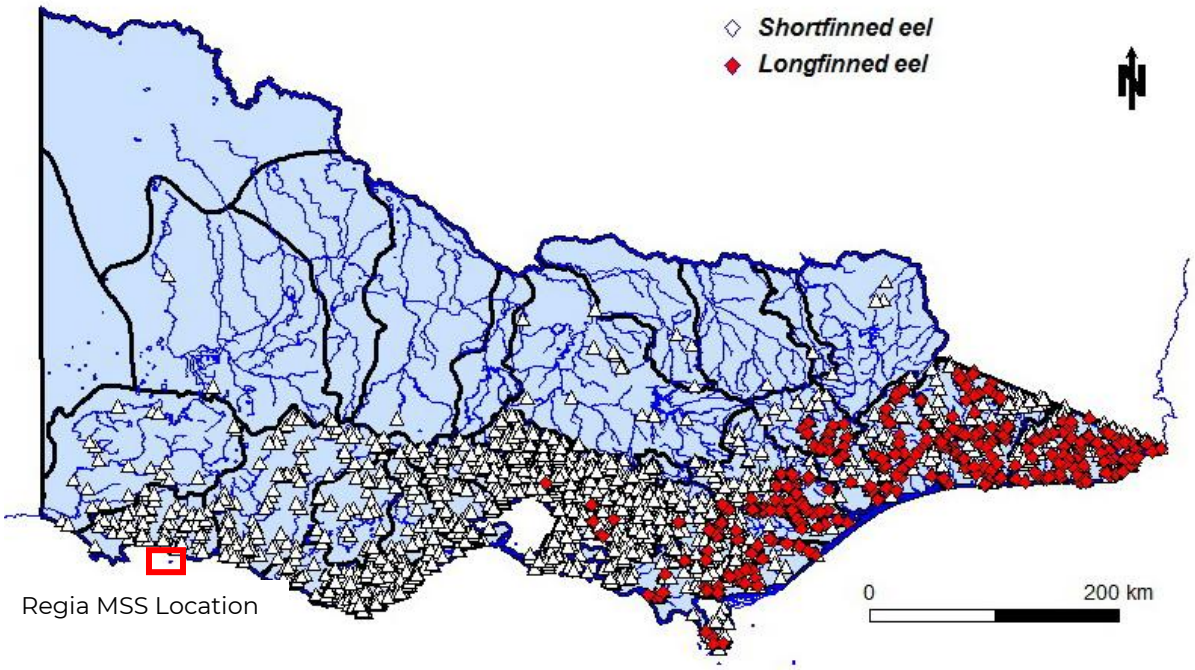


Figure F3-15 - Spatial distribution of both species of freshwater eel across Victoria (VFA Eel Fishery Management Plan) and the location of the proposed Regia MSS survey.

The short-fin eel has a complicated but spectacular life cycle. The juveniles and adults live in freshwater rivers but when reproductively mature the adults migrate many thousands of kilometres to spawning grounds in the Coral Sea (Gooley et al 1999). Once spawning has finished the adults perish and never return. The life cycle is then continued by the many trillions of larvae who attempt to make their way back to river systems over 200 plus days using prevailing currents and an evolving swimming ability. There is no homing into river systems as seen with salmon, rather larvae will randomly enter river systems they encounter. Adult migration out of the estuaries to the spawning grounds occurs from January to May while the returning glass eels stage occurs during the July-September period (Figure F3-16).

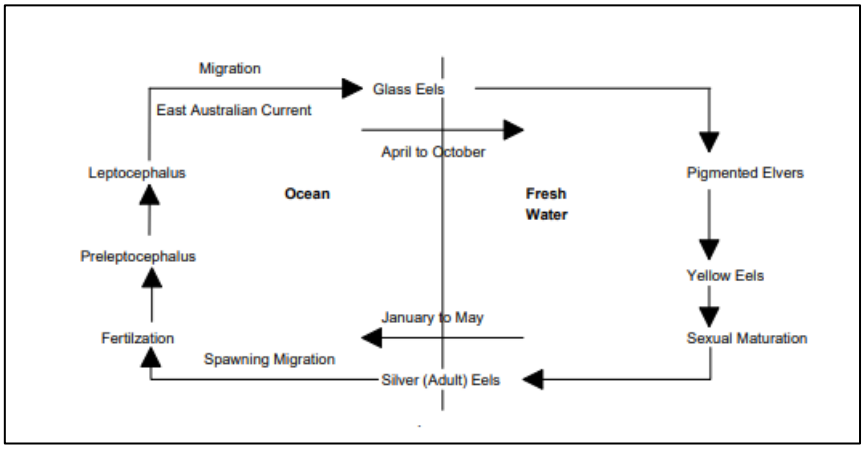


Figure F3-16 - Life cycle of Anguilla australis eels. After Gooley et al. (1999).

This life cycle predisposes this species to very large mortality rates both as larvae and as adults. Adult mortality has been estimated to be at least 30% for migrating adults (Koster et al 2021) and while there have been no direct measurements of larval mortality in eels, as a broadcast spawner it likely exceeds >95 % as could reasonably be expected from a larval life-history which encompasses 200+ days at sea and many thousands of kms of travel from spawning grounds to river systems (Figure F3-17) For example, modelling work by Bonhommeau et al. (2009) on A. anguilla indicated <0.2 % of larvae survived the trans-Atlantic migration.

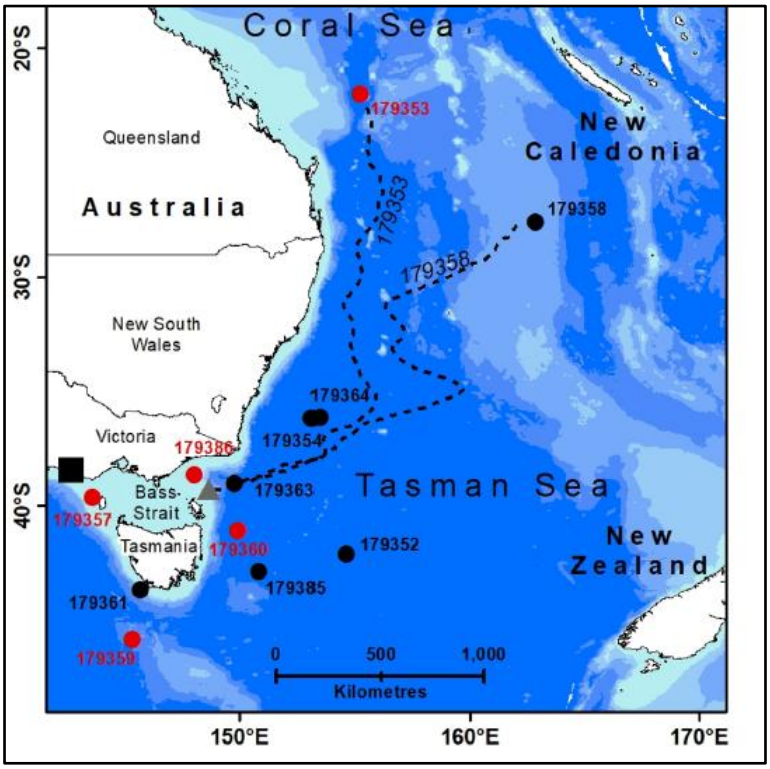


Figure F3-17 - Map indicating locations of tagged adult eels originating from Otway coast region (from Koster et al 2021)

Australasian short-finned eels are listed as 'near threatened' on the IUCN Red List of Threatened Species, with barriers to riverine movement and freshwater habitat loss identified as key threats. In addition, changes in ocean currents, primary production, and thermal regimes may affect eel migration, spawning success, and recruitment (Koster et al. 2021). These processes operate at landscape scales and are heavily influenced by long term climate trends. Changes to riverine flows

and water quality are affected not only by changing climates but also land management regimes adjacent to riverine systems.

Changes in the size of the spawning stock (i.e. adults) have been identified as the most likely cause of declining recruitment of eels (see review by Jellyman 2022) and so it is factors affecting the adult population that will have the largest effect on the population health of *A. australis*. As previously mentioned, climate related changes and modification of the landscape are affecting the carrying capacity of rivers to support populations of eels and other species. Fishing is also a major pressure on eel stocks and there has been a commercial fishery for short-finned eels across Southern Victoria since the 1950's.

Pre-migrating adults have been found to spend a lot of time in the estuaries of rivers before starting their migrations, making them more vulnerable to net fisheries than was previously thought (Crook et al. 2014). Catches reached a peak in the mid 1990's with a low in 2009, but have since stabilised around 30-80 tonnes/year (Southern Shortfin Eel 2020 (fish.gov.au)) (see Figure F3-18). The massive decline in catches from 1993 was related to the so-called millennium drought throughout the late 90's and early 2000's (van Dijk et al 2013) illustrating the powerful links between eel health and environmental conditions.

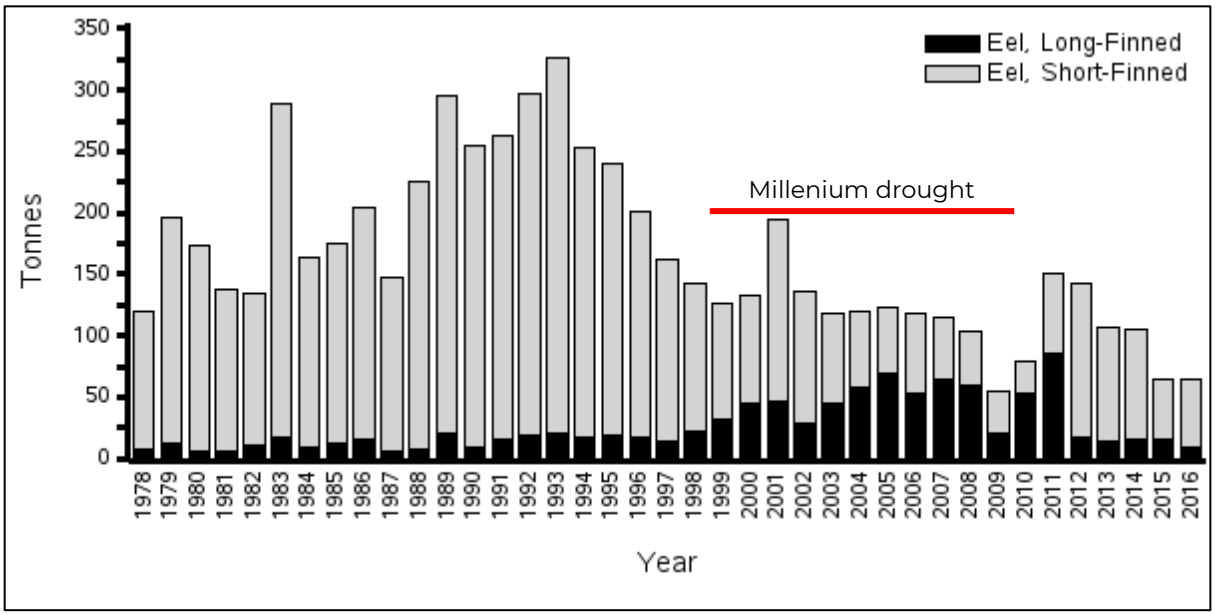


Figure F3-18 - Annual commercial catches of eels in Victoria (VFA 2017). Red line encompasses those years when extended drought conditions prevailed.

Once adults begin migrating to their spawning grounds they travel quickly, with migration speeds averaging 30.8 ± 7.3 km/day although one individual was found travelling at 80km/day (Koster et al 2021). The annual timing of adult migrations is from January to May each year.

There are no scientifically derived studies indicating mortality effects on eels from seismic surveys, which we group with fish containing swim bladders when assessing seismic effect studies. Adult eels are undertaking their migrations over an extended period of 5 months and the work of Crook et al (2014) indicates that migration from estuaries is a highly variable process. Given the extended and volatile timing of migration from estuaries and the high mobility of individual animals we do not anticipate any critical effects to the local populations of eels from the Regia MSS.

3.7.2 Magnitude of Effect

If any individual adult eels are within proximity to the seismic arrays when acquisition is occurring, there will likely be non-lethal impacts. However, given the mobility of adult eels, their intrinsic drive to get to their spawning grounds, and the soft startup procedures of the Regia MSS the risks

associated with this event are extremely low and impossible to distinguish from the large-scale changes inherent in the population each year and driven by multiple factors as previously described. However, once the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I04].

For the larval leptocephelae and glass eel stages, they are most prevalent in regional waters during the winter-spring months. If the Regia MSS is scheduled outside this timeframe, then all interactions with this stage of the life cycle will be avoided.

3.7.3 Recovery Potential

There is no identified recovery plan for this species, nor do we anticipate impacts of sufficient scale to be considered for future recovery plans. The species has proven resilient to fishing and other anthropogenic pressures for millennia.

3.7.4 Conservation Status

The short-finned eel *Anguilla australis* is not under any conservation status. However, short-finned eels are of cultural significance to First Nations people. The Gunditjmara people of south-western Victoria built and used sophisticated aquaculture systems throughout the Budj Bim Cultural Landscape to exploit eel migrations at least 7,000 years ago. Budj Bim Cultural Landscape is listed as a World Heritage Area and is protected by Victoria's Aboriginal Heritage Act 2006. One of the values of this World Heritage Area is the Budj Bim lava flows, which provides the basis for one of the world's most extensive and oldest aquaculture systems developed by the Gunditjmara, based on deliberate redirection, modification and management of waterways and wetlands (UNESCO 2023). There is no direct effect, and no measurable indirect effect, from the Regia MSS to the Budj Bim Cultural Landscape (see section 3.15).

3.7.5 Mitigation Effectiveness

Potential impacts could be minimised or avoided by scheduling of the Regia MSS to outside the period when elvers are returning to the river systems along the Southwest coast during the months of April to October. However, this measure would increase the effects on other more sensitive species. No petroleum activity will be carried out between 1 January and 15 September, so the overlap with this period is reduced.

3.8 Gould's Squid (*Nototodarus gouldi*)

3.8.1 Species-Specific Sensitivity

There remains minimal research completed on the effects of seismic surveys on squid. Two key sources have been the work of McCauley et al (2000) and Fewtrell & McCauley (2012). Startle or alarm responses out to 4-5 km from the seismic source were the only consistent outcomes from the experimental work, and these were shown to reduce with amount of exposure i.e. habituation to the sound. Potential effects from damage to the tissue surrounding the statoliths were not evident as experimental animals showed consistent responses even after multiple seismic pulses.

Gould's Squid which is the primary targeted species in the Southern Squid Jig Fishery (SSJF), is short-lived (<1 year) and has been found to spawn up to 4 times a year. They also display highly variable growth rates and size and age-at-maturity. Populations with life-history characteristics like these have high turnover rates and are consequently much more resilient to fishing pressure. Moreover, with fishing concentrated over the few months of summer there remains multiple other spawning events to provide new recruits for the population.

Research has shown that squid populations are highly responsive to variations in environmental conditions from year to year, however it has been difficult to pinpoint whether any factor is more important than another. This is borne out by the correlation between all the fisheries across SE Australia having peak catches around the same time. A final model for all zones of the SSJF sector combined included Year, zone, depth, and the interaction of depth and moon phase as the variables of most influence with Year explaining the greatest source of variation in CPUE (15.1%; see Figure F3-19) (Koopman et al 2018). Genetic studies support the hypothesis of a single biological stock of Gould's Squid throughout southeastern Australian waters (Jackson and McGrath-Steer 2003) which provides another layer of resilience at the population level.

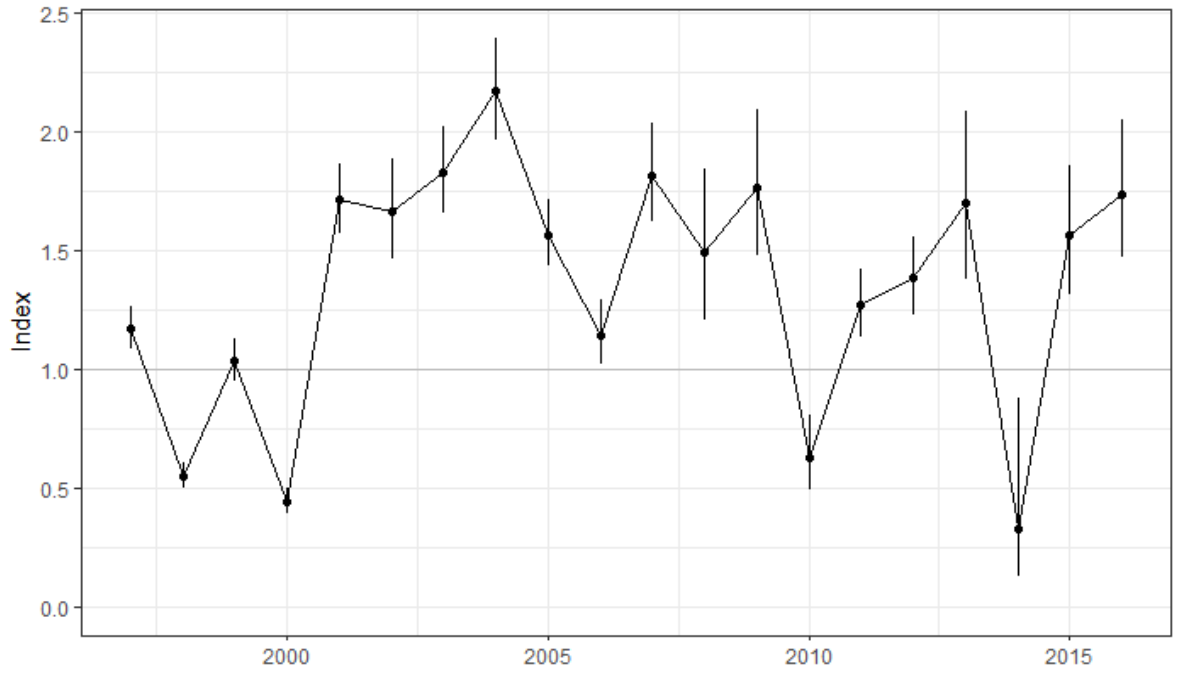


Figure F3-19 - Final model showing annual variation of Standardized CPUE for all catches of Gould's squid.

Very large catches were taken by foreign vessels in the 70's and 80's without appearing to reduce available biomass in subsequent seasons. Modelling of heavy fishing in the GAB fishery has also shown that even when biomass is reduced to 10% of original size, recovery still occurs (Virtue et al 2011). The overall productivity of the region is the likely key driver of dynamics.

3.8.2 Magnitude of Effect

Fishing remains the largest anthropogenic impact on populations and this source has been shown to carry less impact on standing biomass of the population than environmental parameters. Hence any potential impacts from seismic activity on the resilience of the squid population in the region is not going to be measurable against the backdrop of annual variation that is naturally occurring.

3.8.3 Cumulative Impacts

Studies have not identified any large-scale impacts to squid from seismic blasting. Short term behavioural changes as observed are not likely to have any impacts on the squid population in the vicinity of the seismic surveys. Soft starting will provide a catalyst for squid to move and provide scope for a learned response such that subsequent seismic pulses will not illicit as strong a response from individual animals. In this context there is a very low probability of cumulative impacts occurring. However, once the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I04].

3.8.4 Recovery Potential

As outlined in the previous sections current knowledge indicates only temporary localised effects to individual squid and no evidence of effects that could cascade into population level impacts. Squid populations are highly dynamic and responsive to larger scale environmental influences.

3.8.5 Mitigation Effectiveness

While the probability of adverse consequences for squid populations from seismic is extremely low it is appropriate to reduce any probability to as low as possible. The timing of peak catches has centred around February/ March in the Western Victoria fishery hence avoiding seismic during this period is advisable.

3.9 Pale Octopus (*Octopus pallidus*)

[Section added in response to Matters: F11 and F12]

3.9.1 Species-Specific Sensitivity

While there are a number of species of octopus that can be caught in Victorian waters (e.g. Maori Octopus, *Macroctopus maorum* and Gloomy Octopus, *Octopus tetricus*) the most abundant species and focus of commercial fishing, is the Pale Octopus, *Octopus pallidus*. This species is most commonly found on sandy substrates, often near beds of sponges or sea squirts (VFA website).

The pale octopus is found from the Great Australian Bight across to Tasmania and up into Southern NSW. It has a typical life span of 12 months but can live for up to 18 months. It is a benthic species with no pelagic stage in its development. They spawn throughout the year but with an optimal spawning period during late summer (Leporati et al. 2008). Lack of a pelagic cycle is correlated with strong spatial genetic structuring in populations, with connectivity mostly through movement of adults between locations (Higgins et al 2013)

Cephalopods are increasingly being identified as highly dynamic organisms that grow and mature with great degrees of individual variability, often influenced by external factors such as temperature and diet (Moltschaniwskyj 2004).

Sensitivity of the pale octopus to seismic has been specifically tested through a dedicated research program funded by the Fisheries Research and Development Corporation (FRDC), with the final report recently released (Day et al 2023; Examining the potential impacts of seismic surveys on Octopus and larval stages of Southern Rock Lobster, FRDC). The key findings were that exposure to seismic airgun signals did not kill adult octopus and nor was there any indication of harm to offspring. There were some observed behavioural changes but no indications that this would translate to sustained and deleterious changes in the health of exposed populations.

3.9.2 Magnitude of Effect

Fishing and climate changes are the largest impacts to fisheries in general. A stand-alone octopus fishery commenced in Victoria as recently as 2020 and is focussed on Eastern Victoria. Octopus fishing in central and western Victoria is less established and is managed through exploratory, temporary permits. A fishing experiment found that continual local fishing pressure appeared to have altered the age and reproductive structure of the female *O. pallidus* population, reflecting size selective fishing mortality, which could lead to smaller sizes at maturity, fecundity, and ultimately recruitment (Leporati 2008). A recent and substantive meta-analysis of studies looking at climate-change impacts on cephalopods (Borges et al. 2023) has highlighted that ocean warming poses a clear threat to cephalopods with impacts seen across all stages of the life cycle. There is no evidence to support significant impacts to pale octopus from the proposed Regia MSS.

3.9.3 Recovery Potential

There is no evidence to support significant impacts to pale octopus from the proposed Regia MSS such that Recovery Potential has to be assessed.

3.9.4 Conservation Status

There are no conservation consequences associated with the Pale Octopus in Australian Waters. Stocks in Victoria are classified as undefined with a dedicated octopus' fishery only starting in 2020 in eastern Victoria.

3.9.5 Mitigation Effectiveness

While the probability of adverse consequences for pale octopus' populations from seismic is extremely low, scheduling the Regia MSS outside of summer months, when spawning peaks, would reduce this probability even further.

3.10 Blacklip Abalone (*Haliotus rubra)*

[Section added in response to Matters: F12 and F16]

3.10.1 Species-Specific Sensitivity

Blacklip Abalone stocks in Victoria are in relatively poor condition having suffered greatly from disease and overfishing. In addition, the southeast coast of Australia is in a climate change 'hot-spot' where sea surface temperatures are experiencing rapid warming at rates 3–4 times the global average. These increasing SSTs are predicted to have negative impacts on the abundance of *H. rubra* in South coast waters. Modelling work has identified summer SST as the most influential variable on density distribution of *H. rubra*, with smaller sizes and lower catches coinciding with warmer SST's (Young et al 2020 and refs therein).

The pelagic larval duration of abalone is short at ~10 days, nevertheless genetics studies have found that abalone stocks along Victorias south coast are well connected, with high levels of gene flow within and between reef patches. Larval supply and recruitment success may therefore not depend predominantly on local reef sources. The marine physical environment of the south coast is highly variable, driven by converging ocean currents, strong environmental gradients, habitat discontinuities and varying degrees of exposure to wave energy (Miller et al 2016).

Regia MSS will be operating at depths greater than 50m. While almost all diver-harvested abalone will come from depths <30m the majority will come from depths <20m, hence there is approximately 15-20km distance between the 20m and 50m depth contours adjacent to where the proposed Regia MSS will approach the coast.

There has not been any direct testing of seismic effects on Abalone, so a weight-of-evidence approach is taken where we use results from testing on other molluscs, notably scallops and pearl oysters. Testing outcomes on scallops were consistent with studies on seismic effects to other invertebrates, with impacts clearly noted within very close proximity to seismic pulses (i.e. hundreds of metres) but then rapidly dissipating (see response to Matter F09). Estimated mortality rates in all cases remained well below natural mortality rates. A recent, major study into seismic effects on silverlip pearly oysters found no evidence of reduced productivity or mortality (Parsons et al 2024).

We do not therefore, find compelling evidence for a high likelihood of significant lethal or sub-lethal effects to abalone stocks from the proposed Regia MSS. As already stated, Abalone stocks are being influenced by climate, overfishing and disease and these remain the primary areas of concern.

3.10.2 Magnitude of Effect

There is no evidence to support significant impacts to black-lip abalone from the proposed Regia MSS. There is a possibility for impacts to abalone divers working in the fishery, however this has been recognised and appropriate measures put in place based on feedback from the Abalone Fishers in the region (see Appendix E8: Underwater Sound – Divers).

There is no evidence to support the Regia MSS causing significant impacts to black-lip abalone stocks in the region. Cumulative impacts to Abalone stocks are coming through climate, overfishing and disease and these remain the primary areas of concern. Rebuilding biomass has been proposed through a combination of conservative catch and minimum size limits, spatial management of fishing and catch, and a combination of fishery-independent and fishery-dependent data collection to demonstrate ongoing recovery and guide future TAC setting (Peeters et al 2023). Climate change will however pose further challenges to management objectives as temperature increases have been linked to fitness reductions in abalone along with smaller size and lower catches (Young et al 2020 and refs therein).

3.10.3 Recovery Potential

There is no evidence to support significant impacts to black-lip abalone from the proposed Regia MSS such that recovery potential must be assessed.

3.10.4 Conservation Status

There is no conservation status classification with black lip abalone in Australian Waters. However, stocks in 2 of 3 fishing zones in Victoria are classified as depleting while the western zone is considered sustainable.

3.10.5 Mitigation Effectiveness

While the probability of adverse consequences for black lip abalone from Regia MSS is extremely low, scheduling the Regia MSS for outside of the summer months, when spawning peaks, would reduce this probability even further.

3.11 Pink Snapper (*Chrysophrys auratus*)

[Section added in response to Matter: F12]

3.11.1 Species-Specific Sensitivity

Pink Snapper are widely distributed in the Indo-Pacific and an important species for both recreational and commercial fisheries in Australia and New Zealand. The reproductive biology of the snapper has been studied in several places across its distribution and is well understood However, there is geographic variation with respect to the timing of spawning, length of season and the environmental conditions associated with spawning, such as water temperature and photoperiod (Saunders et al 2012). Such geographic differences indicate the need to understand the reproductive biology of the species at the local scale to understand regional population dynamics.

Most adult snapper recruiting into the major fisheries in Port Phillip Bay (PPB), Western Port, and Western Victorian coastal waters originate from one major spawning/nursery area in PPB. Spawning happens between November and February with larval durations of ~ 18-32 days. Settlement will start to occur from 1 month after spawning occurs and will continue through to early winter. Therefore, it is the strong fluctuations in juvenile recruitment within PPB that dominate the population dynamics of the entire western Victorian snapper stock (Hamer & Jenkins 2007). Young snapper (1–4 years of age) born in PPB can migrate large distances (100's km) to replenish populations in coastal waters and other bays.

The latest assessment of stock health (Bell et al 2022) classifies snapper as sustainable and highlights the extremely strong recruitment cohorts of 2018 and 2022 which should result in increased adult fish in the system over the following years. Recruitment patterns have been highly variable over the years and are more influenced by local-scale processes e.g. at the estuary level.

Testing of seismic effects on adult snapper has found damage to the sensory epithelia within their ears, for fish exposed to a towed single seismic array <15m away (McCauley et al 2003). However there have been no reports of mortality in adult fish of any species nor evidence to support population-level effects on fish stocks from seismic surveys. A review of the potential impacts of marine seismic surveys on fish & invertebrates (Carroll et al 2017) found that while there was some evidence to support lethal and semi-lethal effects to fish larvae near a seismic source, these effects dissipated with distance and were not consistent between taxa.

Annual counts of snapper recruitment to Port Philip Bay were also compared with counts of annual seismic surveys in the region to see if there was any correlation between the two. We found no evidence of a link, with high recruitment of snapper equally likely to coincide with low or high seismic activity levels (see Figure F3-20).

In summary we find that the species-specific sensitivity to seismic is low for *Chrysophrys auratus* and further reduced because of spatial and temporal distance from the proposed location and timing of the Regia MSS.

3.11.2 Magnitude of Effect

Because the key parts of the lifecycle of snapper are centred on PPB and its surrounds and this is ~170km from the proposed Regia MSS zone any possible effects will be substantially diluted. Management of timing for the proposed survey to avoid the peak recruitment period over Dec -Jan - Feb will further mitigate any possible effects.

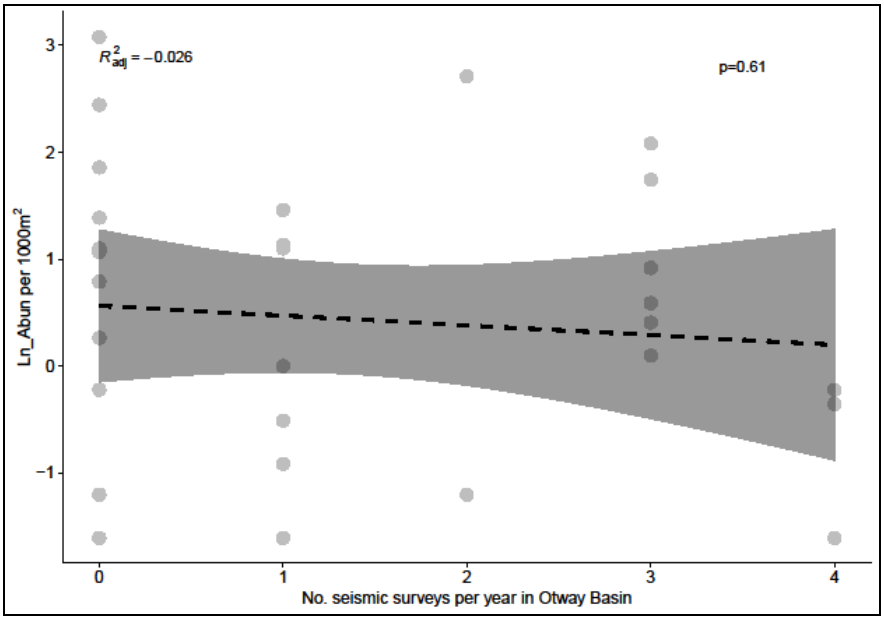


Figure F3-20 - Snapper recruit abundance (transformed) versus level of seismic activity each year for all basins combined (top) and for Otway basin only (bottom).

The dynamics of the entire western Victorian snapper fishery, encompassing over 500km of coastline from Portland to Wilsons Promontory, are linked to recruitment variation in PPB. The focus is therefore on maintaining the processes/habitats that support the production and survival of juvenile snapper in PPB. This dynamic demonstrates the importance of the spawning adults that migrate into PPB from coastal waters during spring/summer, and the potential implications of over-fishing of this spawning aggregation. Hence the main impacts to snapper stocks in the region are fishing and the ongoing health of PPB.

3.11.3 Recovery Potential

Recent strong recruitment with two high peaks observed during the past 5 years is expected to reverse any declining biomass trends and drive a rebuilding of adult biomass consistent with forecasts from Port Philip Bay creel showing an expected improvement in fishery performance over the next 5–10 years. Length compositions are not showing signs of truncation, and commercial fishing pressure has reduced substantially in recent years due to the Port Phillip Bay buy-outs and reduced landings by South Australian and Commonwealth operators. The available evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

3.11.4 Conservation Status

Pink Snapper are not under any conservation protection status other than state and commonwealth fishing regulations. Snapper populations in Victoria are currently classified as sustainable and improving based on a successful recruitment year in 2018.

3.11.5 Mitigation Effectiveness

As noted, the key dynamics of pink snapper stocks in Victoria are centred around PPB and to a lesser extent Westernport Bay. Their distance from the proposed Regia MSS area provides an inherent buffer to any potential effects of seismic. In addition, there are multiple adaptions to the MSS protocols to further reduce risk of seismic effects. This includes soft starting procedures with seismic and depth limitations (>50m). Recruitment dynamics, the health of spawning populations and the interaction with fishing effects remain the main drivers of population health in pink snapper stocks.

3.12 King George Whiting (*Sillaginodes punctatus*)

[Section added in response to Matter: F14]

3.12.1 Species-Specific Sensitivity

King George Whiting are found within the bays, estuaries, and coastal waters of Victoria. They are a popular target of recreational fishers with most fish taken within the semi-sheltered waters of Port Phillip Bay (PPB), Corner Inlet-Nooramunga (CI) and Western Port (WP), where commercial fishers are also located. Population dynamics are strongly influenced by climatic factors determining numbers of larvae transported to bay and estuarine nurseries from coastal spawning areas in spring [Jenkins and May 1994, Hamer and Jenkins 1996, Jenkins et al. 2000, Jenkins 2005]. As most King George Whiting leave the bays and inlets permanently by four years of age (prior to adulthood) [Hamer et al. 2004], these fisheries are based on just a few age classes at any one time, making catches highly variable over relatively short time scales. Over the past 60 years catches have shown peaks and troughs at about 10 to 12-year intervals. These cycles are thought to be related to variation in westerly winds driving larval transport and survival (Jenkins 2005). Because fishing effort is concentrated in bays and inlets, adults in coastal waters are likely subject to low fishing mortality.

King George Whiting has a complex life history, exhibiting ontogenetic shifts in habitat at different life history stages (Fowler and Jones, 2008). Spawning occurs during late autumn and early winter at offshore reefs, shoals, and mounds in relatively deep water (30–100 m) in exposed locations (Fowler, 2000, Fowler et al., 1999, Steer et al., 2018). The larvae of King George Whiting can be advected across hundreds of kilometers over a prolonged pre-settlement period (3–5 months), dispersing larvae from the offshore spawning grounds to the shallow water nursery areas in protected shallow bays (Fowler et al., 2000b, Rogers, 2019). Juvenile fish develop and grow in the vicinity of these nursery areas until 3-4 years of age (Fowler et al., 2000a) when they move to their offshore spawning grounds to repeat the cycle (Fowler et al., 2000a, Fowler et al., 1999).

Most of the investigative research into seismic effects on fish (and invertebrates) has been from laboratory, or field-based studies where the animals are confined and hence not representative of a normal environment. A recent scientific publication conducted a systematic literature review of the effects of marine seismic surveys on free-ranging fauna only (Affatati & Camerlinghi (2023)). Frontiers in Marine Science Vol 10: 1222523). Unlike many review papers, they looked only at field studies on wild animals to provide the most realistic context for interpreting effects, ending up with 6 relevant publications for fish. Results described either no changes or temporary changes in behaviour/distribution of populations of animals. Studies were constrained to the North Sea and two solitary studies in the NE (Meekan et al. 2021) and SE (Bruce et al. 2018) corners of Australia, reflecting areas with appropriate resources to conduct ‘natural’ experiments.

The scientific evidence is clear that individuals within very close proximity to seismic sources will potentially face lethal or sub-lethal damage. There is, however, no evidence to support levels of disturbance greater than natural rates of mortality, for those species that may encounter the proposed Regia MSS. As such any potential effects will be immeasurable. Long term cumulative drivers of change in KGW fish populations remain closely linked to commercial and recreational fishing pressure and changing climate with little evidence to suggest seismic testing is driving population changes.

3.12.2 Magnitude of Effect

To further investigate the potential influence of seismic on KGW populations we sought to understand if there was any relationship between the annual frequency of seismic programs running in Victorian waters and the annual recruitment levels of King George Whiting in Port Philip Bay (PPB). PPB is the main area for KGW stocks in Victoria and hence where any correlations would be most likely to show up.

One of the arguments used by both sides of the “effects of marine seismic testing” issue is that the persistent presence of seismic testing in Victoria over a prolonged period has either been a primary driver of declines in fishing catches or it is evidence that the systems are relatively resilient to the scale of these effects. Providing a direct cause and effect is virtually impossible given the scale of the operating environment and the large number of confounding factors that are also acting at any given point in time and/or space.

In lieu of this, one approach is to look at long term datasets of a resource such as fish and see if the patterns revealed have any coherency with long-term patterns of MSS in the greater region. If seismic testing is having a significant effect on a stock at population level, then it might be argued that the more seismic testing that is done then the greater any likely impact will be. Hence in years of multiple seismic there will be a greater impact than in years where there has been little or no seismic.

To investigate this hypothesis CGG compared a long-term dataset of annual counts of newly settled King George Whiting recruits within Port Philip Bay (as described in VFA 2021 – Review of key Victorian fish stocks) with a similarly long-term dataset on annual seismic surveys in Victorian waters. Patterns of recruitment into this bay are representative of the other 2 catchments of Western Port Bay and Corner inlet as described in multiple papers and reports already submitted as part of the EP.

A simple linear regression approach was used to test for any correlations between the annual recruitment of KGW to Port Philip Bay and the annual count of seismic surveys across Victorian waters. This data was further subdivided to test for correlations with only seismic conducted in waters of the Otway Basin region which is more closely linked to offshore spawning behaviours of KGW in Victorian waters. For each of the two seismic datasets CGG compared KGW recruitment counts in the same year and then also lagged by 1 year, 2 years and 3 years. This is a test to look for delayed effects of seismic. For example, with a 1-year lag CGG compare the seismic accounts from 1999 with the recruitment counts in 2000, 2000 with 2001, 2001 with 2002 and so on. For a 2-year lag CGG compared seismic in 1999 with KGW recruitment in 2001 and so on. This analysis is shown in Figure F3-21.

CGG found no evidence of a relationship between annual recruitment levels of KGW to PPB and annual seismic levels, whether in the same year or lagged by multiple years. High recruitment of KGW was just as evident during years with high seismic activity or low seismic activity.

As analysed and described in the previous sections we do not foresee any measurable impact on KGW stocks in Victoria from the proposed Regia MSS. Analysis of long-term seismic frequency versus long term KGW recruitment records finds no evidence of linkages between these two outcomes. Therefore, we conclude that the risk of the proposed Regia MSS causing an impact of sufficient scale and intensity as to cause synergistically greater impacts to KGW than already exist, is low.

3.12.3 Recovery Potential

Indicators of stock status for King George Whiting are all directly related to juvenile life stages and are highly variable, being primarily driven by recruitment dynamics – which CGG could not link to annual seismic frequency. None of the fishery CPUE or pre-recruit time series show persistently declining trends, providing reassurance that the poorly known and lightly fished adult stock in coastal waters is continuing to be replenished at rates that are sufficient to prevent declines in recruitment potential/egg production. Recent modest post-larval recruitment is expected to result in a decline in fishery performance, but it is expected to remain within historical bounds so the stock should remain sustainable (Bell et al 2022).

3.12.4 Conservation Status

King George Whiting is not under any conservation protection status other than state fishing regulations. King George Whiting populations in Victoria are currently classified as sustainable.

3.12.5 Mitigation Effectiveness

As noted, the key dynamics of KGW stocks in Victoria are centred around PPB, WPB and CI. Recruitment dynamics, the health of spawning populations and the interaction with fishing effects remain the main drivers of population health in KGW stocks.

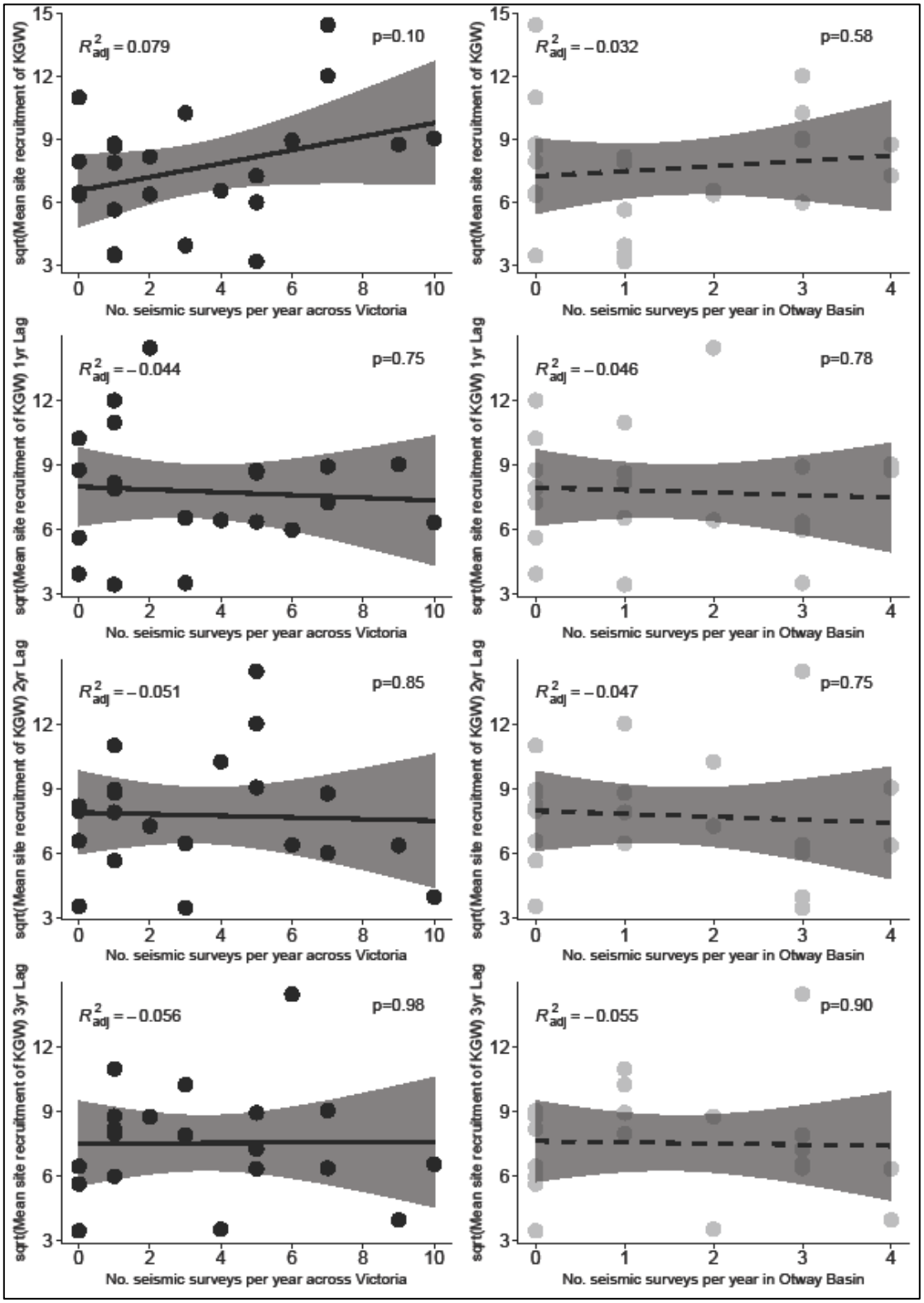


Figure F3-21 - Relationship between frequency of seismic surveys and KGW recruitment levels in PPB. Left hand column includes seismic surveys across Victoria, Right hand column is seismic surveys conducted in the Otway Basin only. Rows represent a lag effect of 0, 1, 2 and 3 years respectively.

3.13 Plankton Communities and the Bonney Upwelling System

3.13.1 Species-Specific Sensitivity

The plankton communities of the general region encompassing the Regia MSS area are dominated by copepods, cladocerans, euphausids (Krill) and chaetognaths amongst others (Kampf & Chapman 2016; Van Ruth & Ward 2009). Much of the work on direct effects of seismic to plankton has focussed on copepods, krill and fish/invertebrate larvae. Results are mixed, with the consensus indicating a range of effects, including mortality, for individuals within close proximity to the seismic pulses at the time of discharging. However, the evidence is much less compelling for large scale mortality and potential population level effects to plankton communities at ever increasing distances from the seismic discharges. A pivotal study cited as definitive proof of large-scale mortality of krill (McCauley et al 2017) presented an outcome more extreme than previous research, concluding that there was large-scale mortality out to 1.2 km from the source. A subsequent study was conducted by three highly cited CSIRO modellers/ researchers (Richardson et al 2017) to model the effects of a seismic survey on zooplankton in a hypothetical survey conducted off the NW Shelf of Australia. This work was also suggested by McCauley et al (2017),

> "*There is an urgent need to conduct further study to mitigate, model and understand potential impacts on plankton and the marine environment…*"

The model outcomes demonstrated substantial impact within 15 km of the seismic in keeping with previous empirical research, but unlike McCauley et al (2017) they found no likely population level effects, with recovery of zooplankton populations within 26 days of the survey completion. Modelling is a proven tool for investigating systems that are difficult to study at large scales and the model outcomes were closely aligned with previous research outcomes across a range of plankton species. As with all models there were numerous caveats due to insufficient information to inform aspects of the model. Richardson et al (2107) however also identified multiple outcomes from the McCauley et al (2017) study that cannot be taken as absolute, especially the apparent lack of any attenuation by distance effects on mortality rates. The obvious conclusions were that there needs to be an independent, rigorous, largescale follow up study to see if the results of McCauley et al (2017) can be verified and validated.

Sensitivity of individual plankton species across multiple studies have all indicated maximum mortality rates from Regia MSS to be below estimated natural mortality rates, with reduced impact at increasing distances/depth from the seismic source (multiple references in the EIA doc on UWS – Plankton).

A significant component of plankton community dynamics in the region is collectively known as the Great Southern Upwelling which mostly refers to three distinct upwelling centres located off the Bonney coast, the southwest coast of Kangaroo Island and the west coast of the Eyre Peninsula. While these centres are not seen as being connected (see Huang and Wang 2019) there is evidence of upwelling at a lower level across the greater shelf region and blue whales are known to aggregate for feeding along the Otway coast SE of Cape Nelson (Gill et al 2011). There is also evidence of sub-surface phytoplankton blooms occurring along the shelf region (Shute et al. 2022, Kampf & Kavi 2017).

Upwelling is a key driver of seasonal biomass enhancements of mesozooplankton (Van Ruth and Ward, 2009), sardine (*Sardinops sagax*) (Ward et al. 2006) and other small pelagic fishes (e.g. *Arripis georgianus*, *Etrumeus teres*, *Trachurus declivis*, *T. novaezelandiae*, *Scomber australicus*, *Emmelichthys nitidus* and *Scomberesox saurus*) (Ward et al., 2008), which are in turn important in the trophic webs of higher order predators in the region (Goldsworthy et al., 2013). Productivity associated with the Bonney Upwelling is also linked to enhancements of euphausiid (*Nyctiphanes australis*) biomass and associated blue whale (*Balaenoptera musculus*) feeding aggregations (Gill, 2002).

In the case of the euphausiid *N. australis*, while its highest abundance is found in summer in response to the upwelling, this species is short-lived and extremely productive, reaching maturity within 4 months and reproducing continuously throughout the year (UTas, IMAS website).

When the upwelling season starts during late spring and early summer (November and December), the influence of the Bonney coast upwelling is often restricted to the coast. During the mid-summer

and early autumn (January to March) when the upwelling is the strongest (measured by AoI), the upwelling influence often extended to the shelf break before retreating in April. At the height of the Bonney coast upwelling during February and March, the upwelling's area of influence often exceeds 12,000 km^2, its SST anomaly often exceeds 1 °C, and its chlorophyll-a concentrations are often >1.5 times of its adjacent areas (All part of Huang and Wang 2019).

The upwelling area of influence is affected by ENSO events, especially at inter-annual level (Huang and Wang 2019). El Nino or La Nina events tend to increase or reduce, respectively, the upwelling's area of influence. It has even been suggested that La Nina events could potentially stop the upwelling events from happening altogether. For example, the Bonney coast upwelling season in 2008–09 was restricted to February only. Interannual variation in areal extent (AoI) can be as high as 50 % from year to year. At the Bonney Coast Western Victoria (BCWVIC) area, the highest annual means in 2009–10 (13,029 ± 5894 km^2) and 2015–16 (12,414 ± 7794 km^2) were more than twice the lowest two in 2004–05 (5378 ± 3184 km^2) and 2012–13 (5184 ± 4838 km^2).

The inherent variability in the dynamics of plankton productivity and the oceanographic processes that drive their life cycles, including concentrating food in upwelling systems, is driven by global-scale climate cycles such as the El Nino Southern Oscillation, with rising SST's also impacting at regional scales. While the direct effects of seismic pulses are felt by individual animals within proximity to the Regia MSS the impacts on population dynamics of these communities are insignificant relative to the scales of change that operate normally.

Krill is a key component of the plankton communities of the region. Because of its primary role in the regional food chains, many species long term sustainability is closely linked to the annual upwelling events that drive the krill blooms upon which animals converge to feed. Because upwelling is the key driver of krill population dynamics, it follows that the huge shifts in temporal and areal extent of the GSU both within and between years will cause krill populations to shrink and expand in a similar way. Such changes, as previously noted, can be as much as 50%. The animals that rely on this system (e.g. whales) for their survival must therefore have evolved to survive and thrive within a system that changes markedly in scale and extent. When put into this context the scale of any potential impacts to plankton communities from the proposed Regia MSS will have no measurable effect on the population health of plankton communities. By extension the risk associated with reduced krill biomass available to feeding animals as a result of the proposed Regia MSS is immeasurably low. [Paragraph added in response to Matter: M10].

The Bonney Upwelling is also identified as culturally significant to the Gunditjmara People (Appendix F3, Section 3.16.1), with its current bringing cold nutrient-rich waters that support culturally significant species such as phytoplankton, fish, squid, seals, dolphins, whales, penguins, gannets and other sea birds (GMTOAC, 2023).

3.13.2 Magnitude of Effect

As noted in Appendix E2 (Underwater Sound – Plankton) there are multiple studies detailing the effects of seismic on fish larvae (see also Sivle et al 2021) and other inhabitants of the plankton. The results consistently indicate that there are deleterious effects on plankton in close proximity to seismic sources however the scale of the impacts is varied and species specific. There is a general relationship of decreasing effects with increasing distance from the seismic sources, although the work of McCauley et al (2017) disputes this relationship.

There has been a constructive assessment of the work of McCauley et al (2017) by Richardson et al (2017) which highlights the need for more research into the findings of this work, especially the apparent lack of attenuation in responses with distance from the seismic source. There is much variation in experimental and study methodologies undertaken to assess seismic effects, and most do not replicate 'real-life' scenarios adequately. Hence more targeted research is needed.

The outcomes discussed by McCauley et al (2017) have indeed catalysed further research into the effects of seismic on planktonic assemblages. Norway has a long history of oil and gas exploration and a concomitant program of research into its effects on the environment (Sivle et al 2021). As a direct result of this work the Norwegian Research Council has funded a 4-year project (ZoopSeis) aimed at uncovering the effects of seismic sound on zooplankton (https://www.hi.no/hi/nettrapporter/toktrapport-en-2022-9). This work is designed to investigate effects under realistic seismic survey conditions and finishes at the end of 2023. Peer-reviewed papers of the research are being completed, with the first publication now available. Mortality rates and

reduced growth of copepod larvae of *Acartia* spp were found to be high in the vicinity of the airgun discharges however the actual rates were significantly lower than normal population mortality rates and hence would likely not be detected (Vereide et al. 2023). They did not test for the effects of distance-from-seismic in this work, but their results remain consistent with most of the other research already published in this area.

A second publication derived from the ZoopSeis work (Vereide et al. (2024a)) has also found that while there was significant damage at close quarters to seismic discharges, there was not extensive and unattenuated mortality out to 1 km + as reported by McCauley et al (2017). Mortality levels reported were also lower than natural mortality rates and hence are predicted to be difficult to separate from background mortality. As well as experimental work a review was conducted as part of the ZoopSeis program and highlighted the vexed issue of extrapolating experimental results to real-life situations (Vereide et al 2024b). They noted that although a seismic survey may cover up to 3000 km^2 and shoot continuously for many weeks the animals will not be constantly exposed throughout that period. The duration of exposure in the reviewed studies lasted for a maximum of 3–4 days, which could be considered too long to be transferred into a real-life setting, considering advection and migration processes that typically occur in the plankton. [Paragraph added in response to Matters: P04 and P06].

Zooplankton will be exposed to airgun discharges when a seismic survey is conducted but over varying time durations and sound levels. In addition, seasonal, diel, and species-specific changes in copepod distribution, both within and among species (Hygum et al., 2000; Thor et al., 2005), will influence exposure level and, therefore, the overall impact of seismic discharges. Dongen-Vogels et al (2011) found up to 4 magnitudes of difference in the abundance of picophytoplankton communities in GAB which highlighted the role of localised physical events including upwelling, downwelling, water column stratification and eddy formations.

A recent study attempted to quantify the patchiness of planktonic assemblages off Florida and clearly demonstrated the multi-scale nature of this phenomenon – see Figure F3-22 below (Robinson et al 2021).

While effects of seismic will be felt by plankton assemblages at localised scales the highly dynamic nature of populations in space and time will ensure there are no population level effects hence the magnitude of any effects will be minor.

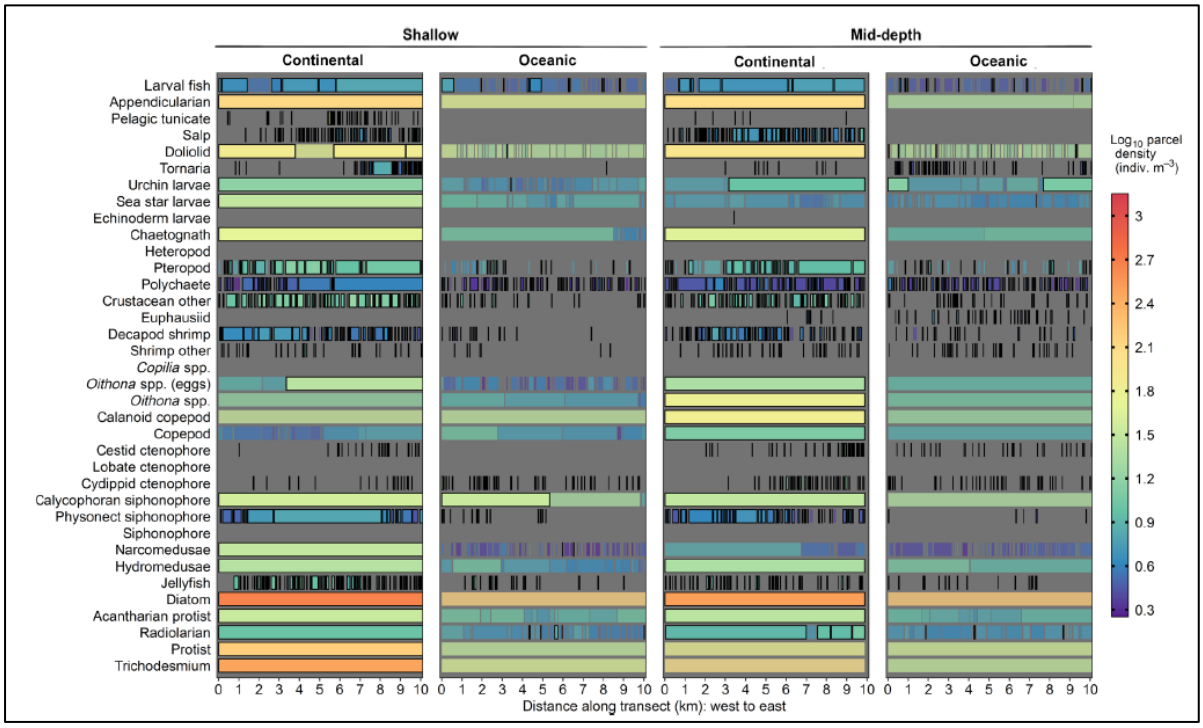


Figure F3-22 - Position and length of plankton catches for 36 taxa. The position and length of patch (coloured bars with black outline) and aggregated parcel (opaque coloured bars) for each taxonomic group along with a single example set of 10-km ISIIS transects in the shallow and mid-depth waters of continental oceanic regions of the SOF. The bar colour gradient indicates the log $_{10}$ – transformed density of individuals (individuals per cubic meter). Multiple groups had patches of aggregate parcels that extended the entirety of the 10-km transects (e.g. diatom).

3.13.3 Recovery Potential

The scale of seismic effects relative to natural background mortality and patchiness of planktonic communities precludes any impacts on such a scale that 'recovery' would be a process specifically applied to a seismic event.

3.13.4 Conservation Status

Planktonic communities of themselves are not given any conservation status. The Bonney Upwelling has been recognised as a Key Ecological Feature however this has no formal legal standing. Whale conservation and management plans may indirectly confer a conservation status on plankton communities in the same area.

3.13.5 Mitigation Effectiveness

Plankton exists in the oceanic environment off the Otway coast and greater south coast region all year round. Localised areas of extremely high plankton density such as upwelling areas should be avoided, however they do not exist within the Regia MSS area. Mitigation might otherwise be better targeted towards avoidance of aggregations of animals that either feed on plankton or who target those species that are feeding on plankton.

3.14 Spawning Patterns

3.14.1 Species-Specific Sensitivity

The commercially important fish species that occur proximate to the survey are largely broadcast spawners (i.e. species that release vast numbers of sperm and eggs into the water column, or in some cases scatter them on the substratum), with several species forming spawning aggregations on the continental shelf, shelf break and slope.

The commercially important crustacean species fished in the vicinity of the Operational Area (i.e. southern rock lobster and giant crab) also spawn eggs but incubate them under their abdomen until hatching. Some species may aggregate at locations to spawn all their eggs and sperm at a specific time within a certain period, batch spawn across a region multiple times during certain seasons (e.g. pink ling and Australian sardine) or spawn continuously throughout the year (e.g. Gould's squid). Significant spawning aggregation areas are not known to occur in the vicinity of the Operational Area, although information regarding fish spawning in offshore regions of the Otway Basin is generally not well documented.

Spawning periods for key species of Commonwealth and State managed fisheries (as identified in B6) overlapping the Operational Area are shown in Table F3-5 with Table F3-6 providing more spawning detail for those species most likely fished in the operational area. Austral spring-summer is the predominant spawning period for most species as it coincides with warmer conditions although many of the deeper water species prefer winter/spring for spawning.

Table F3-5 - Commercial fisheries species spawning timings and depths.

	Spawning Timing												
Fish species	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**Depth Range**
Australian sardine									■	■	■	■	0-200 m
Blue grenadier						■	■	■	■				200 - 700 m
Blue warehou					■	■	■	■	■				50 - 600m
Blue-eye trevalla			■	■	■								200 - 900 m
Eastern School Whiting	■	■	■									■	0-180m
Eels					■	■	■						0-300m
Elephant fish		■	■										0-30m
Giant Crab						■	■	■					20-6 00 m
Gould's squid	■	■	■	■	■	■	■	■	■	■	■	■	<200 m
Gummy Shark		■	■										80-350m
Jack mackerel	■	■	■									■	10-460 m
Orange Roughy						■	■	■	■				700-1400m
Pink ling							■	■	■	■			40-700 m
Pink Snapper	■	■									■	■	20-250m
Redbait								■	■	■	■		86-500 m
Ribaldo						■	■	■	■				450-2500m
Saw Sharks						■	■	■	■				40-650m
School Shark									■	■	■	■	20-550m
Southern rock lobster									■	■	■		<200 m
Tiger flathead	■	■	■								■	■	10-400 m

Table F3-6 - Fish species potentially spawning in Regia MSS Operational area.

Fish species	Spawning activity	Impacted by survey
Blue Grenadier	Main spawning areas located off the central west coast of mainland Tasmania (Gunn et al. 1989b) and eastern VIC / southern NSW (Bruce et al. 2001).	Main spawning areas outside of the active source area and overlap of spawning limited to one month at end of spawning period
Elephant fish	Only partly known. Females migrate to shallow coastal waters in spring to lay their eggs (AFMA 2024).	Broad distribution across southern Australia but only incidental catches in SESSF. No aggregations known in OA.
Gummy shark	Similar to elephant fish	A continuous stock across southern Australia (ABARES Fishery Status Reports 2024).
Saw sharks	Also similar to elephant fish although timing of migration is in winter	Biological structure unknown but found across southern Australia.
School sharks	Pups and juveniles aggregate in shallower 'nursery' waters during the spring and summer.	Found across southern Australia. Stocks are considered overfished. No known aggregations inside OA.
Tiger Flathead	Mature fish migrate to shallow continental shelf waters (<200 m depth) prior to the spawning period (AFMA 2017).	Minimal overlaps at start of general spawning season. OA not a major location for TF
Eastern School Whiting	Spawning is regionally variable but peaks in summer for the region. Spawning is twice a year in deep water.	Minimal overlaps at start of general spawning season. OA not a major location for TF
Blue Warehou	Major spawning areas are located off the west coast of mainland Tasmania.	Main spawning areas outside of active source area and overlap of spawning limited to two months at end of spawning season
Blue Grenadier	Major spawning areas are located off the west coast of mainland Tasmania.	Main spawning areas outside of active source area and overlap of spawning season limited to a month at end of spawning season
Pink Ling	Mature fish migrate to shallow continental shelf waters (<200 m depth) prior to the spawning period (CSIRO 2002).	Main spawning areas deeper than survey and overlap of spawning limited to two months at end of spawning season.
Blue-eye Trevalla	Spawning occurs in summer and autumn where they move into shallower depths (320–400 m) and form spawning aggregations over rough ground and drop-offs on the continental slope, as well as over seamounts (Kailola et al., 1993).	No overlap with spawning period. Spawning is widespread across the South-east Marine Region (CSIRO, 2002) although most spawning activity occurs in waters from central NSW to north-eastern TAS (AFMA, 2017).
Ribaldo	Spawning occurs in winter and early spring. Ribaldo are not thought to form large spawning aggregations.	No overlap with spawning period.
Jack Mackerel	Spawning occurs near the edge of the continental shelf with eggs and sperm released among schooling fish deep in the water column (CSIRO, 2002). Larvae are thought to be carried inshore by currents (Marshall et al. 1993).	No overlap with spawning period. Multiple spawning events over areas outside of acquisition timing.
Redbait	Spawns on outer continental shelf, mostly at night, once every three to five days over the spawning period between Sept. – Nov..	Multiple spawning events over an extensive area between Tasmania and King Island. Spawning is confined to narrow corridor along the shelf break including within the active source area. Minor component of CSPF with no state catches reported.

Fish species	Spawning activity	Impacted by survey
Australian Sardine	Spawns on continental shelf (200 m) with larvae moving Inshore towards bays and inlets during a planktonic period of around 120 days after hatching.	Multiple spawning events over the spawning season. Overlaps the active source area. Stock is spread over >6000km and assessed as highly abundant in 2024.
Orange Roughy	Usually found at depths of 700 - 1400 m where it forms dense spawning aggregations around pinnacles in winter	No spawning or feeding aggregation areas have been identified in the Operational Area. Major spawning locations located on the east coast of Tasmania
Gould's Squid	Spawn throughout the year with 2-3 peaks of spawning activity (AFMA website)	Spawning is continuous throughout year with multiple intra-year peaks that can vary from year-to-year depending on inter- and intra-year variability of environmental conditions. Highly resilient stock that can be subject to 90% mortality.
Southern Rock Lobster	Mating is in autumn with fertilised eggs released from Sept – Nov. where they spend 12-24 months in the plankton.	SRL are considered a single stock across their entire range with high connectivity. Extremely resilient to episodic disturbances.
Giant Crab	Spawning occurs in June-July	No overlap with spawning period

Overlapping Spawning Species

Australian Sardine

Some locations identified as Australian Sardine spawning areas overlap with the Regia MSS area with timing of spawning centred around spring-summer months. Mapping of egg densities along the south coast shows the distribution and abundance of sardine spawning locations is centred around Kangaroo Island and the Cape Otway region (Ward et al. 2018). However, Ward et al. (2018) state that these results are underestimates of the total spawning biomass of the south coast region. This has recently been confirmed by Ward et al (2023) who have discovered that the size of the SE Australian Sardine stock is substantially bigger than previously estimated. This species is recognised as one genetically identical stock, subdivided into meta-populations that are still connected but more self-regulating (Izzo et al. 2017). The distribution of spawning areas is extensive across the south and southeast coast and connected at a much larger scale than the Regia MSS area (Figure F3-23 and Figure F3-24). As such, the scale of any effects to the spawning output of sardines across the greater region are expected to be immeasurable.

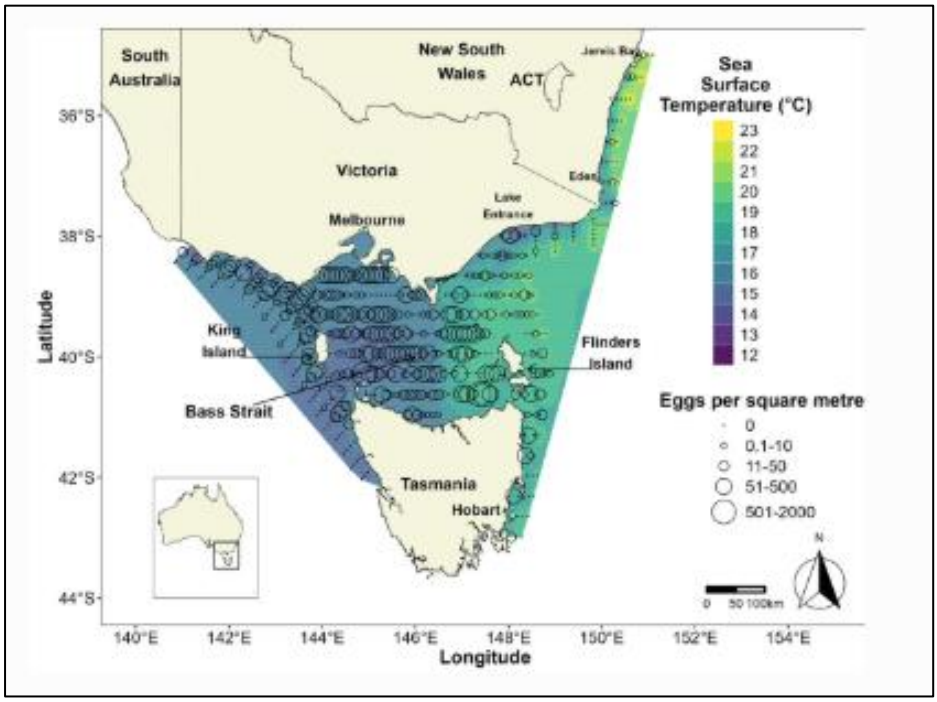


Figure F3-23 - Spatial patterns and density of Sardine eggs between December 2023 and January 2024. Along with the corresponding sea surface temperature (Credit: Tim Ward UoT 2024).

Redbait

There is overlap of redbait spawning locations with the Regia MSS area (Table F3-6) with timing of spawning during spring/early summer (Table F3-5). However, distribution of redbait eggs was found to be greater to the west and east of the Regia MSS area with highest concentrations off the west coast of Tasmania and the Bonney Upwelling region (Ward et al 2019) (Figure F3-24).

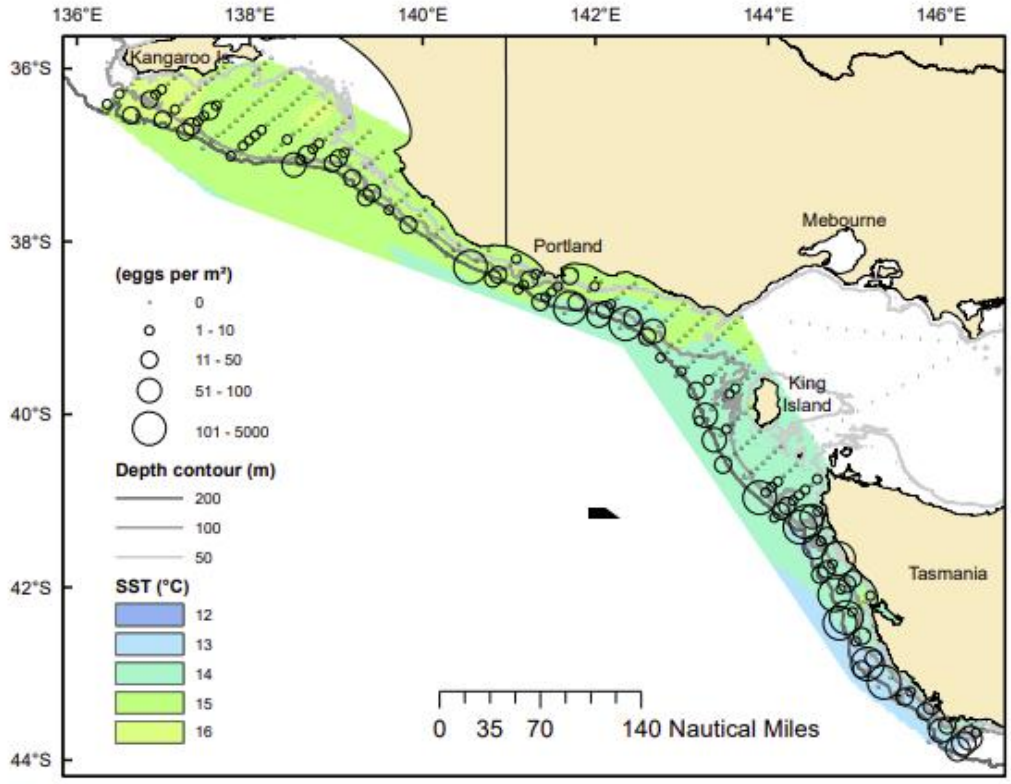


Figure F3-24 - Distribution and abundance of Redbait eggs between western Tasmania and Kangaroo Island in October 2017 (from Ward et al. 2019).

3.14.2 Magnitude of Effect

An effect on spawning from the operation of the seismic source could only happen if seismic is occurring at the time of spawning and is within the threshold distances for each particular species. . Moreover the levels of energy and scale of effects that marine biota will be exposed to within the ensonified area will vary by species and by individual according to their closeness to the sound energy source, their behaviour and physiology, the complexity and density of their preferred habitat and the speed and direction of the survey. Actual near-field and far-field received sound levels are influenced by several factors including the overall size (capacity) of the acoustic source, the array configuration, water depths in the area, position in the water column, distance from the source and geo-acoustic properties of the seabed.

Appendices B7 and B8 highlight that the distance thresholds selected for understanding the effects of elevated levels of sound on fish eggs and larvae are defined as the active source area plus 740 m. In selecting impact thresholds, the EP considers an extensive list of different studies which have investigated the effects of underwater sound on plankton (which includes the eggs and larvae of finfish and invertebrates). Guideline thresholds for mortality to eggs and larvae have been drawn from the sound exposure guidelines of the ANSI-Accredited Standards Committee S3/SC 1, Animal Bioacoustics Working Group (Popper et al. 2014). The critical level proposed for mortality in eggs and larvae is 207 dB re 1 µPa Lpk and this is based on the maximum sound levels measured from repeated pile driving that indicated no damage to the larvae of the common sole (Bolle et al. 2012). This level has been used for the assessment of underwater sound from seismic on plankton including fish larvae and eggs (see Appendix E2). The spatial extent within which effects are being assessed is conservative in keeping with the precautionary approach because it encompasses all physiological and behavioural disturbance effects to all the marine fauna considered, at the seabed and in the water column.

In general, there have been few studies into the effects of marine seismic surveys on plankton. Up until recently, studies on the effects of noise from airguns on plankton have indicated that any effect

is likely to be highly localised (<10 m from the source and typically within 0.5 to 5 m) (Kostyuchenko 1973; Matishov 1992; Booman et al. 1996; Payne 2009). These studies indicated that impacts would be insignificant compared with the naturally high turnover rates of zooplankton.

Scale of impacts is also closely linked to the size of the population. Species with high abundance and a large, interconnected distribution will be resilient and robust to a spatially and temporally constrained seismic survey. Any localised mortality will be buffered by the scales of advection and dispersal that are intrinsic to highly connected populations. Recent work has demonstrated the abundance of sardine stocks across the region (Ward et al 2023) while Redbait populations are also spatially extensive and relatively abundant across southern Australia, occurring continuously at the shelf break between southern NSW and south-western Western Australia (Ward et al 2019). potential mortality of larval fish that rely on zooplankton for food is difficult to predict but is not expected to affect a significant proportion of larvae based on the assumptions that not all zooplankton are killed by exposure to airguns (Richardson et al. 2017) and only a very small proportion of the plankton would be exposed at any one time.

No population level effects are predicted from an individual survey, however there is the potential for an overlap with the TGS Otway 3D MSS. TGS and CGG have committed that both surveys will not occur at the same time. The two surveys are targeting acquisition in different water depths such that cumulative effects are not predicted to species whose spawning distributions are depth limited. The only species with depth ranges affected by both surveys have such broad distributions that cumulative effects remain within acceptable levels. The recoverability of populations and levels of natural mortality are such that no effect is predicted to commercially caught species, or to their catch rates as an indirect result of impacts on eggs/larvae.

3.14.3 Recovery Potential

Although the work by McCauley et al. (2017) and Richardson et al. (2017) suggests that the zone of impact for zooplankton may be two orders of magnitude higher than previously thought, there is still evidence that for certain components of the plankton effects are likely to be limited to <10 m. Further, for many components of the zooplankton and phytoplankton, recovery is expected to be rapid (in the order of days), so the effects are expected to be limited and within the range of natural variability.

Richardson et al. (2017) showed that zooplankton communities can begin to recover during the survey period during periods of good oceanic circulation (and periods of upwelling). Hence, a continuous decline in zooplankton throughout the survey period is not anticipated, and parts of the Active Source Area would progressively recover as the survey proceeded. It is unlikely therefore that localised patches of reduced food availability for plankton feeders would occur over the period of the survey and during the 3-day recovery period (as modelled by Richardson et al. (2017)).

3.14.4 Conservation Status

Fish eggs and larvae are not protected in Australia.

3.14.5 Mitigation Effectiveness

There are no known critical spawning areas (i.e. species with restricted distribution and/or a relatively large-scale event) for any commercially important fish species within the Regia MSS area-of-effect and the survey will not have population level impacts on spawning output of commercially important fish and invertebrate species. Given the broad distribution and high natural mortality of spawning and the potential mortal injury effects the only viable mitigation measures are avoidance of spawning timing. In all cases, the avoidance of minor impacts to spawning should not be traded off against higher order effects of moving to other times.

In consideration of the spatial and temporal extent of this predicted impact it is also important to consider the following:

- Any plankton, including fish eggs and larvae, present in the water column within the Active Source Area will not be evenly distributed with substantial spatial patchiness the most likely (e.g. Robinson et al 2021).
- The seismic source will be constantly moving, and plankton populations are constantly being replenished by currents from non-impacted areas. Plankton populations' recover quickly due

to their fast growth rates, and the dispersal and mixing of plankton from both inside and outside of the impacted area.

- Any mortality or mortal injury effects to fish eggs and larvae resulting from seismic noise emissions are likely to be inconsequential compared to natural mortality rates of fish eggs and larvae, which are very high (exceeding 50% per day in some species and commonly exceeding 10% per day). For example, in a review of mortality estimates (Houde and Zastrow 1993), the mean mortality rate for marine fish larvae was M = 0.24, a rate equivalent to a loss of 21.3% per day.

3.15 Budj Bim Cultural Landscape

The Budj Bim Cultural Landscape, located in the traditional Country of the Gunditjmara Aboriginal people in south-eastern Australia and comprises three components: Budj Bim – Northern Component (Budj Bim IPA and National Park), Kurtonitj – Central Component (Budj Bim IPA) and Tyrendarra Southern Component (Budj Bim IPA and Tyrendarra IPA) (GMTOAC, 2023). Budj Bim is recognized for its world heritage values due to its ancient and sophisticated aquaculture systems. The Budj Bim lava flow is recognised as an attribute contributing to the Outstanding Universal Value of the Budj Bim World Heritage Site which extends into Portland Bay (Wheeler et al., 2023). These systems are among the world's oldest, dating back at least 6,600 years.[3] The Gunditjmara people utilized the lava flows from the Budj Bim volcano to create one of the largest and oldest freshwater aquaculture systems in the world. This system comprises of an extensive network of channels (yereoc), weirs (stone and wood), dams, ponds and sinkholes. This network was ingeniously designed to manage floodwaters and create basins for the systematic trapping, storing, and harvesting of Kooyang (short-finned eel - Anguilla australis), providing a sustainable economic and social base for their society over millennia.[4] More recently, acoustic tagging of Kooyang from 2008 to 2020 traced their migration from Tae Rak out to sea before spawning, with tags recorded near Tasmania, Sydney and New Caledonia. In 2019, the Kooyang Killara Water Project also piloted a six-tub, solar-powered aquaculture facility that strengthened participants' skills in feeding Kooyang, monitoring water levels and flows, and recording results.

The landscape embodies the continuing and evolving relationship between the Gunditjmara people and their land, showcasing a unique interrelationship of cultural and environmental systems. This connection is evidenced through the continuation of traditional knowledge, practices, and cultural traditions expressed through oral traditions, dance, landscape management methods such as cultural burning, and resource utilisation, such as basket weaving and rock building. This connection is also physically evidenced both archaeologically and contemporarily via the extensive aquaculture systems and interconnected geological, hydrological and ecological systems.

3.15.1 Sensitivity (World Heritage Outstanding Universal Values)

The World Heritage values of Budj Bim are recognized under two specific criteria:

Criterion (iii): This criterion highlights the Budj Bim Cultural Landscape as an exceptional testimony to the cultural traditions, knowledge, practices, and ingenuity of the Gunditjmara people. Their aquaculture system serves as a testament to their engineering skills and sustainable fishing practices, which have been passed down through generations.

Criterion (v): Under this criterion, the Budj Bim Cultural Landscape is acknowledged as an outstanding example of human interaction with the environment. The Gunditjmara's manipulation and management of the landscape through their aquaculture system demonstrate a profound understanding and relationship with their natural surroundings, emphasizing the dynamic ecological-cultural relationships that have been maintained over thousands of years.

The integrity and authenticity of the site are maintained through the intact and operational nature of the aquaculture systems, the ongoing connection of the Gunditjmara to their land, and the continuation of cultural practices. The landscape is managed to respect the rights and obligations of

[3] UNESCO 2019 https://whc.unesco.org/en/list/1577/
[4] Budj Bim website https://www.budjbim.com.au/about-us/world-heritage/

the Gunditjmara Traditional Owners. The preservation of its cultural and natural values are currently managed by the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan (2015), the Gunditj Mirring Budj Bim Indigenous Protected Area Plan of Management 2022 – 2027 (Event ID 352), the Budj Bim Cultural Landscape Master Plan 2022 – 2030, a GMTOAC Budj Bim World Heritage Unit and a Steering Committee that includes membership from GMTOAC, Winda-Mara, World Heritage experts and state and federal agencies. The 'Tyrendarra Indigenous Protected Area Management Action Plan 2015–2018' is a strategic document outlining the conservation, protection, and management of the Tyrendarra Indigenous Protected Area (IPA) (Event ID 352)

3.15.2 Magnitude of Effect

CGG undertook a review of the World Heritage Listing information on the UNESCO website, the Budj Bim and GMTOAC websites, the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan, the Gunditj Mirring Budj Bim Indigenous Protected Area Plan of Management 2022 – 2027 (Event ID 352), the Budj Bim Cultural Landscape Master Plan 2022 – 2030, Tyrendarra Indigenous Protected Area Management Action Plan 2015–2018' and social media posts related to the cultural values in the region. CGG has also undertaken a tour of the Budj Bim site and consulted with GMTOAC and other Traditional Owner groups in the region to better understand the significance of cultural heritage features of the environment in and around the area in which it proposes to operate.

The management plans (listed above in section 3.15.1) for the Budj Bim Cultural Landscape integrate requirements to protect the site's UNESCO Outstanding Universal Value, describing the World Heritage aims for the landscape to be universally recognised and protected as a dynamic living place with internationally recognised cultural heritage and sustainable ecological systems, with a specific long-term target of zero substantial decline in natural or cultural heritage values. Other fundamental indicators and goals focus on preventing significant decline in the condition and function of the aquaculture features (channels, weirs, dams, and ponds), including ensuring water flows are within the range that enables the aquaculture system to function sustainably, increasing native fauna populations, the development and implementation of a long-term kooyang and fish monitoring program, and building the resilience of the landscape to the impacts of climate change

The cultural values documented in the UNESCO listing and the Management Plans identified the Budj Bim Cultural Landscape and the example of human interaction with that environment. CGG subsequently considered the environmental aspects arising from the Regia MSS on the World Heritage values of the Budj Bim Cultural Landscape. The understanding CGG had of the values were analysed from both direct and indirect perspective.

Direct effects

Since Budj Bim's World Heritage values are tied to its ancient aquaculture systems, cultural traditions at the site, and the deep historical connection between the landscape and the Gunditjmara people, a seismic survey undertaken over 20km offshore will not change the physical characteristics or resources of the Budj Bim Cultural Landscape. Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability, in alignment with the related Management Plans.

Indirect effects

Indirect effects could potentially be more significant, especially concerning the marine environment and its interconnectedness with the cultural practices and values of the Gunditjmara people. Since the Gunditjmara's traditional practices and cultural significance associated with the Budj Bim Cultural Landscape include the management and harvesting of aquatic resources, changes in marine ecosystems could indirectly impact these cultural practices.

CGG understood from our consultations the cultural significance of the Kooyang eel (Short-finned Eel - *Anguilla australis* – also known as Glass Eels when they are ocean bound before they migrate to inland freshwater systems). CGG undertook a detailed assessment of the effects of short-term seismic surveys on this species which can be found in Section 3.7 Short-finned Eel / Kooyang (*Anguilla australis*)

3.15.3 Recovery Potential

Due to the absence of direct effects and immeasurable indirect effects, this is no recovery potential to assess.

3.15.4 Conservation Status

As a World Heritage Listed environmental value it was important for CGG to thoroughly assess the Outstanding Universal Value of the Budj Bim site. This assessment has found no threat to the values of the site from the proposed activity.

3.15.5 Mitigation Effectiveness

Whilst there are no direct effects, and immeasurable indirect effects, from the Regia MSS on the World Heritage Values of Budj Bim, CGG recognises that there may be other indirect effects to spiritual values held by the Gunditjmara people and that this information may be sensitive such that it cannot be shared.

In acknowledgement of the ongoing sovereignty of the Gunditjmara people, and CGG's willingness to find ways to protect cultural heritage, a Sea Country Protection Plan will be implemented to facilitate the identification and management of new information, relevant to the activity, through collaboration of First Nations people who decide to be part of the program.

3.16 Cultural Features of the Environment

3.16.1 Sensitivities

Following review of relevant literature, case law, and information provided through consultation, the following environmental values and sensitivities were identified as cultural features of the environment that may be affected by the Regia MSS. Where an impact and risk on a cultural feature has been identified, environmental assessment has been undertaken and can be located as per the 'Reference to Evaluation' column in Table F3-7 below.

Table F3-7: Table showing the cultural features that may be impacted by the Regia MSS.

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Tangible				
Koontapool Woorrkngan Yakeen	Whale Birthing Dreaming Sites, are in coastal bay areas from Port Campbell to Portland, including Warrnambool. These places on Gunditjmara Country are known resting and feeding sites for mothers and calves and are directly related to Gunditjmara Neeyn (midwives), explaining why Gunditjmara is a Matrilineal Nation.	DCCEEW 2024 Appendix C3, Desktop Research: Org ID 316 & Person ID 1163	**Planned:** Underwater sound Physical Presence **Unplanned:** Fauna interactions Accidental release of fuel Accidental release of materials or waste overboard	Underwater Sound (Marine Mammals), Appendix E7 Fauna Interactions, Appendix D2 Accidental release of fuel, Appendix D4, *(cited in section 9.3.6).* Release of materials or waste overboard, Appendix D1 Physical Presence, Appendix E1

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Whale	Southern Right Whales (*Eubalaena australis*) and Blue Whales (*Balaenoptera musculus*) have been identified as a culturally significant species for Indigenous peoples. The GMTOAC Nyamat Mirring Plan 2023-2033 describes the spiritual connection Gunditjmara maintain with all species of whale that travel through their sea country, with the arrival of Karntubul signifying the start of the big wet season. Their whale ancestors and kin, Koontapool, the southern right whale, and Wuuloc, the pygmy blue whale, are sacred to the Gunditjmara and hold a significant place in their cultural practices. [This sentence has been updated follow public comment FN01] Koontapool are a culturally significant species for the Eastern Maar people. Blue Whales, Southern Right Whales and Killer Whales use Wadawurrung Warre (sea country).	Event ID 3678Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020 Event ID 6624 Feedback ID 4389 Appendix C3, Desktop Research: Org ID 316 & Person ID 1163	**Planned:** Underwater sound Physical Presence **Unplanned:** Fauna interactions Accidental release of fuel Accidental release of materials or waste overboard	Underwater Sound (Marine Mammals), Appendix E7 Fauna Interactions, Appendix D2 Accidental release of fuel, Appendix D4, *(cited in section 9.3.6)* Release of materials or waste overboard, Appendix D1 Physical Presence, Appendix E1

Native Title Areas & Rights	In July 2011 the Eastern Maar and Gunditjmara peoples were recognised as the native title holders for an area of their Traditional Country in south-west Victoria between the Shaw and Eumerella Rivers and from Yambuk in the south to beyond Lake Linlithgow in the north. For the Gunditjmara People, their recognised native title rights and interests include the non-exclusive right to: • have access to or enter and remain on the land and waters • camp on the land and waters landward of the high water mark of the sea • use and enjoy the land and waters • protect places and areas of importance on the land and waters • take resources of the land and water Native Title rights and interests are non-exclusive and sit alongside the broader community's right to enjoy these places. A significant site of early conflict in Gunditjmara Country was at a place now known as the "Convincing Ground". In 1832 – 33, when Kilcarer Gunditj came together at a beached whale, whalers used the gathering, murdering approximately 60 people at the Convincing Ground. Only two members of the clan survived the massacre. 'The 'Convincing Ground' is located in Portland Bay and is listed on the Victorian Heritage Register. Deen Maar and its surrounding area hold deep spiritual significance	https://easternmaar.com.au/about/ https://www.gunditjmirring.com/nativetitle Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023	**Planned:** Light Emissions Physical Presence Diving, Surfing and Swimming **Unplanned:** Accidental release of materials or waste overboard Accidental release of fuel	Light Emissions, Appendix E9. Physical Presence, Appendix E1 Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4, *(cited in section 9.5.4)* Diving, Surfing and Swimming, Appendix E8

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	for the Gunditjmara people and fall within one of their native title determinations. Gunditjmara hold recognised native title rights and interests over this part of Mirring (see also '*Deen Maar'* below).			
Registered Aboriginal Party	Wadawurrung Traditional Owners Aboriginal Corporation was appointed in May 2009 as a Registered Aboriginal Party under the Victorian Aboriginal Heritage Act 2006.Wadawurrung's RAP area covers over 10,000 square kilometres on the western side Melbourne and including the major regional cities of Geelong and Ballarat. Their coastal Country extends from the Werribee River to Airey's Inlet, with Sea Country east of Anglesea to Clifton Springs. Bunurong Land Council Aboriginal Corporation are the Registered Aboriginal Party for the Mornington Peninsula, Westernport, and a portion of South-West Gippsland.	Wadawurrung Traditional Owners Aboriginal Corporation, 2020. https://www.bunuronglc.org/rap-map.html	**Planned:** Physical Presence **Unplanned:** Accidental release of materials or waste overboard Accidental release of fuel	Physical Presence, Appendix E1 Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4 *(cited in section 9.5.4)*
Deen Maar	Lovett on behalf of the Gunditjmara People v State of Victoria ((No 5) [2011] FCA 932) identified Deen Maar as a spiritually significant place. A culturally significant site and special place to Eastern Maar and Gunditjmara peoples. The island of Deen Maar is part of the homeland of the Gunditjmara and Eastern Maar peoples and contains important cultural sites and artefacts as well as spiritual significance. [This sentence has been updated follow public comment FN01]	Victoria State Government, 2023 Eastern Maar Aboriginal Corporation, 2015 Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Event ID 1891, Feedback ID 1103. Cultural heritage desktop assessment, Appendix B12	**Planned:** Physical Presence Light Emissions **Unplanned:** Accidental release of fuel Accidental release of materials or waste overboard	Physical Presence, Appendix E1 Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4 *(cited in section 9.5.4)* Light Emissions, Appendix E9.

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	A story associated with Deen Maar Island is that the spirits go first to Deen Maar and then up to the stars, as Bunjil had done (Eastern Maar Aboriginal Corporation, 2015). The island is where the Gunditjmara believe the spirits of their dead travel to wait to be reborn. Ancestral creation beings revealing themselves in the landscape: erupting volcanoes; tsunamis; mountains forming; sea country creeping up onto the land. (Weir 2009). Deen Maar holds cultural significance (Event ID 1891, Feedback ID 1103) Deen Maar (Lady Julia Percy Island) is the point where two creator deities, Punjil and Pallian left this earth. Pallian was the creator deity of the sea and fish and the governor of the oceans (after William Thomas, Letters from Victorian Pioneers, in National Oceans Office 2003:12). This island holds and creation story holds significance for both the Gunditj Mara and Eastern Maar. (Appendix B12)			
Point Nepean & Mornington Peninsula	During consultation with Bunurong Land Council Aboriginal Corporation (Org ID 144) identified Mornington Peninsula, and particularly Point Nepean, as an area of high cultural significance.	Event ID 2371, Feedback 1170 Thomas et al. (2017)	**Planned:** Physical Presence Light Emissions **Unplanned:**	Physical Presence, Appendix E1 Release of materials or waste overboard, Appendix D1

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	With significant input from Dan Turnbull of Bunurong Land Council Aboriginal Corporation, Thomas et al., describe Point Nepean/Monmar as a culturally significant and sacred site on the Mornington Peninsula, which is itself culturally significant with values including tradition, story and song. Stating that within Point Nepean is a special women's place, used for birthing, ceremony and initiation.		Accidental release of fuel Accidental release of materials or waste overboard	Accidental release of fuel, Appendix D4 *(cited in section 9.5.4)* Light Emissions, Appendix E9.
Budj Bim	See detailed description and assessment in Section 3.15 Budj Bim Cultural Landscape			
Waterway/water bodies	Spirits of the dead reside in waterways and water bodies. The estuaries where Yulluk (waterways) and Warre (Sea Country) meet are vital breeding grounds, crucial for the continued renewal of marine life. The sea, caves, estuaries, reefs, nearshore islands, and extensive dune and wetland systems along the coast are embodied with stories from continuous use by Gunditjmara over millennia.	Eastern Maar Aboriginal Corporation, 2015 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023	**Unplanned:** Accidental release of fuel Accidental release of materials or waste overboard	Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4 *(cited in section 9.1, 9.5.5)*
Kooyang (eels)	Are culturally significant and are a resource. Fishing is described as a cultural activity in The Wadawurrung Country Plan 2020 – 2030, with eel (buniyak) caught in tubular-shaped baskets (buniya). Eeling also remains an important traditional, social and economic practice among the Eastern Maar People. They continue to fish for perch, blackfish.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Eastern Maar Aboriginal Corporation, 2015.	**Planned:** Physical presence. Underwater sound. **Unplanned:** Accidental release of Fuel.	Physical Presence, Appendix E1 Underwater Sound (Fish), Appendix E3 Accidental release of fuel, Appendix D4 *(cited in section 9.3.3)* Refer to Section 3.7 above.

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Koorn Moorn (seals)	Feature in song and dance and are used as a resource. They were collected in traditional times by women along the Gunditjmara coast with evidence at Tarragal cave site dated to 10,000 years. During consultation, seals were identified by the Eastern Maar people as a culturally significant species.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Event ID EVT272	**Planned:** Physical presence. Underwater sound. **Unplanned:** Release of waste overboard. Fauna interactions. Accidental release of fuel.	Physical Presence, Appendix E1 Underwater Sound (Marine Mammals), Appendix E7 Fauna Interactions, Appendix D2 Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4 *(cited in section 9.3.6)*
The Bonney Upwelling	Supports culturally significant species such as phytoplankton, fish, squid, seals, dolphins, whales, penguins, gannets and other sea birds.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023	**Planned:** Underwater sound **Unplanned:** Release of waste overboard. Accidental release of fuel.	Underwater Sound (Plankton), Appendix E2 Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4, *(cited in section 9.3.1)* Refer to Section 3.13 above.
Nyamat Mirring IPA	The Nyamat Mirring Indigenous Protected Area [currently under consultation], encompasses the coastal section of native title areas including sea, submerged lands and potential traditional fish traps found therein.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023	**Planned:** Physical Presence Light emissions. **Unplanned:** Release of waste overboard. Accidental release of fuel.	Physical Presence (Appendix E1) Light Emissions, Appendix E9. Accidental release of fuel, Appendix D4 *(cited in section 9.5.4)* Release of materials or waste overboard, Appendix D1

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Marine Mammals – General	Marine mammal species are identified by the Gunditjmara people as culturally significant as important resources, particularly as food sources, and as a feature in dreaming stories, ceremony, song and dance. Relating to Koorn Moorn (seals) and Karntubul (whales), dolphins. The Wadawurrung People recognize marine mammals, including Blue Whales, Southern Right Whales, Killer Whales, and seals, as culturally significant species. During consultation, whales, seals and sea lions are identified by the Eastern Maar people as culturally significant species.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Event ID EVT272	**Planned:** Physical presence. Underwater sound. **Unplanned:** Release of waste overboard. Fauna interactions. Accidental release of fuel.	Underwater Sound (Marine Mammals), Appendix E7 Physical Presence, Appendix E1 Fauna Interactions, Appendix D2 Accidental Release of Fuel, Appendix D4 *(cited in section 9.3.6)* Release of materials or waste overboard, Appendix D1
Fish - General	Two freshwater species, blackfish and eels continue to be harvested by the Gunditjmara people Fishing is described as a cultural activity in The Wadawurrung Country Plan 2020 – 2030, with eel (buniyak) caught in tubular-shaped baskets (buniya). Eeling also remains an important traditional, social and economic practice among the Eastern Maar People. They continue to fish for perch, blackfish.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Eastern Maar Aboriginal Corporation, 2015.	**Planned:** Underwater sound. Light emissions. **Unplanned:** Fauna interactions. Accidental release of fuel.	Underwater Sound (Fish), Appendix E3 Light Emissions, Appendix E9. Blackfish, eels and perch species are not identified as being potentially affected by light emissions (Appendix E9, Annex 3). Fauna Interactions, Appendix D2. Blackfish, eels and perch species are not identified as being potentially affected by fauna interactions (Appendix D2). Accidental Release of Fuel, Appendix D4 *(cited in section 9.3.3)* Blackfish are an inland river fish (VFA 2024b) and therefore outside of the Operational

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
				and Planning Areas.
Invertebrates - General	Coastal shellfish harvested from the sea, intertidal reefs and beaches are important resources, particularly as food sources to the Gunditjmara People. They hold strong cultural value as evidenced by cultural heritage sites and current practices. Shellfish species central to ongoing connection include torbos, pipis, abalone, limpets, mussel, elephant snail, crayfish/lobster, and crabs. Several invertebrate species are identified as important resources, particularly as food sources to the Wadawurrung People. Species include barnabeel (oyster), murrabal (mussel), bam (crayfish), abalone and pipis. Invertebrate species are an important traditional, social and economic resource for the Eastern Maar People. Abalone, cockles and crayfish are collected as tucker along the coast.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Eastern Maar Aboriginal Corporation, 2015.	**Planned:** Underwater sound. Light emissions. Diving, Surfing and Swimming **Unplanned:** Accidental release of fuel. Invasive Marine Species.	Underwater Sound (Invertebrates), Appendix E4 Light Emissions, Appendix E9 Invasive Marine Species, Appendix D3 Diving, Surfing and Swimming, Appendix E8 Accidental Release of Fuel, Appendix D4, *(cited in section 9.3.2)*
Birds - General	Short-tailed shearwaters (mutton bird) are culturally significant to the Gunditjmara People and their harvesting practice. During consultation, seabirds including shearwaters, gannets and Little Penguins are identified by the Eastern Maar people as culturally significant species.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Event ID EVT272	**Planned:** Light emissions. Underwater sound. **Unplanned:** Release of waste overboard. Accidental release of fuel.	Light Emissions, Appendix E9 Underwater Sound (Birds), Appendix E5, Release of materials or waste overboard, Appendix D1 Accidental Release of Fuel, Appendix D4 *(cited in section 9.3.4)*

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Kelp	Kelp forests, home to giant and bull kelps, serve as habitats and food sources for numerous marine animals. They are also habitat for food resources, such as rock lobster and abalone, and can be used to create water carriers.	Wadawurrung Traditional Owners Aboriginal Corporation, 2020.	**Planned:** Underwater sound **Unplanned:** Release of waste overboard. Accidental release of fuel. Invasive Marine Species.	Underwater Sound (Plankton), Appendix E2 Accidental Release of Fuel, Appendix D4 *(cited in section 9.4.1)* Release of materials or waste overboard, Appendix D1 Invasive Marine Species, Appendix D3
Other coastal Resources	Flint stone holds cultural value as a resource used to craft tools. Ancient shell middens, evidence of Aboriginal occupation, are important to cultural learning and connection to Country.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Eastern Maar Aboriginal Corporation, 2015.	**Planned:** Physical Presence **Unplanned:** Release of waste overboard. Accidental release of fuel.	Accidental Release of Fuel, Appendix D4 *(cited in section 9.4.2)* Release of materials or waste overboard, Appendix D1 Physical Presence, Appendix E1
Intangible				

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Totemic Value and Kinship	Individuals may have kinship to specific species and/or a responsibility to care for particular species. Kinship arises from totemic associations within First Nations "skin group" systems. It is forbidden for an individual to kill or eat a species who is from the same "skin group". They may also have certain obligations linked to caring for Country. For Aboriginal Peoples, plants and animals are totems and central to their cultural responsibility, providing food, health, shelter, and spiritual wellbeing. Their relationship with these species is fundamental to cultural practices and expression. Caring for plants, animals, and their habitats is a keyway of expressing culture. Indigenous ecological knowledge, passed down for tens of thousands of years, is unique to each Aboriginal clan and language group in Victoria. (AHC) In addition to this uniquity, knowledge may also be kept within Traditional Owner groups. However, the tangibles section of this table lists, describes, and references the cause-and-effect pathways, of the species identified as having cultural values.	Smyth, 2008; Juluwarlu, 2004; Muller, 2008. Aboriginal Heritage Council Victoria, 2025	*Refer to identified tangible species above*	*Refer to identified tangible species above*

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Sea Country Knowledge	Knowledge of and familiarity with the features of Sea Country is itself a "value". The inherent potential for restricted or secret knowledge (or information that is not wished to be shared) makes this difficult to assess even through consultation with Traditional Custodians. However, aspects such as limitations on access to sites or disruption/relocation of First Nations communities may have implications for the preservation of First Nations knowledge. Transfer of knowledge includes continuing traditional practices to pass on practical skills. This transfer of knowledge may be integral to managing a group's intangible cultural heritage.	UNESCO, 2003	Indigenous tangible and intangible values are interconnected (see section 3.16.2), relying on the health of Country, for cultural values to be maintained and passed down to future generations. Therefore, holistic assessment through the principles of ESD is appropriate.	Acceptable Levels Assessment, Intergenerational Equity Principle, Appendix F4
Songlines	Cultural knowledge, as expressed through songlines, dreaming, dance and other cultural practices, can be associated with tangible objects and physical sites that are culturally important to First Nations people. The land's physical features are instrumental in maintaining songlines because this is how ancestral spirits journeyed through, and interacted with, the physical landscape leaving shared knowledge behind.	Ardler, 2021; Bursill et al., 2007. Event ID 842 Feedback ID 4216 Appendix C3, Desktop Research: Org ID 316 & Person ID 1163	Indigenous tangible and intangible values are interconnected, relying on the health of Country, for cultural values to be maintained and passed down to future generations. Therefore, holistic assessment through the principles of ESD is appropriate. (See also the identified tangible culturally significant	Acceptable Levels Assessment, Intergenerational Equity Principle, Appendix F4 (See also the identified tangible culturally significant species in this table above)

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	The effects from the proposed activity lie at the interconnection between the physical and spiritual and this is where songlines become intrinsically tied to significant places across Country. As a result, geographical landforms are recorded within songlines and become sacred places. Such landforms can include inter alia: rocks, mountains, rivers, caves, and hills.	Higgins, 2021	species in this table above)	
	Physical sites that have been identified as comprising a component of a songline are important to protect to prevent the fragmenting or breaking apart of songlines and loss of sacred cultural knowledge. The region is located within the ancient landscape where prominent landscape features (e.g., rocks, mountains, rivers, caves and hills) would have been visible or used by Traditional Custodians and therefore likely to be incorporated in songlines. In Australia, songlines can stretch thousands of kilometres, making up a complex and organic network of stories containing cultural knowledge of First Nations communities across the land.	Neale and Kelly, 2020		

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	Songlines can also extend out to Sea Country and contain cultural knowledge that is tied to geographic features, atmospheric phenomena and marine plants and animals. Often songlines containing references to a seascape or Sea Country make mention of mythical events occurring around marine life, fishing areas, submerged rocks or coral. Songlines that embody seascapes can reflect how a group may relate to, or value, Sea Country—for example connections to nearby islands that they once inhabited in their songlines.	Smyth and Isherwood, 2016		
	Songlines can become lost, fragmented, or broken when there is a loss of Country or impact to culturally important physical features.	Neale and Kelly 2020:30		
Connection out to the continental shelf	The connection with Sea Country extends well beyond the current shoreline to the edge of the continental shelf with Songlines across the land and out to sea (Eastern Maar Aboriginal Corporation, 2015).	Eastern Maar Aboriginal Corporation, 2015.	Indigenous tangible and intangible values are interconnected, relying on the health of Country, for cultural values to be maintained and passed down to future generations. Therefore, holistic assessment through the principles of ESD is appropriate.	Acceptable Levels Assessment, Intergenerational Equity Principle, Appendix F4

Connection to Country	This describes the multi-faceted relationship between First Nations people and the landscape, which is envisioned as having personhood and spirit. It is also an aspect of personal identity for many First Nations people. In the case of Sea Country this can mean identifying as a Saltwater person, where "essence of being a 'Saltwater' person is ontological… it is about how people relate spiritually to the sea and engage with spiritual forces that created it, the marine flora and fauna and people" The proposed activity is situated in important Sea Country for the Gunditjmara people, who have enduring spiritual and cultural connections to the area and marine life that lives within it [This sentence has been updated follow public comment FN01] Nyamat Mirring is an intrinsic part of their (*Gunditjmara*) culture, law, Lore, and custom (Event ID 352) In the video 'Bunurong Land Council @ Point Nepean in HD', representatives from the Bunurong Land Council talk about their connection to Country and ancestors. Gunditjmara have a strong connection, and responsibility, to Nyamat Mirring. Wadawurrung describe the interwoven relationship they have with Dja (Country), and the connection to their past, cultural practices and stories. Country represents a deep, intrinsic connection to the land, a source of identity, nurturing individuals and communities through	McDonald and Phillips, 2021 Bunurong Land Council, 2016 Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Eastern Maar Aboriginal Corporation, 2015. Event ID 352	Indigenous tangible and intangible values are interconnected, relying on the health of Country, for cultural values to be maintained and passed down to future generations. Therefore, holistic assessment through the principles of ESD is appropriate.	Acceptable Levels Assessment, Intergenerational Equity Principle, Appendix F4,

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	shared knowledge, stories, values, and traditions passed down through generations. For those who live away, the bond remains strong, with frequent returns to reconnect with both the land and the community, reinforcing their role in caring for and preserving Country.			

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	Seasonal knowledge. The Eastern Maar seasonal calendar follows six distinct seasons, Larneuk, Gwangal moronn, Petyan, Kooyang, Chinnup, and Ballambar, each marked by ecological signs that indicate changes in weather, animal behaviour, and the availability of important food resources, guide the Eastern Maar in caring for Country, aligning their activities with natural cycles rather than fixed Western seasons. The Gunditjmara follow a six-season calendar that guides their understanding of Country and informs when different natural cycles occur. The seasons are known (in English) as: Big Dry, Early Wet, Big Wet, Flowering Time, Fattening Up, and Drying Out. Changes in rainfall, water levels, wetlands, plants flowering, insect and animal behaviour guide Gunditjmara land-management, harvesting, and cultural activities. This calendar, rooted in careful observation of environmental rhythms rather than fixed dates, helps the Gunditjmara maintain a living, responsive relationship with their Country, ensuring that practices align with ecological and cultural cycles.l	Eastern Maar Aboriginal Corporation, 2015. Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Event ID EVT352	Traditional Owner seasonal calendars differ from the Western four-season model by using ecological cues, such as plant flowering, eel movement, whale migration, or bird nesting, to define the transitions between seasons. These seasons are specific to Country and reflect local ecological rhythms, whereas Western calendar seasons are fixed by date and do not adjust to environmental variability.	Annex 1 – 'Presence/Absence Analysis for Species within the Environment Planning Area' of the EP incorporates species "biological calendars," the distribution of their habitats, and the identification of environmentally sensitive areas, including breeding grounds, migration pathways, and resting areas.
	Access to Country is highly valued and a key aspect of cultural maintenance.	Woods (2020)	**Planned:** Physical Presence	Physical Presence, Appendix E1, *(cited in section 8.2.5)*

3.16.2 Magnitude of Effects

McConnell, et al, describes Indigenous tangible and intangible values as symbiotic and inseparable, explaining that Songlines depend upon the continued health of Country, including access and connection (McConnell, 2021). The tangible value must persist for the intangible value to continue to be maintained and passed down through future generations of Indigenous peoples. UNESCO (2003) and ICOMOS (2013) recognise that tangible and intangible cultural heritage are inseparable and mutually reinforcing: physical places, species and landscapes embody cultural memory and identity, while intangible traditions, meanings and practices give those tangible elements their significance and rely on them as the setting for their practice and transmission.

CGG's proposed management approach reflects this relationship. In CGG's impact and risk framework, cultural values and sensitivities are therefore treated as an integrated receptor. Impacts on the biophysical environment, such as changes to species behaviour, water quality or access to Sea Country, may also generate non-physical cultural impacts by affecting the meanings, practices, associations and obligations associated with those places and species. Accordingly, the impact pathways, risk evaluation and control measures consider both the potential effects on tangible cultural features and the intangible values that rely on their presence, condition and continuity. The Sea Country Protection Plan has been put in place to provide an ongoing opportunity for identification and management of any new cultural information that may emerge.

In addition, as Appendix F4 – Acceptable Levels Assessment, Section 5.10, demonstrates, the Regia MSS EP aligns with the principles of ESD. From the precautionary approach to intergenerational equity and the conservation of biological diversity, the EP process consistently reflects a commitment to safeguarding the marine environment, reducing environmental impacts and risks, and preserving the interests of future generations.

Throughout the environmental impact and risk assessment chapters, CGG established Environmental Performance Outcomes (EPOs). These EPOs act as key performance indicators to guide the activity's environmental goals. All EPO's are therefore relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas. In addition, a specific social, cultural and economic features EPO has been put in place, reinforcing the protection and sustainability of these values.

3.16.3 Recovery Potential

There will be no interference with the knowledge of Sea Country or the practices and rituals that allow the knowledge to be shared and preserved, including access to Country. Songlines management of intangible cultural heritage can include reducing impacts and risks to environmental features that are associated with intangible cultural heritage (UNESCO 2003; ICOMOS 2013). Therefore, measures that promote the preservation of stories and songlines in the area would be suitable for managing these features. Regarding the intangible values of connection to Sea Country and the related knowledge, due to the absence of direct effects and immeasurable indirect effects, this is no recovery potential to assess.

3.16.4 Conservation Status

Conservation status of the identified tangible cultural features is described on a receptor level, within this document and the relevant impact and risk appendices (Appendix E1, E2, E3, E4, E5, E7, E9, D1, D2, D3, D4)

3.16.5 Mitigation Effectiveness

Mitigation measures are in place to protect marine fauna from the effects of elevated levels of underwater sound, minimise impacts from physical presence and artificial light, and decrease the likelihood of unplanned events. All apply to the protection of intangible cultural features and can be found in Appendix E1-E5, E7, E9. These measures are effective to ensure impacts are temporary and localised such that impacts on intangible cultural heritage values and sensitivities are not predicted.

CGG has adopted a Sea Country Protection Plan (SCPP). The SCPP is a mechanism that facilitates the identification and management of new information, relevant to the activity, through collaboration with First Nations people who decide to be part of the program.

4 Temporal Alignment of Key Environmental Values/Sensitivities

With many competing environmental values to be considered within the EP, a key approach to mitigation is to ascertain whether there are appropriate temporal windows within which disturbances could be minimised and/or avoided. To determine such windows, we ranked all identified key environmental values/sensitivities according to a 3-point scale for every month of the year.

For each individual group, taxa or sensitivity we ranked the importance of each month according to whether they were concentrated or aggregated relative to other months of the year. This was intended to capture spawning/reproductive behaviour and/or feeding behaviour that produces densities above yearly averages, including upwelling periods.

We used a 3-point ranking system;

1 - widely dispersed not displaying aggregating behaviour

2 – months surrounding peak aggregating i.e. shoulder periods

3 – months when aggregating behaviour is highest, such as spawning or upwelling

The resulting matrix was analysed to determine if there were natural patterns in the data reflecting monthly periods of high or low activity. A similarity index was calculated using the Gower coefficient for ordinal data such as ours (see Podani 1999). Clustering and non-metric multidimensional scaling (Clarke et al 2014) was then applied to the similarity matrix to produce a dendrogram and ordination. A heat map was also produced to further illustrate and clarify what groups are driving the observed temporal patterns in the data.

4.1 Results

The clustering analysis identified four distinct time periods across the year (Figure F3-25). The most heavily utilised time period was peak summer between January - March with April still significant enough to be grouped with the summer period but clearly becoming less important to a range of groups, reflecting the tail-end of the summer spawning period. November and December months while considered part of the austral summer period are more closely aligned to the larger grouping of May to October which encompasses non-summer spawners of which there are far less. These two months are shoulder months reflecting the start of the summer breeding season when environmental triggers for species to engage in aggregation behaviour have not reached peak levels.

The shade plot and ordination (Figure F3-26) together provide the detail about what species or sensitivities are linked to particular periods of the year. Twelve of the identified 15 key taxa/sensitivities are most closely aligned to the summer period between December and April. Only three are more closely aligned to the winter months. While numbers alone are not the deciding factor it is notable that in making decisions about timing of the Regia MSS there are far less of the identified groups reliant on the winter-spring-early summer period for their key reproductive and/or feeding behaviours.

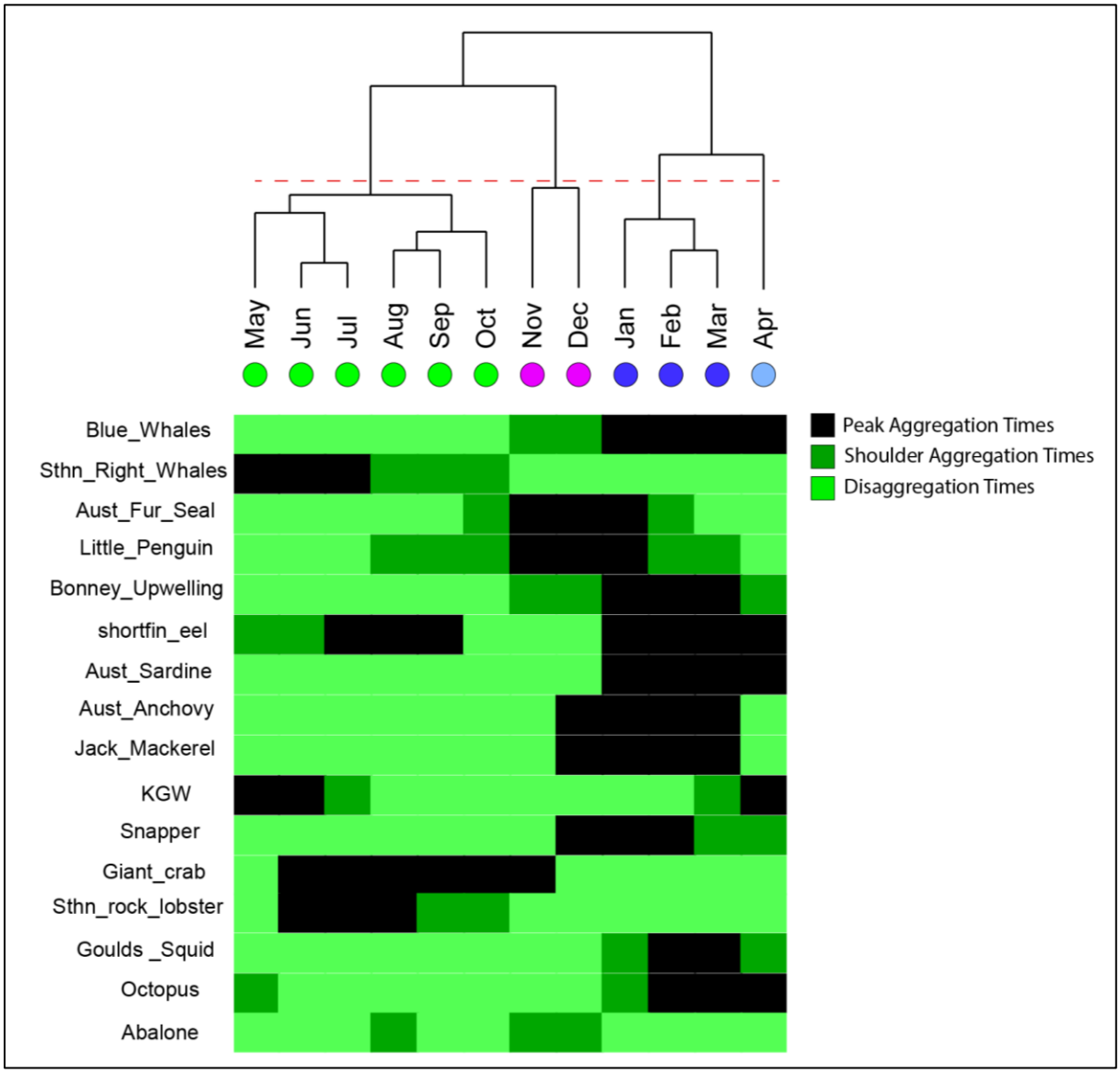


Figure F3-25 - Dendrogram from the cluster analysis indicating the grouping of months across the year according to their importance to the key sensitivities. The associated shade plot (~heat map) provides a clear visual picture of which species are influencing the groupings with the black boxes hjghlighting the most important times for each group.

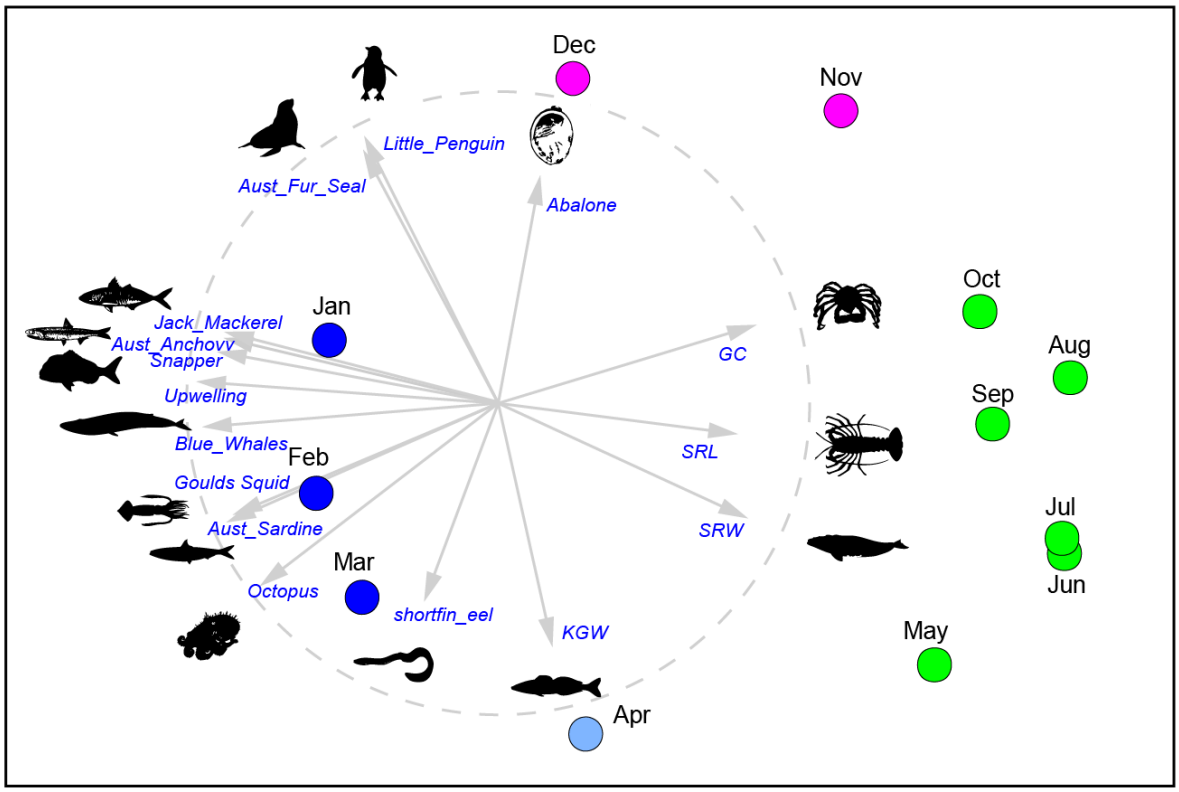


Figure F3-26 - A non-metric multidimensional scaling ordination illustrating the relationships between key values/sensitivities and months of the year. Months are coloured according to their groupings in the cluster analysis. Vectors representing the correlation with months of the year for each taxa/sensitivity are overlaid with arrows indicating the direction of strongest correlation. For example, the most important months of the year for Giant Crab (GC), Southern Rock Lobster (SRL) and Southern Right Whales (SRW) are the winter months ranging from May-October.

5 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

6 Environmental Assessment Modifications Required

Following completion of the further assessments in this document, in line with the iterative nature of the process followed to prepare this EP, CGG has considered whether modifications are required to the originating environmental assessments (Appendices D1-D4 and E1 – E9). This feedback loop ensures that the environment assessments remain contemporary, accurate, and reflects feedback from the regulator and relevant persons.

Further Assessment Topic	Outcome of Further Assessments
Southern Right Whales / Koontapool (*Eubalaena australis*)	Further assessment identified the uncertainty of applying simplistic thresholds to managing behavioural disturbance, particularly to critical life stage activities. Further analysis of the sound propagation modelling led to the design of activity limitations that effectively eliminate the overlap of any sound exposures thought to have any significant behavioural effects to SRW.
Blue Whales / Wuulok (*Balaenoptera musculus*)	
Australian Sea Lion (*Neophoca cinerea*)	CGG has assessed the impacts of the Regia MSS to these receptors in detail throughout this EP and is satisfied through the implementation of mitigation measures and activity limitations, impacts have been reduced to below acceptable levels. As a result, no further assessment or mitigation is recommended.
Southern Rock Lobster (*Jasus edwardsii*)	
Giant Crab (*Pseudocarcinus gigas*)	
Glass Eels / Kooyong (*Aquilla australis*)	
Gould's Squid (*Nototodarus gouldi*)	
Pale Octopus (*Octopus pallidus*)	
Blacklip Abalone (*Haliotus rubra*)	
Pink Snapper (*Chrysophrys auratus*)	
King George Whiting (*Sillaginodes punctatus*)	
Plankton Communities and the Bonney Upwelling System	
Spawning Patterns	
Budj Bim Cultural Landscape	
Cultural Features of the Environment	CGG has assessed the impacts of the Regia MSS to this receptor in detail throughout the EP and has concluded the defined acceptable levels and EPOs for this receptor were not sufficiently detailed. As such, CGG has re-assessed and added more defined acceptable levels and EPO's relating to this receptor in the impact and risk appendices (D1-D4 and E1-E9).
Little Penguin (Eudyptula minor)	CGG has assessed the impacts of the Regia MSS to this receptor in detail throughout the EP and has concluded the defined acceptable levels and EPOs for this receptor are not sufficiently detailed. As such, CGG has set additional defined acceptable levels and EPO's for each life cycle stage for little penguins in EP Appendices E5 and

	update the environmental performance commitments in Appendix G1.

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8 Revision History

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	2 October 2023	MS	Table of contents established and commenced evaluation.
0.1	6 December 2023	MS/AH/SJ/CT	Concluded demonstration of whether environmental impacts and risks from the Regia MSS were of an acceptable level.
0.2	20 December 2023	MS	Review and update following comments.
1	5 January 2023	MS	Formatting complete and published for public comment.
2	15 May 2024	MS	Review and update following public comment
3	4 November 2024	AH/RH/CT/MS	Added further assessments of Budj Bim, cultural features, and little penguins. Updated following feedback from NOPSEMA.
4	16 April 2025	MS	Updated following NOPSEMA OMR 1 Letter
5	6 December 2025	MS/EOR	Updated following NOPSEMA OMR 2 Letter

Annex 1

Public Comment

Table F3-8 shows how the Matters raised during public comment have been incorporated into the EP in this document.

Table F3-8 - Public comment input into the preparation of the EP.

Matter	Matter ID	Changes made arising from public comment
Matter: Flawed argument regarding animals moving away	I04	CGG has considered these claims and has updated the EP Impact Assessments (Appendices E, and F where relevant) to clarify that, while some displacement is expected from mobile taxa during the Regia MSS, the survey will not preclude animals from the Operational Area in its entirety. Instead, animals are expected to temporarily move away from the active acoustic source, but once the source passes, animals will be free to move back into the habitat that they departed from.
Matter: Impacts to whales' food source	M10	CGG has undertaken further investigation and provided an additional detailed responses related to these this matter in EP Appendix F3, Section 5.2.10.1.
Matter: Limitations of MFOs/MMOs when detecting marine mammals	M43	CGG has considered these claims and has updated EP Appendix G2 (Fauna Management Plan) and Appendix F3 (Acceptability Assessment) and EP Appendix G1 (Environmental Outcomes) to include an additional MFO/ PAM operator to ensure fatigue management is appropriately addressed with allowance for 24/7 coverage.
Matter: MFOs/MMO's do not have a 360-degree view, the use of one MFO/MMO is inadequate.	M45	CGG has considered these claims and has determined that additional MFO coverage is appropriate to further mitigate the potential for whales to go undetected within the 3 km observation zone. Consequently, CGG has updated EP Appendix G2 (Fauna Management Plan), EP Appendix F3 (Acceptability Assessment) and EP Appendix G1 (Environmental Performance) to include an additional MFO/ PAM operator will be present on the vessel to support fatigue management. In addition to the two MFOs on the seismic vessel, two dedicated, trained and experienced MFOs will be always onboard a dedicated spotter vessel. In addition, officers of the watch on the attending support vessels will be trained to identify whales during daylight hours to support the visual detection of marine mammals.
Matter: The use of two PAM operators is inadequate.	M49	CGG has considered these claims and has updated EP Appendix G2 (Fauna Management Plan) and Appendix F3 (Acceptability Assessment) and EP Appendix G1 (Environmental Outcomes) to include an additional MFO/ PAM operator to ensure fatigue management is appropriately addressed with allowance for 24/7 coverage.
Matter: No modelling of impacts to zooplankton	P04	CGG has considered these claims and is satisfied that all available and relevant modelling studies on seismic effects have been included in the knowledge base used to develop the EP, and the EP has been updated to include reference to recent publications.
Matter: Extent of impacts to zooplankton	P06	CGG has considered these claims and is satisfied that the extent of seismic effects on zooplankton have been appropriately assessed, and the EP has been updated to include reference to recent publications.
Matter: Impacts of underwater sound on octopus	F11	CGG has considered these claims and to ensure that the most up-to-date assessment has been made has provided an extra Acceptability Assessment within Appendix F3 of the EP, which more clearly defines the levels of risk to Octopus from the proposed Regia MSS.

Matter	Matter ID	Changes made arising from public comment
Matter: Impacts on Fisheries (general)	F12	CGG has considered these claims and has added specific analyses of further species including Abalone, Snapper, and Octopus to the Acceptability Assessment within Appendix F3 to ensure all concerns have been investigated and the level of risk has been clarified according to the available evidence.
Matter: Impacts on spawning aggregation areas for King George Whiting	F14	CGG has considered these claims and has added specific analyses for King George Whiting to the Acceptability Assessment within Appendix F3 to ensure all concerns have been investigated and the level of risk has been clarified according to the available evidence.
Matter: Impacts on abalone fisheries	F16	CGG has considered these claims and is satisfied that through scheduling management of the proposed Regia MSS any potential interaction with abalone stocks can be minimised and has conducted a further assessment on abalone in EP Appendix F3 (Acceptability Assessment), Section 5.2.8, which provides a more detailed species-specific examination of impacts.
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and M#01: Activity limitation, to reflect that the sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the safety criterion human health safety criterion for recreational divers, surfers and swimmers along the coastline. CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F1 F3, G1 and G2).
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has updated EP Appendix F3 (Acceptable Levels Assessment) to include an assessment for the Australian sea lion in response to these claims.

Annex 2

Objections or claims raised through consultation

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4002	Risks to the lives of ancient marine mammals	The titleholder acknowledged the feedback, noting that impacts and risks to marine mammals are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to marine mammals are outlined in the EP in E7 and G1.	5114
4334	This statement opposes seismic blasting in areas designated as Sacred Birthing Grounds for Southern Right Whales, underlining the cultural and environmental significance of these grounds. It also expresses solidarity with the Gunditjmara Traditional Owners, acknowledging the cultural heritage and environmental stewardship of this region by Indigenous communities. The feedback emphasises the perceived risks to both marine life and Indigenous heritage in the area.	The titleholder acknowledged this concern and confirmed that CGG will not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country (Event ID 2101).	2101
4332	This statement calls for a respectful approach, urging stakeholders to engage deeply with Indigenous knowledge and perspectives, including the views of Elders and Traditional Owners. It emphasises empathy and a meaningful understanding of the environmental and cultural impact of activities on marine life.	The titleholder acknowledged this concern and confirmed that CGG will not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country.	2101
4280	The stakeholder expresses strong opposition to the exploration for gas near Deen Maar (Lady Julia Percy Island), emphasising its significance to the local Indigenous community, comparable to the cultural importance of Uluru. They highlight its unique status as Australia's only offshore volcano and assert that such an exploration would be inappropriate in a site of sacred significance, arguing against the project's alignment with respecting Indigenous heritage and environmental integrity.	We are aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how we protect and preserve the values of this site (Event ID 2108).	2108

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4303	The stakeholder stated that they were concerned about both tangible and intangible cultural heritage, as well as submerged underwater archaeology.	Indicated that we will be performing non-invasive work in a site survey and could work with the TO's to help identify culturally significant sites (Event ID 1891).	1891
4271	The stakeholder asserts that seismic blasts will have a direct negative impact on marine life, specifically mentioning that an “exclusion zone” will not effectively prevent the effects of the blasts from travelling through the ocean.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable. The titleholder is aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how to protect and preserve the values of this site.	2108
4216	Stated that they feel a sense of reparability to listen to the Guntijimara people and what they wish for their sea country and ancient song lines.	Titleholder responded to the individual confirming consultaiton was currently being attempted with First Nations Custodians of Country and to engage with them on the activity. Titleholder requested that the individual encourage any potentially relevant people they may know to contact the consutlation team and advised that consultation is an important aspect of the marine seismic survey planning process, community input and feedback will be considered in the planning and execution of the survey.	842
4035	Comment about the impact of human activities on wildlife habitats and calls for a halt to such destruction for profit. It emphasises the negative consequences of competing interests in the area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2109
4036	Comment claims that seismic activity is known to cause significant harm to marine life, arguing that the proposed project will lead to further degradation of the coastal environment and should be abandoned as a result.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2098
4038	Commenter highlights that fish populations have been adversely affected by seismic testing over the past few years, leading to a decline in their numbers. This decline could also impact other marine species and have negative effects on whale populations.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. A fauna management plan is in place to manage whale interactions.	1432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4004	Seismic blasting in our ocean so close to our beautiful home is deeply concerning given the toll will inevitably take on sea life and further unknown impacts.	The titleholder acknowledged the feedback, noting that impacts and risks to sea life are assessed in the Environmental Plan (EP) and can be found in E1 to E9 and F3. Measures to minimise adverse impacts to sea lufe are outlined in the EP in G1.	2757
4006	A call for a moratorium on seismic surveying in biologically important areas during times when whales are present, emphasizing the need to protect vulnerable species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine mammals are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to marine mammals are outlined in the EP in E7 and G1.	612
4008	Acceptable levels are subjective and based mostly on limits set by proponent.	Agreed, noting the subjectivity in the process as a whole. Agreed to include more information on the acceptability argument as a whole and not just aspect-by-aspect. Provided ALARP report (Event ID 4280)	3705
4009	Activities are timed to avoid species' peak migration and foraging behaviors.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in E7 Section 8 and G1.	653

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4010	Activities that may prevent or displace Pygmy Blue Whales or Southern Right Whales' use of BIAs are avoided.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales and ensures The Regia MSS does not prevent SRW and BW utilising their BIAs include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in E7 Section 8 and G1.	653
4012	AMCS critiques the proposed monitoring plan for detecting foraging whales and Southern Right Whales in Biologically Important Areas (BIAs), which relies on two marine fauna observers (MFOs) aboard the survey vessel during daylight hours. They note that this approach may not reliably detect whales that are submerged, in low visibility conditions, or during nighttime operations. Given the potential for seismic surveys to cause temporary and permanent injury to EPBC-listed cetaceans, AMCS requests that CGG provide a comprehensive monitoring plan that ensures reliable detection of whales in all weather conditions and throughout the entire operational schedule, rather than just during daylight or optimal visibility.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in E7 Section 8 and G1.	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4018	Any assessment of potential mortality or injury effects on plankton must consider natural mortality rates. However, relying on natural mortality rates is irrelevant, as seismic survey-induced mortality will compound existing natural mortality, thereby increasing overall mortality rates. The Environmental Impact Assessment (EIA) does not acknowledge that this additional mortality could significantly affect plankton reproduction. The continuous nature of the blasting (every 10-15 seconds for 60 days) will likely hinder zooplankton recovery more than indicated in the EIA, which treats seismic-induced mortality as separate from natural mortality. AMCS requests that CGG explicitly evaluate the cumulative and additive impacts of continuous seismic surveys on plankton communities to provide a more comprehensive assessment of their effects on this critical trophic level and overall ecosystem health.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E2 and F3. Contrary to this feedback our intent within the assessment has been to expressly consider the compounding effect that the sound emissions would have on plankton - as it is stated in the quote provided. We have provided references for our application of recovery rates (Huntley and Lopez 1992, Richardson et al 2017) and respectfully request that AMCS provide your references for the claim that "The continuous nature of the blasting (i.e. every 10-15 seconds for 60 days in a row) will affect the ability of zooplankton communities to recover beyond what is presented in the EIA" so that we can consider them.	3384
4022	Attendees voiced concerns about how seismic activities could impact the sustainability and fish-ability of the immediate and nearby areas.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1529
4023	Behavioural Response Threshold & Seismic Sound Avoidance: If CGG conducts seismic blasting within 82.8 km of any Fairy Penguin colony during the breeding season, the penguins may experience discomfort and hearing interference, leading them to alter their behavior to avoid the seismic source. This distance combines the maximum foraging range for a single day trip and the modelled distance for behavioral response thresholds.	CGG has included the study by Pichegru et al. (2017) on penguins in the EP and has referred to this study multiple times across multiple documents See specific examples below: B8 Seismic Study Report, Section 7, Birds: E5 Underwater Sound- Birds Section 6 F3 Section 4.4.1, 4.4.3 and 4.4.4.	5117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4024	Birds and the little Penguin Colony having to travel further away for food and shelter during seismic testing times, causing stress and fatigue.	The titleholder acknowledged the feedback, noting that impacts and risks to penguins are assessed in the Environmental Plan (EP) and can be found in E5 and F3. F3 focuses on foraging capabilities in the area and the potental oerlap with the Regia MSS. There is an overlap between the foraging range of Little penguins at Deen Maar and the Regia MSS. This overlap is ~5.3 hours spread over 3.5 weeks, therefore, we do not belive little penguins will be displaced from foraging areas.	1784
4025	Bodily harm to Fairy Penguins: Fairy penguins can be harmed and killed by shock waves from underwater blasts.	The Cooper (1982) paper mentioned here is referring to injury/mortality cases with bird species as the result of underwater explosions triggered to fragment limestone. Use of an explosive charge such as dynamite does lead to significant changes in the seabed, sedimentation, and harm to marine life in close vicinity. Underwater detonations are an unconstrained, omnidirectional force of greater intensity and destructive capability than a highly controlled and directed seismic pulse (Koschinski 2011). No comparable effects can be associated with the proposed Regia MSS. CGG therefore does not believe that impacts from explosive blasting and exploratory seismic activity in the marine environment can sufficiently and accurately be compared, and CGG does not believe the threats to Little Penguins highlighted in this section have the potential to occur as a result of the Regia MSS. As a result of this relevant persons claims, CGG carried out an additional assessment on Little Penguins in F3.	5117
4026	Catch rate decreased significantly after the survey was conducted.	The titleholder acknowledged the feedback, noting that this claim was assessed in F3 where historical data was analysed for any correlation between historical seismic survey and a reduction in catch rates. No such correlation was found as shown in the analysis in F3.	5190

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4027, 4385	Central Place Foraging Limitations: All five Western Victorian Fairy Penguin colonies are likely to be directly impacted during the breeding season when adult penguins have limited foraging ranges. The Middle Island population is expected to be the most affected, as it is centrally located within CGG's Active Source Area for seismic blasting. Due to the coastline's geography, this population has the least ocean area available for foraging, with a significant portion of their range falling within the Active Source Area. Consequently, regardless of their foraging direction, the penguins will struggle to avoid the impacts of CGG's seismic activity.	When describing home ranges for feeding it is important to distinguish between maximum distances, total distance travelled and mean/median distances. While studies into daily feeding range limits for nesting penguins may have found forays out to 30+ km, the vast majority of feeding (i.e. mean distance travelled) is occurring with 15-20 km of their nesting sites. Longer distance forays are the exception not the norm and this has been confirmed across multiple studies from multiple locations (e.g. Berlincourt & Arnould 2014, Pelletier et al 2014, Philips et al 2019, Philips et al 2022). Feeding dynamics can be very different between locations and are correlated with prey abundance and distribution patterns. As we have demonstrated with references throughout the EP the Otway region is well supplied with sardines and squid, with quality of food resources correlated with nearness to upwelling areas (Norman et al. 2017). The proposed survey lines for the Regia MSS that will be closest to the coast are outside the core feeding areas for feeding penguins during nesting periods. Moreover, each successive line (lines will run parallel to the coast) will be located further and further away from the coast, hence the time spent within proximity to the coast will be small and continuously diminishing. It is anticipated that MS acquisition will occur over a total of 2-3 days in the distance range of 25-40km declining in intensity - relative to the coast - with every pass. The extent of the disturbance will be limited to a few hours each day over a maximum of 3-4 days at a distance NOT encompassing the main feeding ranges of nesting birds. The scale of such an impact is not predicted to impact on the viability of any local fairy penguin colonies.As a result of this relevant persons claims, CGG carried out an additional assessment on Little Penguins in F3.	5117
4033	Claim that seismic testing is proven to damage and kill marine life.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1024
4035	Comment about the impact of human activities on wildlife habitats and calls for a halt to such destruction for profit. It emphasises the negative consequences of competing interests in the area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2109

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4036	Comment claims that seismic activity is known to cause significant harm to marine life, arguing that the proposed project will lead to further degradation of the coastal environment and should be abandoned as a result.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2098
4038	Commenter highlights that fish populations have been adversely affected by seismic testing over the past few years, leading to a decline in their numbers. This decline could also impact other marine species and have negative effects on whale populations.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. A fauna managment plan is in place to manage whale interactions.	1432
4046	Concern about potential impacts to environmental assets and cultural heritage within Bunurong Country.	Titleholder acknowledged this concern and noted that potential impacts to cultural features from physical presence is assessed in E1 of the EP and in F3 Section 4 . CGG will implement a Sea Country Protection Program to ensure impacts to cultural heritage are minimised.	2371
4047	Concern about spawning activity of the Giant Crab, rather than the impact of the fishing overlap given exclusion of surveying at +200m water depths.	Titleholder acknowledged this concern andcarried out an additional impact assessment for Giant crab and spawning species has been included in F3. There is expected to be no measurable effect on giant crab populations as a result of the survey.	4076
4048	Concern about sustained noise impact on cetaceans in the area.	CGG has conducted a thorough impact assessment relating to underwater sound and marine mammals, with mitigation measures and management adopted as a result of both this assessment (which includes relevant marine mammal species) (E7) and a further assessment (which includes two key whale species: Blue Whale and SRW) (F3). A comprehensive fauna management plan was also established as part of this EP development (G2).	1835

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4050	Concern about the destruction of smaller sealife and the wounding of larger marine animals due to seismic blasting.	Regia EP has conducted thorough assessments of the literature for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures are outlined in the EP.	1669
4057	Concern about the long-lasting impacts of the proposed activity on marine life and coastlines, highlighting ecological and cultural repercussions.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation nor interfere with cultural practices or values. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1022
4061	Concern about the welfare of whales, seals, and birds due to the activity.	The titleholder acknowledged concerns outlined in email regarding welfare of whales, seals and birds due to the activity. Outlined approach to assessment that included demonstrating that impacts to these species will be of an acceptable level and advised that it had been determined that is acceptable to have a temporary behavioural change such as moving away from the survey vessel and that injury or long-term impacts were not acceptable.	835
4063	Concern for various birds and little penguins and the effects of sound and light.	Impacts from underwater sound and artificial light on birds, including little penguins, are assessed in the Environmental Plan (EP) and can be found in E5 and E9. Further assessment of little penguins was also undetook by CGG to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level. Measures to minimise adverse impacts on birds in the region are also outlined in the EP.	1783
4065	Concern regarding comparing spaital placement of the previous surveys	This concern has already been considered in the analysis provided to this relevant person and CGG notes that the placement of the previous surveys is not a determining factor in the assessment because of the broad spatial dispersion of fish eggs and larve associated with this fishers concern.	4639

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4066	Concern regarding the potential effects of the proposed activities on zooplankton populations and the subsequent impacts on marine ecosystems.	The only effects to zooplankton come from elevated levels of sound. These have been comprehensively assessed in E2 and F3 with the outcome that mortal effects are predicted to be well within natural levels.	2027
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration by other companies, particularly regarding the sale of seismic data.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	879
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4070	Concerned about the harm to King George Whiting species and disagreement with the provided information of having no impacts on the mentioned species in the region.	The titleholder agreed to undertake further analysis noting the issues raised needed some further evidence. This analysis can be found in F3 Section 4 of the EP	4497
4071	Concerned about titleholder analysis and King George whiting advection pathway and impact of proposed activity on their business. Stated a spatial and temporal comparison is required.	The titleholder agreed to undertake further analysis noting the issues raised needed some further evidence. This analysis can be found in F3 Section 4 of the EP	4967
4074	Concerns about implications for the population of Rock Lobsters in the area going forward.	This claim has been thoroughly assessed in E1 and E5, and F3 for southern rock lobsters. The known effects to individual lobsters are not predicted to have any measurable effect on population levels or dynamics.	2773
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4076	Concerns about potential disturbance to the marine environment, including marine parks and areas of Biological Importance.	The titleholder acknowledged this concern and noted that potential impacts to the marine environment including marine parks and biologically important areas as a result of the Regia MSS is assessed in E1 to E9 and F3 of the EP. There will be will be no activities with Australian Marine Parks. All areas of biologic importance have been identified and assessment in the respective impact and risk assessments.	2278
4077	Concerns about potential harm to zooplankton, whales, dolphins, sharks, seals, the Bonney Upwelling, rock lobster fishery and other local fishing industries.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identiifed with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	722
4079	Concerns about the impact of seismic activities on the Bonny upwelling.	The Bonney Upwelling is subject to further assessment in F3 and the values (plankton) of the Key Ecological Feature have been assessed in E2. There are limitations in place to ensure there is no discharge of the sound source within the Bonney Upwelling KEF and the effects to zooplankton are well within natural mortality levels.	2997
4083	Concerns about why more seismic needed and what time of the year was the survey going to be done to minimise impacts to fishing for sharks, lobsters, squid	Titleholder acknowledged this concern and each of the species within this claim has been subject to extensive assessment in E1, E3, E4 and F3 with various measure adopted to limit the sound exposure to the lowest level possible to meet geophyiscal objectives and to protect marine fauna (see G1).	740
4084	Concerns for reduced landed catch during the survey due to displacement. Have historical data going back many years to show if changes.	The titleholder has acknowledged this concern and note that displacement is assesed in the EP E1 and F3 as a potential impact of the physical presence of the activity. Control measures to reduce impacts to commercial fishers as a result of displacement are outline in EP. The Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area. While onshore fish processing is not covered by NERA protocol a claim will be considered based on appropriate historical evidence.	4108
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4086	Concerns raised by specific fishers about King George Whiting.	The titleholder acknowledges this concern and carried out an additional impact assessment for King George Whiting and spawning species that has been included in F3. There is expected to be no measurable effect on KGW populations as a result of the survey.	4627
4088	Condemns seismic testing, asserting that it is deadly to marine life and unacceptable for ocean ecosystems. Call for a total ban, citing the large number of marine animals harmed by the practice. Argument that the destruction of marine ecosystems and the fishing industry is unjustifiable and express frustration, telling the parties responsible to stop.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	422
4092	Do not disrupt their whale songlines.	The cultural features of the environemnt have been assessed in E1 and further in F3. The effects to physical receptors are temporary and localised and there is no interference with the practices or rituals required to maintain a spiritual connection to Country. Songlines have been explicitly considered in these assessments.	2254
4093	Doubted the effectiveness of mitigation measures, and believed the reports/information provided were absent of action /intention.	The mitigations applied by CGG are industry standard and comply with government policy. They have been proven to be as effective as reasonably practical for a number of years. The measures adopted to protect species from the aspects of the activity are found in the respective impact and risk assessments.	2830

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4096	Environmental Risk: Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artifical light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity.The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures are outlined in the EP.	2766
4102	Expresses opposition due to proximity to local fishing industries. Emphasises concern about potential risks this testing poses.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Adjustment protocol in place for fishers to seek compensation if impacted by MSS.	428
4106	Feedback raises concern for the welfare of whales that come to calve in local waters, emphasising the need to consider the impact of proposed activities on these vulnerable marine animals.	We will not survey while SRW mothers and calves are in the area. Oil and gas has successfully co-existed with wildlife in this area for 25 years and we are doing everything we can do protect the wildlife and natural beauty of the area (Event ID 1781).	1781
4112	Highlights concern for the disregard of wildlife and humans in environmental decisions, emphasising that extinction is irreversible.	The impact and risk assessments undertaken by CGG have not identified any effects that will led to extinction of any species. A search for unacceptable impacts was undertaken in F4 and found no pathway this these types of significant effects.	1781
4116	Ignoring reputable scientific studies showing harm from seismic testing	CGG refuted this claim and provided the relevant person with 44 peer review studies directly relevant to their concerns as well as a thorough assessment of the effect on spawning and recruitment to their fishery.	4551

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4118	Impact on marine animals, which are the livelihood of the community.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures have been outlined in the EP.	2274
4120	Indigenous Heritage: Advocacy for the protection of the sacred Sea Country of the Otway Basin and objections to the proposal's potential destruction of indigenous cultural heritage.	The cultural features of the environemnt have been assessed in E1 and further in F3. The effects to physical receptors are temporary and localised and there is no interference with the practices or rituals required to maintain a spiritual connection to Country.	2383
4121	Indigenous Heritage: Objection to the proposal due to the potential destruction of a sacred indigenous location in the Otway Basin.	There is no physical interaction with the seabed or coastlines which would lead to destruction of any location. The cultural features of the environemnt have been assessed in E1 and further in F3. The effects to physical receptors are temporary and localised and there is no interference with the practices or rituals required to maintain a spiritual connection to Country.	2766

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4122	Indirect Impact: Changes To Prey Availability: CGG cannot assure that the proposed seismic blasting will not reduce the prey available in the breeding season foraging areas of the Fairy Penguins. Therefore, seismic blasting should be prohibited in these critical areas due to the negative impact it would have on the prey species that the penguins rely on for survival and feeding their young.	We refer you to E - Impact Assessments - E2 – Underwater Sound – Plankton, and F – Decision Making – F3 – Acceptability Assessment - Sections 4.2.7 – Goulds Squid, 4.2.12 – Plankton Communities and Bonney Upwelling, and section 4.2.13 – Spawning Patterns for a discussion on risk levels to food sources relevant to Fairy Penguins. Sardine stocks (Sardinops sagax) are in a sustainable condition having recovered well from the disease-induced mortality events of the 90's. Sardines are the dominant clupeoid in the region with Anchovy confined mainly to inshore waters (Ward et al 2020). Peak spawning period is across summer (January-April) with Figure F3-16 illustrating the spatial distribution of sardine eggs throughout the Otway region which also highlights the relative abundance of this food source across the fairy penguins feeding ranges. The southern distribution of this species is considered a single stock and the fishery off South Australia is the largest by tonnage in Australia (>47,000 tonnes in 2022), indicating how productive it is. Behaviorally, pelagic schooling species such as sardine are highly mobile in space and time which makes them highly resistant to localized and/or transient disturbances. It is also the case that Australia's less-productive pelagic ecosystems means predators are less dependent on only one prey species and can feed opportunistically across a wider variety of species. This has been seen with dietary examinations of Fairy Penguins who can switch between sardines, anchovies and squid as encountered. Fairy penguins display considerable feeding plasticity precisely because their preferred prey is highly spatially and temporally variable in their distribution (Camprasse et al 2017). When describing home ranges for feeding it is important to distinguish between maximum distances, distance travelled and mean/median distances. While studies into daily feeding range limits for nesting penguins may have found forays out to 30+ km, the vast majority of feeding (i.e. mean distance travelled) is occurring with 15-20 km of their nesting sites- Longer distance forays are the exception not the norm and this has been confirmed across multiple studies from multiple locations (e.g. Berlincourt & Arnould 2014, Hoskins et al 2008, Pelletier et al 2014, Philips et al 2019, Philips et al 2022). Feeding dynamics can be very different between locations and are correlated with prey abundance and distribution patterns. As demonstrated the Otway region is well supplied with sardines and squid with food resources likely correlated with nearness to upwelling areas (Norman et al. 2017).	5117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4127	Lack of Acknowledgement of the Fairy Penguin Breeding Colonies in Western Victoria in CGG's Environment Plan, as well as No Acknowledgement of their Biologically Important Foraging Areas.	We believe there is some confusion here on what Biologically Important Areas are. Biologically Important Areas are regions where aggregations of individuals of a particular species are known or likely to display important behaviours such as breeding, foraging, nesting or migration. They have been identified from the literature and using expert scientific knowledge about species' distribution, abundance and behavior (Australian Marine Parks, 2024). Biologically Important Areas were established to guide decision-making under the Environmental Protection and Biodiversity Conservation Act of 1999. These areas have been designated for a specific group of protected species, selected based on their conservation status and the availability of dependable spatial and scientific data. There are two sources we would use to identify Biologically Important Areas, the Protected Matters Search Tool and the National Conservation Values Atlas website. The closest Fairy Penguin BIA is around Christmas Island (off the northeast coast of King Island), and it is a designated foraging BIA. Nonetheless, just because the colonies are not BIA's doesn't mean they don't deserve consideration in our Environmental Plan. Little Penguins are discussed in detail in E56 Section 4.5, here we have acknowledged the breeding colonies on both Middle Island and Lady Julia Percy Island. See excerpt from E5 below: "The Little Penguin was identified as breeding known to occur within the area potentially affected by underwater sound (Annex 2). Within this area, breeding occurs on Lady Julia Percy Island and Middle Island." CGG will amend the Environmental Plan to include references to fairy penguins located at London Bridge, Gibson Steps and Lawrence Rocks.	5117
4128	Lack of adequate monitoring of species present or likely to be impacted.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions regarding species that may be affected by the Regia MSS. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	3237
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4133	Mass destruction of marine populations through the blasting process.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures have been outlined in the EP.	2274
4135	Mention of being heavily impacted by the whales in the tourism industry.	Title holder has undertaken a thorough analysis and assessment of all relevant literature related to Marine Mammals to inform its decisions. The MSS will not impact the population stability of marine mammals within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1244
4136	Mention of considerable damage to marine life outweighing the benefits of mapping seafloors for gas drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1389
4137	Mention of installing sound curtains underwater to reduce destructive sound.	Bubble curtains are not suitable for a moving activity, nor are other measures such as acoustic blankets. This has been included in the ALARP assessment.	2830

4138	Mitigation Deficiencies: CGG lacks a reliable method to consistently detect the presence of Fairy Penguins. To minimize impact, seismic blasting should occur during their breeding season when their foraging range is limited to shorter daily trips, and it should be conducted at least 82.8 km away from each colony, assuming the JASCO sound modeling is accurate for the species.	CGG has undertaken an extensive assessment of all the available scientific literature and other relevant information sourced from reports and websites. Our process is 'live', meaning we are continually checking and updating our plans if new information comes to light which is relevant to assessments. For example, we have been able to add a recent paper, Wei and Erbe (2024) Sound reception and hearing capabilities in the Little Penguin (Eudyptula minor): first predicted in-air and underwater audiograms. Royal Society Open Science 11(8): 240593 which has calculated sound threshold levels of Little Penguins and provides a more robust estimate than has previously been used. It was reassuring to then see that our modelled sound thresholds were appropriate, based on this newly published estimate. The principal aims of the environmental assessment are to ensure there is no impact to population stability and to reduce any potential impacts to "As Low as Reasonably Practicable". The assessment has concluded that there is not a significant risk to the stability and resilience of the Little Penguin population in the region. This outcome is derived from the cumulative effects of mitigation that the Regia MSS has committed to and which includes • Timing of the survey – avoiding the prime egg-laying and chick raising period • Location of survey outside core feeding areas – the majority of feeding is undertaken within 20km of nests as borne out from multiple studies cited in our EP. The seismic is occurring outside this zone with the exception of a very small section adjacent to Deen Maar which is within 17.5 km of the island. However, sum exposure for this area is 5 hours over 3 weeks which is immeasurably low exposure. • Minimal time in proximity to core feeding zones – the seismic acquisition is a continually moving process and will not ever be at full power while stationary. This provides ample opportunity for individual animals to move away from a source even as the source is also moving hence expanding the gap as quickly as possible. • Feeding is equally possible along the coast hence the area available for feeding is substantially larger than implied. • Anchovy stocks are in good health at the moment according to state fishery statistics and these are the core food source for Little Penguins. • If feeding birds are found within 500m of an active seismic line then the source will be switched to low power until outside 500m again. This measure is not expected	5117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		to capture all penguin feeding movements however it does provides a mitigation measure to allow birds feeding to continue doing so with minimal disturbance. The total sum of mitigation measures provides a level of impact that fulfills ALARP and importantly does not provide a pathway to population impacts.	
4140	No mention of ceasing activities when whales are present in the area.	CGG has conducted a thorough impact assessment relating to underwater sound and marine mammals, with mitigation measures and management adopted as a result of both this assessment (which includes relevant marine mammal species) (E7) and a further assessment (which includes two key whale species: Blue Whale and SRW) (F3). A comprehensive fauna management plan was also established as part of this EP development (G2).	1835
4145	Opposes seismic exploration claiming it is dangerous to all marine life. Cannot ensure zero risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	427
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high-decibel blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making them unacceptable in a whale sanctuary area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	537
4148	Opposition to seismic blasting and frontier gas due to community and traditional custodian concerns.	The cultural features of the environemnt have been assessed in E1 and further in F3. The effects to physical receptors are temporary and localised and there is no interference with the practices or rituals required to maintain a spiritual connection to Country.	2632

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4151	Potential cumulative impacts upon species are addressed.	The titleholder responded by informing the stakeholder that the Regia MSS team were currently undertaking the cumulative impact assessment and will ensure that it covers previous and planned seismic surveys within the area and assesses impacts to cetaceans (behaviour, PTS, TTS) and their food source (krill).	653
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4160	Rejects claim that proposed survey will have immeasurably small impact on fishery, states this is not supported by the evidence in the peer reviewed paper provided	Provided further assessments and information on the methodology used. Provided stakeholder with copies of all papers referenced.	4484
4161	Related to the effects of seismic testing on various birds, in particular the Little Penguin colony at Middle and Griffith Islands.	The titleholder provided information regarding the update of the environment plan to reflect the inclusion of various seabirds, including the Little Penguin, at the location of concern, not previously accounted for in the environment plan. The titleholder responded with some summarised information from the paper the stakeholder provided about foraging penguins and its relevence to the Regia MSS (Event ID 2910).	2908
4162	Related to the effects of sesmic testing on various birds, in particular the Little Penguin colony.	The titleholder responded with a provision of a document link to the titleholders preliminary impact and risk assessment relevent to shorebirds, some information regarding light being a likely cause of effect on nesting seabirds, and the titleholder has explained the process by which they conducted the relevent impact assessment in line with government guidelines (Event ID 1792). The titleholder provided information regarding the update of the environment plan to reflect the acknowledgement of various seabirds, including the Little Penguin, not previously accounted for in the environment plan (Event ID 2910).	1783

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4167	Risks are considered too high, impacting cultural and spiritual wellbeing of the populace.	The cultural features of the environemnt have been assessed in E1 and further in F3. The effects to physical receptors are temporary and localised and there is no interference with the practices or rituals required to maintain a spiritual connection to Country.	2118
4170	Scientific evidence indicates that seismic blasting using air guns has chronic impacts on whales. These effects include the exclusion of marine mammals from crucial areas during important times, interference with migration, habitat degradation, disruption of vital behaviors, and increased stress levels. Statement that such findings underscore the unacceptable risks associated with seismic testing in marine environments.	The titleholder acknowledged the feedback, noting that impacts to whales are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales are outlined in the EP in E7 and G1.	2073
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	3343
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2963

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4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1659

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4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1665

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4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments are covered below in response to concern 6.	2886

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4203	Stakeholder outlined impacts to marine animals from seismic testing. It was noted that to communicate with other whales, humpbacks use a complex combination of noises in beautiful melodics and that seismic airguns emit a wide range of frequencies with sounds in the lower frequency ranges which can travel long distances being particularly troublesome sounds with humpback whales known to stop singing when subjected to the sound of a seismic airgun near Scotland. Ending the humpback's haunting song could impact migration, breeding and feeding. (Credit: NOAA's National Ocean Service.) LINK provided.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of dolphins ir whales within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	2886
4205	Stakeholder raised concern regarding amount of spatial placement effect from previous studies causing lag effect or reduction in catch/recruitment and noted titleholder analyses shows this may be hard to detect. Concerned if seismic study done over bulk of larval advection pathway, this could significantly impact fishery.	This concern has already been considered in the analysis provided to this relevant person and CGG notes that the placement of the previous surveys is not a determining factor in the assessment because of the broad spatial dispersion of fish eggs and larve associated with this fishers concern.	4638
4210	Stakeholder stated they were concerned at the impact the activity will have on the nearby whale nursery and marine sanctuary. We need to be protecting our oceans and marine life from further disruption and climate change not attempting to extract more gas through seismic blasting.	The Regia MSS will be undertaken in a manner that does not prevent or displace Pygmy Blue Whales or Southern Right Whales' use of BIAs. This will be done by implementing spatial and/or temporal zones and where these cannot be implemented mitigation controls will be implemented. Controls will be evaluated with expert opinion from acoustic specialists and whale researchers to ensure they are effective.	870
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049

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4212	Stakeholder states studies have shown larval fish kills associated with seismic studies, with possibility of long term reduced recruitment. Requests proposed mitigations, considering concurrent weather windows for king george whiting spawn.	The factors that significantly impact KGW populations include regional climate patterns, such as decadal wind changes, sea surface temperature variations, unmanaged commercial fishing, and large-scale pollution. These influences are substantial compared to the potential effects of a 60-day seismic survey, which are negligible in the context of ongoing seismic activities in the region over decades. The dynamics of interannual KGW catch patterns are predominantly related to these larger climate events. Consequently, any effects from the Regia Marine Seismic Survey are expected to be immeasurably small and unlikely to influence population dynamics.	4355
4218	Strong opposition to seismic testing in the ocean due to its effects on both wildlife and the fishing industry. Individual firmly disapproves of the practice.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	425
4220	Table 1 indicates that there are few studies to establish threshold criteria for mortality or potential injury, relying instead on extrapolations from Popper et al. (2014). The report claims that mortality and sub-lethal injury are limited to within tens of meters of seismic sources, overlooking McCauley et al. (2017), which found a 2-3-fold increase in zooplankton mortality up to 1.2 km from the source. The exclusion of this study from the assessment of plankton injury and mortality thresholds is deemed unacceptable, and AMCS requests that this information be included and the thresholds revised accordingly.	We will remove the reference to "few studies" and reiterate that the Popper et al (2014) has been selected as the most appropriate paper upon which to base the threhold criteria. The McCauley et al (2017) paper has been considered in the chapter as a whole and it is incorrect to claim its omission from the assessment	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4224	The EIA claims that impacts to the Bonney Coast Upwelling KEF and the broader Great Southern Australian Upwelling System, which the Regia MSS overlaps, are not predicted because the effects on zooplankton mortality are within natural mortality rates. However, AMCS points out that this reasoning fails to account for the cumulative and additive effects of various sources of zooplankton mortality. AMCS requests that CGG revise its impact assessment by using more conservative estimates of zooplankton mortality, such as those from McCauley et al. (2017).	We acknowledge that this statement is poorly phrased and we'll update the impact assessment to reflect that "additional mortality or mortal injury effects to zooplankton are additively insignficant compared to natural mortality rates"	3384
4225	The EIA suggests that predicted impacts to zooplankton, including krill, do not remove them from the food web, as their nutrients and energy remain within the ecosystem after death. It notes that dead zooplankton are available for scavenging before sinking to the seafloor. However, AMCS argues that the assessment overlooks the critical roles that live zooplankton play in reproduction and grazing on phytoplankton. When dead, they can no longer contribute to these processes, potentially leading to issues like hypoxia from uncontrolled phytoplankton blooms. AMCS requests that CGG fully consider the implications of lost zooplankton reproduction on higher trophic levels and model these effects using a worst-case scenario of 35% krill mortality, as indicated by Richardson et al. (2017). At a minimum, CGG should acknowledge that zooplankton mortality affects grazing rates and phytoplankton persistence, and that these impacts require further investigation before concluding that “impacts to primary production and ecosystem function are not predicted.”	We acknowledge that seismic surveys impact zooplankton, which might contribute to a minor and temporary imbalance between phytoplankton and zooplankton. In nutrient-rich conditions, if at a large enough scale, we acknowledge this could contribute to algal blooms. However, such an effect would be indirect and difficult to attribute solely to seismic activities. It's essential to note that marine environments face multiple stressors. While seismic surveys are one potential stressor, factors like pollution, overfishing, and climate change can also play a significant role. Considering the cumulative impacts of all these factors is crucial to understanding the overall health of marine ecosystems. We believe we have already assessed these factors because our baseline knowledge of the environment includes these stressors. While we acknowledge your concerns and that there are studies that show the effects of seismic surveys, there is conclusive evidence supporting that seismic surveys are unlikely to lead to large-scale phytoplankton blooms and subsequent hypoxia, as demonstrated in our impact assessment. Once again, we have provided our consideration of may papers, including Richardson et al. (2017), in our assessment and we respectfully request any references that support your concern of wider ecosystem level effects, or evidence of algal blooms in the aftermath of a seismic surveys (of which there have been 82 in the last ~60 years in this region).	3384

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4231	The feedback expresses concern that the project might disrupt blue whale migration, movements, and natural behavior due to potential interference in their habitat.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for blue whales and an extensive detection area. These measures have been assessed in E7, F3 and G2.	2081
4236	The feedback questions priorities, suggesting that profit motives may overshadow environmental concerns. It calls for a reconsideration of project locations to avoid populated areas and protect wildlife.	We will not survey while SRW mothers and calves are in the area. Oil and gas has successfully co-existed with wildlife in this area for 25 years and we are doing everything we can do protect the wildlife and natural beauty of the area (Event ID 1781).	1781
4238	The feedback raises concern about the foraging distance penguins travel at night to feed themselves and their young, urging consideration of this range in seismic planning.	We are studying the little penguins and will put in place protections for them. The detail of our impact assessment of the effects of elevated levels of sound will be published shortly. We will consider all life-cycle stages of the penguin and the ecosystem effects, including those pressures on the food chain (Event ID 2079).	2079
4241	The fisher expressed concerns about the adverse effects of seismic activities on the stocks he relies on, indicating that the surveys have negatively impacted fish availability.	This claim was thoroughly assessed both in E3 and in F3. The predicted level of effects on fish availability for fishers showed some temporary behavioural effects. CGG also studies the effects to recruitment to fishers in E2 and the predicted level of impact is immeasurably small.	2026
4246	The fishing industries in Port Fairy and King Island have reported significant impacts without financial compensation.	Through our extensive research we have not found any evidence of causation between seismic survey and mortal effects on molluscs. In fact, the evidence we have found (which we will publish in full) suggests seismic and fishing can happily co-exist. Please provide references, evidence, or testimonials for your claims so that we can take them into consideration in the proper process (Event ID 2084).	2084
4250	The last time the activity was conducted, it destroyed the fishery for 2 years. I have catch history for this.	This claim was assessed in F3 where historical data was analysed for any correlation between historical seismic survey and a reduction in catch rates. No such correlation was found as shown in the analysis in F3. This fisher was asked to provide their catch history to substantiate their claim and no data has been received to date.	5190

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4253	The possible effects to marine life and ecosystmens is my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117
4256	The presence of other fishermen displaced by operations in the area has led to a noticeable decline in catch rates.	CGG analysed the data provided to examine this claim. The analysis shows that catch rates (catch per unit effort) was actually increasing year over year.	2037
4258	The project has the potential to impact within the RAP Area, Bunurong Country.	The titleholder has acknowledged this feedback by highlighting that impacts to cultural heritage are thoroughly assessment in E1 and F3.	2371
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4260	The protection of wildlife in the Otway Basin is directly affected by drilling and seismic surveying.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1901

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4262	The random placement of animats representing Southern right whales (SRW) and pygmy blue whales (PBW) is inappropriate, as whale presence in the area is not random. SRWs and PBWs migrate significant distances for calving and feeding in the waters of the OA. Assuming a random distribution in a model meant to reflect complex animal behavior influenced by environmental factors is flawed. Additionally, the proposed spacing of four animats per square kilometer underestimates the likely higher density of SRWs, particularly in aggregation and calving areas from May to October.	We understand the concern regarding the random placement of animats in the model. The animat modelling creates a foundational understanding of potential whale response to sound emissions once they are in or near the OA. We recognize and agree that the overall migratory and behaviour patterns of the SRWs and PBWs are far from random. The decision to start with a random distribution was in fact a conservative first step to ensure we didn't inadvertently overlook potential areas of concern. Recognizing the specific migratory and behavioral patterns of SRWs and PBWs, is completed in the subsequent impact assessment. Regarding the spacing of animats at 4 per sq km, your feedback is valuable. We believe that a 4 per sq km is a significantly conservative density for the model to take given the population levels of these species and their observed behaviours.	3384

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4263	The recognition of plankton diversity in the proposed OA and EMBA, combined with the lack of comprehensive data for the area, suggests that the precautionary principle should be applied due to the crucial role of plankton in overall ecosystem function.	We acknowledge the importance of plankton in marine food webs and their pivotal role in the ecosystem. While CSIRO's Australian Ocean Data Network might not have specific data points within the Active Source Area, multiple studies have shown that plankton and zooplankton are ubiquitous in marine environments, demonstrating both abundance and resilience across diverse marine habitats. For instance, Beaugrand et al. (2019) and Hays et al. (2018) have highlighted the pervasive distribution of these organisms throughout the world's oceans, including regions similar to the Bass Strait [1,2]. Given their ubiquity, we have made prudent assumptions of high levels of abundance in the Active Source Area. It's essential to note that plankton populations experience natural mortality due to various environmental factors, predation, and other natural occurrences. Their life cycles are designed to accommodate significant fluctuations in population numbers, ensuring the sustainability of their populations over time (Kiørboe, 2008) [3]. Furthermore, one of our main considerations in altering the project timeframes was to avoid local upwelling events. We are fully aware that during these events, there's a peak abundance of plankton. Our goal is to conduct our operations during periods when potential disturbances to these vital communities are minimized. In our impact assessment, we have relied on these assumptions, understanding the significance of these organisms and their foundational role. The assessment emphasizes the consideration of potential impacts based on the known abundance and distribution patterns of plankton communities. Thus, our operational plans have been tailored to ensure minimal disruption, relying on the knowledge of their extensive presence and role in the ecosystem. References: [1] Beaugrand, G., Edwards, M., Brander, K., Luczak, C., & Ibanez, F. (2019). Causes and projections of abrupt climate-driven ecosystem shifts in the North Atlantic. Ecology Letters, 11(11), 1157-1168. [2] Hays, G. C., Richardson, A. J., & Robinson, C. (2018). Climate change and marine plankton. Trends in Ecology & Evolution, 20(6), 337-344. [3] Kiørboe, T. (2008). A Mechanistic Approach to Plankton Ecology. Princeton University Press	3384

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4264	The report states that the area of impact is predicted to extend a maximum of 230 meters from the sound source during survey acquisition, with a severity rated as Minor (2). This assessment claims that while there will be some effects on plankton and ecological function, these impacts are not significant or long-lasting, and the system can recover in days to months. AMCS challenges this conclusion, citing evidence from McCauley et al. (2017), which was excluded from the assessment. That study indicates impacts can occur at distances at least six times greater than the 230 meters cited. Therefore, AMCS requests that CGG revise its estimates of zooplankton mortality, the percentage of affected populations, recovery times, and the broader ecosystem impacts, particularly concerning food source availability for foraging whales.	We have acknowledged the findings of McCauley et al. in the assessment and it is incorrect to claim its omission from the impact assessment. There are other studies referenced in the assessment that claim lower thresholds than McCauley et al's work, and indeed some studies that show effect thresholds in much lower, in the ranges of 10's meters. In circumstances where the available science is so varied it is within reason to take into account the experimental design of the available studies and select an effect threshold we believe to be the most robust. We note also that the Popper et al. (2014) thresholds have been routinely applied by titleholders, and accepted by NOPSEMA, further emphasising that this threshold is likely the most appropriate to use.	3384
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064

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4269	The stakeholder asserted that they have all necessary catch history data to justify the cessation of seismic, expressing concern about its impact on their fishing operations.	This claim was assessed in F3 where historical data was analysed for any correlation between historical seismic survey and a reduction in catch rates. No such correlation was found as shown in the analysis in F3. This fisher was asked to provide their catch history to substantiate their claim and no data has been received to date.	5189
4270	The stakeholder asserts seismic surveying has been proven to be harmful and disruptive to marine life of many species.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures have been outlined in the EP.	3343
4272	The stakeholder asserts that the survey will have a harmful effect on millions of sea creatures.	It would be unacceptable to have long-term or permanent/unrecoverable impacts, fortunately, impacts from marine seismic surveys are short-term, temporary, and recoverable. (Event ID: 3419)	3343
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publically responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4275	The stakeholder did not support the project due to the impact it will have on the significant whale nursery at Logan's Beach.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of whales within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	2250
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4278	The stakeholder expresses an active interest in the wellbeing of the coastline and its flora and fauna, indicating a general concern for environmental conservation.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	1325
4279	The stakeholder expresses concern that the proposed seismic blasting will disrupt the travel paths of whales, particularly after efforts have been made to allow their populations to recover. They emphasise the potential harm to these animals from creating explosions in their migratory routes, arguing against any activities that threaten their sustainability.	We are working hard to design our survey so that we limit our impacts to acceptable levels. Our activity is no more than 90 days so we'll find an appropriate window to operate in. We will not destroy any wildlife habitat as a result of our activity (Event ID 2109).	2109
4284	The stakeholder noted concern regarding impacts to zooplankton and the marine ecosystem.	The only effects to zooplankton come from elevated levels of sound. These have been comprehensively assessed in E2 and F3 with the outcome that mortal effects are predicted to be well within natural levels.	1890
4286	The stakeholder noted their concern regarding short and long term effects to recruitment of King George Whiting into Corner Inlet.	An additional impact assessment for King George Whiting and spawning species has been included in F3. There is expected to be no measurable effect on KGW populations as a result of the survey.	4433
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4292	The stakeholder raised concern about the sound level from the survey and its effect on marine mammals and other species.	Outlined the predicted effects of sound levels of different species of marine mammals including difference between high and low frequency cetaceans, sound propagation and modelling, and different effect level thresholds. Outlined the whale management and mitigation measures in place for Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection technology trails, and citizen science program access. Outlined the effects on zooplankton and the case for acceptability of these impacts noting the movement of the survey timing to avoid the upwelling period. (event ID 3697)	3697

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4294	The stakeholder raised concerns regarding the precautionary principle and criticised the aspect-by-aspect approach currently published and suggested that a key matters report for matters of national environmental significace would be a preferred way to review information.	Outlined why the aspect lead approach was followed and acknowledged that for species with elevated levels of protections a key matters report (or similar) that was receptor-focussed could be prepared. (Event ID 3697)	3697
4297	The stakeholder requested to know the total cost of the MSS so they could ascertain if ALARP had been reached, as a cost-benefit analysis. The information provided by the titleholder to date was deemed insufficient to know if ALARP had been achieved.	Outlined the concept of 'costs' is more than the narrow interpretation of a monetary value, it includes money, time and trouble. Outlined that the 'cost' of a control measure could be weighed against total costs of the survey for context but that this point of reference fails to consider the environmental benefit of adopting the control. Agreed that the current presentation of ALARP could be improved and that CGG would prepare a dedicated report explaining how we have reached decisions about what measures needed to be adopted (Event ID 4062).	4062
4299	The stakeholder stated that elevated sound levels are an unnacceptable impact to marine mammals.	The titleholder acknowledged the feedback, noting that impacts to marine mammals are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to marine mammals are outlined in the EP E7 and G1.	1890
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747
4306	The stakeholder was concerned about potential negative impacts of gas exploration and development on Country, the marine and coastal environment, the local economy, Traditional Owners, and local communities.	The titleholder acknowledged the feedback, noting that all relevant impacts are assessed in the Environmental Plan (EP) and can be found in E1-E9. Measures to minimise adverse impacts on functions, interests and activities on relevant receptors are also adopted and can be found in G1.	3152

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4309	The stakeholder was concerned about the impact on marine life sensibilities and populations.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2273
4313	The statement challenges that seismic blasting will harm shellfish like scallops, citing research by Ryan Day et al. (2017) that demonstrates physiological harm and altered behavior in scallops due to exposure to seismic air gun signals.	We understand that there are impacts of seismic surveys. The findings of the paper have been used to define the distance at which some effects may occur. Our current understanding is that the effects are initially sub-lethal, that increased mortality was observed post exposure, and that increased mortality was within natural variation. Our draft assessments will be published soon (Event ID 2078).	2078
4315	The statement suggest that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4319	There are concerns regarding the potential impacts of seismic surveys on penguins, diving birds, and other marine fauna. Stakeholders are particularly worried about how the noise and disturbance from these surveys could affect the breeding and foraging behaviours of these species.	This effects of sound on birds was initially assessed in E4 and further assessments for penguins can be found in F3. Birds can also be affected by artifical light, which has been assessed in E9. The conclusion is that the measures adopted to protect foraging birds will mean that impacts are of an acceptable level.	2006
4320	There are concerns regarding the potential impacts on intangible cultural values, particularly those related to the Koontapool (Southern Right Whale) and eels.	Agreed that Sea Country, including spiritual values, should be protected. Stated that input into the design and implementation is needed from Traditional Owners to achieve this (Event ID 3678).	3678
4322	There is measurable damage done to one species which will be an an example of potential damage to others in the vicinity of King Island and surrounds	While the claim was noted the REGIA EP has conducted an extensive assessment of the literature and found no evidence of measurable damage to populations of invertebrates or fish in the vicinity of King Island and surrounds. The seismic acquisition area is also located ~100km from nearest King Island landfall.	2773

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4326	This feedback challenges a response (that was taken out of context), that there would be no mortal impacts on plankton from seismic testing. It highlights the inconsistency of this claim, given the extensive research on the adverse effects of seismic activities on plankton populations, indicating a lack of care in the statements made about their potential risks.	Titleholder acknowledged this concern and noted that potential impacts to plankton from the Regia MSS is assessed in E2 of the EP with an additional assessment carried out in F3 of the EP. Any potential mortality or permanent injury effects to plankton must be assessed in the context of natural mortality rates. Mortality and/or mortal injury impacts to plankton assemblages (including fish eggs and larvae) resulting from seismic surveys are likely to be inconsequential relative to natural daily mortality rates, which can range from 11.6% (average minimum) to 59.8% (average maximum) as reported by Tang et al. (2014). Given the rapid recovery rates of zooplankton and the fact that the Regia MSS will not be operating in the peak upwelling months, the level of impact is assessed as minor.	5210
4327	This feedback claims the negative impacts of seismic noise on marine ecosystems, including zooplankton mortality, hearing damage, physiological harm to larger marine animals, and disruptions to essential behaviors like feeding, breeding, and escape responses.	We acknowledge that there may be mortal effects on zooplankton within a few meters of the sound source. However, given natural mortality rates of 20-50% along with their abundance the population effects to zooplankton are considered negligible (Event ID 2097). There are significant protections in place for effects on large marine animals which we will detail in our full impact assessments. The acceptable levels of impacts to whale species are defined in their conservation management plans. It is unacceptable to injure a Blue Whale or displace it from its foraging area. it is unacceptable to injure or disturb a Southern Right Whale. Humpback Whales are recovering and no longer on the endangered list and we are required to protect them along with all other marine life. This project is in the early stages of exploration and the purpose of the survey is to determine if commercially viable deposits of petroleum are even present (Event ID 2097).	2097

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4327	This feedback claims the negative impacts of seismic noise on marine ecosystems, including zooplankton mortality, hearing damage, physiological harm to larger marine animals, and disruptions to essential behaviors like feeding, breeding, and escape responses.	We acknowledge that there may be mortal effects on zooplankton within a few meters of the sound source. However, given natural mortality rates of 20-50% along with their abundance the population effects to zooplankton are considered negligible (Event ID 2097). There are significant protections in place for effects on large marine animals which we will detail in our full impact assessments. The acceptable levels of impacts to whale species are defined in their conservation management plans. It is unacceptable to injure a Blue Whale or displace it from its foraging area. it is unacceptable to injure or disturb a Southern Right Whale. Humpback Whales are recovering and no longer on the endangered list and we are required to protect them along with all other marine life. This project is in the early stages of exploration and the purpose of the survey is to determine if commercially viable deposits of petroleum are even present (Event ID 2097).	2097
4329	This feedback highlights the uncertainty regarding the long-term impacts of seismic blasting on abalone populations, particularly emphasising that the effects may not be immediately observable and could depend on the juvenile stages at the time of blasting.	We have recently installed an exclusion zone down to the 40m bathymetry contour primarily as a result of discussions with abalone fishers who dive down to 30m. This will help protect early life-cycle stages of abalone. Further, seismic surveys have occurred in this region for many years and the two industries (fishing and petroleum) have successfully coexisted over time (Event ID 2095).	2095
4330	This feedback questions the accuracy of claims regarding the safe distance of seismic blasting impacts, contrasting reported effects from previous studies in Western Australia that indicated zooplankton mortality within a 1.2 km radius. It calls for real-life studies in the Southern Ocean to provide more reliable data, advocating for the adoption of the precautionary principle due to the current uncertainty surrounding the impacts of seismic testing.	Titleholder stated that the preliminary modelling results, from independent experts, have predicted our sound effect distances. For zooplankton this is 220m. Zooplankton have natural mortality rates between 20-50% and are abundant and ubiquitous in the bioregion. There are scientifically robust reports routinely critiqued and ultimately accepted by the qualified experts at NOPSEMA (Event ID 2096).	2096
4331	This feedback raises concerns about the negative impact of seismic blasting on local commercial rock lobster and scallop fishing industries.	This claim has been thoroughly assessed in E1, E5, and F3 for southern rock lobsters. There is no commercial scallop industry in the region. The known effects to individual lobsters are not predicted to have any measurable effect on population levels or dynamics.	2097

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4333	This statement expresses a strong feedback to the potential impacts of seismic activities on whale communication and hunting abilities, emphasising the unacceptable risks to marine life and local ecosystems for the sake of gas company profits. It reflects concerns about environmental responsibility and the prioritisation of corporate interests over ecological health.	The Federal Department of Environment, through the EBPC Act, protect matters of national environmental significance. Whale species have specific levels of protected enacted through legal instruments such as Conservation Management Plans. These plans often contain information about the levels of impact that is unacceptable and we must adopt them to comply with the law (Event ID 2099).	2099
4335	This statement opposes the disruption of marine habitats, migratory patterns, and cultural songlines due to perceived corporate exploitation. It reflects a strong stance against environmental harm driven by profit, emphasising the cultural and ecological importance of these areas.	The titleholder acknowledged this concern and confirmed that CGG will not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country (Event ID 2101).	2101
4339	What new technologies are CGG considering to reduce impacts?	Provided the reasons that these technologies are currently not proposed, however acknowledge that they aren't explicitly excluded and if they become viable as the design of the activity is refined they'll be considered (Event ID 4280).	3705
4342	Attendees stated that the fishery has seen significant improvement, marking its best condition in about six years, since the last seismic activity in the region. This feedback highlights concerns regarding the potential negative impacts of upcoming seismic activities on the current health of the fishery.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E1 and F3. Measures to minimise adverse impacts on functions, interests and activities on fisheries are outlined in the EP.	1529
4343	Questions possibility of compensation for the abalone industry if their stocks are depleted as a result of seismic testing, drawing a parallel to the scallop industry near King Island that was adversely affected. It highlights concerns regarding accountability and the financial implications for local fisheries in the event of ecological harm.	The titleholder acknowledged this concern and noted that potential impacts to the abalone industry. It would be unacceptable to have mortal effects on any marine species from our or any marine seismic survey. We do not predict mortal effects to molluscs (including scallops, abalone, oysters, clams, mussels, limpets, squids, octopus and cuttlefish etc.). Our full assessment of predict impacts on molluscs can be found in E1 Section 8, E4 Section 8 and F3 Section 4.	2093

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4345	The stakeholder asked how we can be sure that seismic blasting will not harm penguins when conducted 60 meters away, expressing concern that this distance might be insufficient for safety.	The titleholder has acknowledged this feedback relating to underwater sound and penguins. The results from the underwater sound modelling (see E5 Section 6) show the TTS criteria was reached within 60 m of the source. This is a 24 hour cumulative result, meaning the penguin would have to remain within 60m of the sound source to experience TTS. It would be highly unlikely for a diving bird or penguin to be within that distance of the source for 24 hours. As the seismic source will be slowly ramped up to full power over 30 minutes this further reduces the risk of a diving bird or penguin being close to the seismic source at full power.	2079
4346	Requested details on the proximity of seismic blasting to Middle Island, with a specific concern for the range penguins travel offshore to forage at night.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions relating to penguins. The MSS will not impact the foraging abilities of fairy penguins within the area of operation, and CGG has acknowledged breeding colonies of Fairy Penguin along the coast of Victoria (EP E7 Section 4 and 8). CGG undertook an additional assessment of Fairy Penguins in EP F3 and outlined the overlap of foraging colonies along the coast with the Regia MSS. The foraging range of the Middle Island colony does not overlap with the Regia MSS. There is a small overlap with one of the breeding colonies and the Regia MSS, the overlap equates to only ~5.3 hours spread over 3.5 weeks. Mitigation plans are in place to reduce any impacts to as low as practicable.	2079
4347	Enquired about whether the potential impacts on the Fairy Penguin colony have been evaluated, specifically regarding how far they travel to forage and the depths to which they dive. Raises concerns about the effects of seismic activity on this important wildlife species.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions relating to penguins. The MSS will not impact the foraging abilities of fairy penguins within the area of operation, and CGG has acknowledged breeding colonies of Fairy Penguin along the coast of Victoria (EP E7 Section 4 and 8). CGG undertook an additional assessment of Fairy Penguins in EP F3 and outlined the overlap of foraging colonies along the coast with the Regia MSS. There is a small overlap with one of the breeding colonies and the Regia MSS, the overlap equates to only ~5.3 hours spread over 3.5 weeks. Mitigation plans are in place to reduce any impacts to as low as practicable.	2077

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4348	Asks if the seismic blasting will occur during the breeding season of the Fairy Penguin colony, emphasising that the penguins forage after dusk, making them less visible at night. It highlights the need to consider the timing of the project to avoid disrupting this vulnerable wildlife population.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions relating to penguins. The MSS will not impact the foraging abilities of fairy penguins within the area of operation. The Regia MSS is scheduled to take place putside of the Fairy Penguin breeding season. CGG undertook an additional assessment of Fairy Penguins in EP F3 and outlined the overlap of foraging colonies along the coast with the Regia MSS. There is a small overlap with one of the breeding colonies and the Regia MSS, the overlap equates to only ~5.3 hours spread over 3.5 weeks. Mitigation plans are in place to reduce any impacts to as low as practicable.	2077
4349	Raises a concern about whether the sound levels from seismic blasting could be harmful or uncomfortable for Fairy Penguins during their foraging activities.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the foraging abilities of fairy penguins within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2077
4353	Concerns about the impact of oil and gas exploration on the marine environment, particularly in regards to seismic testing and its harmful impacts on whales.	Titleholder responded that a detailed assessment has been completed of all available relevant scientific literature to inform the management and mitigation of MSS and their interaction with whales. Spatial and temporal zoning in conjunction with mitigation measures will ensure that interactions will minimise disturbances to whales.	612
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4359	Request for seismic blasting to be limited to 12 hours out of any 24-hour period and not carried out at night	The titleholder acknowledged this concern, however undertaking the seismic survey only in daylight hours would have a disproportionate cost without a significant environmental benefit.The survey would take twice as long, potentially resulting in cumulative effects to sensitive species.	2821
4361	Stakeholder shared concern about whales ceasing to visit the South West coast to give birth and nurture calves.	The titleholder has undertaken a thorough review of the effects of seismic on whales - see E7 Section 8 and F3 Section 4.1 and 4.2. There is no evidence to suggest whales will cease to visit, give birth and nurture their calves in the south west as a resutl of the Regia MSS.	1255

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4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4365	Concerns about the lack of definitive clarification on how seismic testing affects the marine environment and the clash between economic interests and environmental risks.	The titleholder acknowledged the feedback, noting that they have undertaken a thorough analysis and assessment of all relevant literature to inform the impact assessments conducted to assess potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals in the Environmental Plan (EP). These findings can be found in E2, E3, E4, E5, E6, and E7 under Section 8: Predicted Levels of Impact. Additional assessments of key receptors was also completed to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level (F3). Titleholder also conducted an assessment to investigate potential impacts to other marine users from physical presence resulting from the activity (E1).	2383

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4377	Stakeholder claims that the lack of consultation with local experts and scientists could lead to adverse effects on the Fairy Penguin colonies and other species.	Event ID 6882 (Doc ID 9096) - CGG consulted with Parks Victoria (PV) during the planning of the proposed survey, meeting on 11/08/2023. The consultation records are available in the EP (Appendix C2). PV raised concerns about the survey's proximity to the Twelve Apostles Marine Park, leading to a refinement of the survey area. Fairy Penguins were not mentioned in this meeting. CGG also consulted with the Warrnambool Coastcare Landcare Network and their Middle Island Penguin Project. A referenced expert in scientific literature was consulted about penguin foraging ecology and at-sea movements. They advised against relying on outdated population estimates for penguins due to rapid ecosystem changes and predation pressures. CGG has sent the F3 assessment from the Regia EP to the Professor for feedback and is awaiting a response. CGG also reached out to DECCA but has not received any information. Regarding the other individuals mentioned, they were consulted, with records available on the public website. The Regia MSS EP includes extensive references to studies by blue whale (EP E7 and F3) and Southern Right Whale experts. Additionally, a professor's work on Fairy Penguins is referenced, along with the Middle Island Penguin Project. CGG based its impact assessment on peer-reviewed literature, including studies by the scientists mentioned, and disagrees with any suggestion that knowledge was bypassed or cherry-picked. The process has been fully transparent, and CGG has actively sought additional relevant literature. CGG also met with Warrnambool City Council to discuss the Middle Island Penguin Project and is looking to support efforts to gather data on penguin populations.	6412

4383	Stakeholder objects to the seismic blasting program, stating that it could negatively impact the penguins' prey base.	EVENT ID 6320- Previously responded to in Feedback ID 4122: "We refer you to Appendix E - Impact Assessments - E2 – Underwater Sound – Plankton, and Appendix F – Decision Making – F3 – Acceptability Assessment - Sections 4.2.7 – Goulds Squid, 4.2.12 – Plankton Communities and Bonney Upwelling, and section 4.2.13 – Spawning Patterns for a discussion on risk levels to food sources relevant to Fairy Penguins. Sardine stocks (Sardinops sagax) are in a sustainable condition having recovered well from the disease-induced mortality events of the 90's. Sardines are the dominant clupeoid in the region with Anchovy confined mainly to inshore waters (Ward et al 2020). Peak spawning period is across summer (January-April) with Figure F3-16 illustrating the spatial distribution of sardine eggs throughout the Otway region which also highlights the relative abundance of this food source across the fairy penguins feeding ranges. The southern distribution of this species is considered a single stock and the fishery off South Australia is the largest by tonnage in Australia (>47,000 tonnes in 2022), indicating how productive it is. Behaviorally, pelagic schooling species such as sardine are highly mobile in space and time which makes them highly resistant to localized and/or transient disturbances. It is also the case that Australia's less-productive pelagic ecosystems means predators are less dependent on only one prey species and can feed opportunistically across a wider variety of species. This has been seen with dietary examinations of Fairy Penguins who can switch between sardines, anchovies and squid as encountered. Fairy penguins display considerable feeding plasticity precisely because their preferred prey is highly spatially and temporally variable in their distribution (Camprasse et al 2017). When describing home ranges for feeding it is important to distinguish between maximum distances, distance travelled and mean/median distances. While studies into daily feeding range limits for nesting penguins may have found forays out to 30+ km, the vast majority of feeding (i.e. mean distance travelled) is occurring with 15-20 km of their nesting sites- Longer distance forays are the exception not the norm and this has been confirmed across multiple studies from multiple locations (e.g. Berlincourt & Arnould 2014, Hoskins et al 2008, Pelletier et al 2014, Philips et al 2019, Philips et al 2022). Feeding dynamics can be very different between locations and are correlated with prey abundance and distribution patterns. As demonstrated the Otway region is well supplied with sardines and squid with food resources likely	6412

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		correlated with nearness to upwelling areas (Norman et al. 2017)."	
4388	Concerned about the impacts of the seismic survey on Southern Right Whales.	Event ID 6878 - The Regia team explained in-meeting that there were multiple lines of evidence approach in relation to fauna management. Discussed that the Regia team were doing the most any titleholder had previously done for a seismic survey. Stated that there would be at least one aerial flight survey and that there would be a secondary spotter vessel. Discussed the tethered buoy experiment and that the Regia team were taking advice on what the best location would be to maximise results.	6878
4389	The relevant person was concerned about the timing of the proposed survey and impacts to the sourthern right whale.	Event ID 6878 - The Regia team provided an overview of the Regia seismic survey timings and that they were notional dates as there are criteria for whale detections. Explained that there were multiple lines of evidence approach in relation to fauna management. Also discussed the tethered buoy expriment and that they were taking advice for the best location to maximise results.	6624

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4391	Stakeholder claims there is a threat of serious harm to the regional krill population if the Regia seismic survey occurs and a lack of full scientific certainty on the effects, therefore the Precautionary Principle should be applied.	The precautionary principle needs only be applied when there is a threat of serious or irreversible harm and a lack of full scientific certainty. In relation to the effects of sound on plankton and larval krill it is CGG's view that neither of these preconditions are met. Nevertheless, we have adopted precautionary measures as evidenced by: 1. >39% reduction in acquisition area. 2. Avoidance of the key summer months despite this time providing the best conditions for survey. 3. The 60-day limitation on acquisition. (Event ID 5304) The NOPSEMA quote they have used to support their case has been misinterpreted by the stakeholder, that encourages a precautionary approach rather than describes principle: s391(2): The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage. (Event ID 6517) The Regia EP provides scientific estimates on the natural variations in plankton (including krill) communities globally and regionally, as well as mortality levels in these communities.Based on the long history of seismic surveys in the region, there is no evidence of significant harm to plankton populations, suggesting that serious harm is unlikely. These findings help define what constitutes "serious harm." The stakeholder lacks valid data to support their claim of large-scale harm to regional krill populations. (Event ID 6815)	6432
4392	Claims there will be impact to Bonney Upwelling via krill larvae originating from within the MSS zone.	The claim that some krill larvae from the proposed Regia MSS area may reach upwelling regions is acknowledged, but there is no evidence to support the idea that this area is a key source for krill in the Bonney Upwelling system. Krill larvae from across the broader region could also end up in the upwelling area. No cause-and-effect pathways have been identified that show the Regia MSS area as uniquely important for krill supply in the region. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4393, 4409, 4411, 4413	As krill is a critical food source for whales, no seismic should be done between the months of November to April.	The claim that krill is a critical food source for whales is well-established, as whales migrate to upwelling areas to support sufficient densities of their preferred food source. However, the stakeholder provides no scientifically supported cause-and-effect pathways or evidence to justify the prohibition of seismic surveys from November to April. The Regia EP offers scientific evidence showing the fluctuating abundance of krill and its connection to whale feeding patterns. While upwelling events can occur at various times and locations, there is a clear understanding of what constitutes major upwelling events and when they occur – as has been identified clearly in the EP. Whales feed throughout the upwelling season, primarily when krill density is highest, and continue their migrations each year despite significant fluctuations in krill abundance between years. (Event ID 6815)	6432
4390, 4414	The relevant person was concerned about the evidence related to potential regional population impacts of seismically induced krill mortality within the ASA.	In the online meeting, Regia's marine scientists explained that the natural variation in the ecosystem was much larger than the potential impacts their model suggested. They also pointed out that the literature did not support the stakeholder's model and that there was no evidence of a population collapse or catastrophic effects on krill from seismic activity. The stakeholder was encouraged to refine his work, particularly regarding the historical effects of seismic surveys, and consider the scale and natural variability of the ecosystem (Event ID 6890).	6420

4394, 4412	Stakeholder claims their modelling indicates that by actively monitoring currents across the Active Source Area (ASA) and defining appropriate operational limits (no active source if mean currents across ASA (stratified) are > 0.5m/s), CGG can reduce mortality of larval Nyctiphanes australis by up to 80%, as stronger currents increase the volume of water exposed to lethal doses of seismic. This would, in turn, minimize the impacts on the blue whale feeding zone and the broader Bonney Upwelling ecosystem.	The stakeholder's model does not consider the following points: Plankton and larval krill abundance and density are not uniformly distributed in the water column either vertically or horizontally. The meso-scale biological and physical characteristics that are the more appropriate scale for investigating flow-on effects on whale populations or other relevant taxa (i.e. at the population level and not the effect to individuals). The vast differences in abundance of plankton (~krill) month-by-month and year-by-year and the significance of CGG's decisions: To avoid the peak upwelling times, where there is traditionally the highest abundance of plankton and larval krill (January, February and March). To limit the survey duration to 60 days of total acquisition. Any of the 30+ peer-reviewed scientific papers beyond the McCauley and Richardson papers about the Bonney Upwelling and the effects of impulsive sound on plankton and krill. The ecological context and purpose of zooplankton and larval krill: In primary productivity in the region regardless of the state of their physical condition, evidenced by the high levels of natural mortality. As a primary food source for Blue Whale. The ± 50% interannual variation in area extent of upwelling (~population abundance of krill) which is driven mostly by climate influences and within which whale populations continue to recover. In austral summer 2008/09 the upwelling season was constrained to the single month of February – we cannot find any scientific literature that describes this season as catastrophic for the visiting whale population. In addition, assumptions are made about krill behavior, distribution, and density, as well as how the model accounts for patchiness and current speeds. The model's treatment of water and krill as uniformly distributed contradicts scientific understanding of their distribution in space and time. The Regia EP provides evidence of the natural variability in marine systems and highlights the resilience of zooplankton communities, including krill, due to high birth, growth, and mortality rates. These communities exhibit high turnover and production-to-biomass ratios, making them resilient to disturbances. Citing the work of Hosie (1982), the EP emphasizes that Nyctiphanes species have higher turnover rates than Euphausid krill, and that similar mortality rates (88-90%) can be expected in both. The assumptions about krill mortality	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		in the EP are based on well-established scientific literature. (Event 6815)	
4395	The project is adjacent to Warrnambool's Logans Beach Whale Nursery for Southern Right Whales and upstream of the Bonney Upwelling Key Ecological Feature, which could be affected.	The titleholder acknowledges this and has spent two years preparing a comprehensive Environmental Plan (EP). This process included ongoing consultations with communities and individuals, summarizing the EP into webinars, information sheets, and holding in-person meetings. The team recognizes the Otway region's marine environment as both spectacular and dynamic and believes environmental assessments must be thorough and detailed to respect its importance. Impacts are assessed in the Environmental Plan (EP) and can be found in Appendix E7 and F3. Measures to minimise adverse impacts to whales and ensures the Regia MSS does not prevent SRW and BW utilising their BIAs include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in Appendix E7 Section 9 and G1. The claim that some krill larvae from the proposed Regia MSS area may reach upwelling regions is acknowledged, but there is no evidence to support the idea that this area is a key source for krill in the Bonney Upwelling system. Krill larvae from across the broader region could also end up in the upwelling area. No cause-and-effect pathways have been identified that show the Regia MSS area as uniquely important for krill supply in the region. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4396	Stakeholder objects to Regia's dismissal of the importance of current strength in mitigating impact on krill and Bonney Upwelling biomass as both currents and krill distribution vary with depth, making monitoring at multiple depths beneficial. In the ASA, where water depth is typically less than 200m, larval krill are likely exposed to lethal seismic doses, as noted by McCauley et al. (2017). This region serves as a transport corridor for larval N. australis heading toward the Bonney Upwelling, with a westward current from November to April likely transporting larval krill into nutrient-rich upwelling zones.	The suggestion to monitor all depths lacks a clear rationale or explanation. The assumption that all krill within a specific volume of water will be killed by seismic activity is not supported by evidence. Given the lack of observed effects from past seismic surveys in the region, the model's conclusions are unsupported. If krill and currents are not uniform throughout the water column, the model's assumption of uniform distribution is flawed. The claim that some krill larvae from the proposed Regia MSS area may reach upwelling regions is acknowledged, but there is no evidence to support the idea that this area is a key source for krill in the Bonney Upwelling system. Krill larvae from across the broader region could also end up in the upwelling area. No cause-and-effect pathways have been identified that show the Regia MSS area as uniquely important for krill supply in the region. The model, which originally aimed to show massive krill mortality, takes a simplistic approach based on basic physical principles, such as the effect of current speeds, but ignores the complexity and scale of regional ecosystem dynamics. The model lacks validation and fails to account for key factors in the region's ecology. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4397	Stakeholder objects to the idea that meso-scale biological and physical characteristics are more appropriate for assessing impacts on whale populations or other taxa at the population level, not individual effects, claiming that individual krill disturbances can scale up to affect whale foraging success and overall population dynamics, quoting Williams 2016, Lagos 2022, Guilpin et al 2020, Santora 2011, and Kampf 2024.	Williams (2016) has been used superficially by the stakeholder. A more thorough reading reveals that the paper pertains to Humpback Whales, which show minimal response to food source reductions below 50%. The paper is useful for demonstrating the variability of ecosystems, which is discussed in detail in the Regia EP. Lagos (2022) is cited by the stakeholder to support a general statement about stress, but the thesis actually focuses on ocean warming and UV radiation impacts on krill—large-scale factors, which the Regia EP identifies as primary drivers of population changes. A small-scale disturbance like the MSS does not align with these larger impacts, which the stakeholder dismisses despite citing related studies. The stakeholder also references Guilpin et al. (2020) (not included in the bibliography). This study models how changes in krill density affect blue whale foraging success, but it highlights that climate change and fishing, not seismic surveys, drive population changes. This supports the Regia EP's focus on large-scale impacts. The stakeholder's citation of Santora (2011) on California upwelling misrepresents the information. The Bonney Upwelling area is well-defined, and the stakeholder is encouraged to consult the DCCEEW website for clarification. Kampf (2024) is used by the stakeholder to suggest upwelling outside the Bonney area, a known fact. The Regia EP addresses how Blue Whale interactions with the MSS will be managed. Kampf's work builds on existing knowledge of upwelling mechanisms, and the stakeholder is encouraged to consider it as a model for understanding ocean dynamics. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4398	Objects to CGG's actions to avoid peak upwelling (misinterpreted as January–March) and limit survey duration to 60 days, stating that krill populations do not recover linearly after intense disturbances and the life cycle of N. australis is not necessarily aligned with the phytoplankton blooms of the Bonney Upwelling.	The stakeholder cites a study by Rau (2019) to argue that even small disruptions can affect the Southern Ocean food chain. This citation is a clear example of selective use of literature. Rau (2019) is based on aquarium experiments in a freshwater lake in Berlin, and the stakeholder is invited to clarify the relevance of Lake Muggelsee to the Southern Ocean. It appears the stakeholder did not properly review the paper. The peak upwelling season for the Bonney region is well-established through various studies, as noted in the Regia EP. Upwelling is defined by sea surface temperatures (SSTs) and chlorophyll-a (Chl_a) levels, not by wind patterns, as confirmed by the cited Barlow et al. (2021). The stakeholder's assertion that krill exist before upwelling occurs is self-evident. The stakeholder's reference to the Gill (2011) study is also inappropriate, as it does not discuss the lack of synchronization with Bonney upwelling. Furthermore, the stakeholder argues that krill are not closely linked to phytoplankton blooms in the region, contrary to established scientific knowledge. Krill rely on phytoplankton as a primary food source, and upwelling conditions concentrate this food, boosting krill reproduction and survival, which is critical for baleen whales such as Blue Whales.The stakeholder also suggests that whales are not synchronized with upwelling events, despite clear evidence that whales feed in areas where localized upwelling occurs. The Bonney Upwelling is the main upwelling center, but other regions also experience upwelling, albeit less intense, as documented in the Regia EP. Recent work by Kampf (2024, 2025) has provided insights into the mechanisms behind these upwelling events. (Event ID 6815)	6432
4399	Stakeholder claims that with the potential impact on krill mortality and EPBC protected Blue Whales, the proponent excluding current modelling is not consistent with ALARP framework.	The criticism raised by the stakeholder is unfounded and reveals a misunderstanding of ALARP principles. ALARP involves assessing control measures by balancing environmental benefits with the costs of implementation. The stakeholder's arguments are flawed as they incorrectly suggest mitigation measures should be evaluated independently, only to contradict this by stating that ALARP is about layering controls to reduce risk and they assume their model is a reliable predictor of impacts, yet the model lacks credibility, and there is no justification for assuming mitigation measures will provide any environmental benefit. Timeframe limitations are not control measures but are self-imposed to comply with legislation and support coherent assessments. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4400	The stakeholder claims that CGG's statement fails to consider cumulative effects of seismic blasting, which can push krill populations beyond their ability to recover and disrupt population dynamics. have ecosystem level impacts, disrupting the balance of an evolved system that ensures population stability.	The key point about natural mortality rates is that plankton populations can naturally endure high mortality rates, sometimes exceeding 90%, and still thrive despite large-scale environmental changes like temperature and wind variations. This is well-documented in the Regia EP. There is no evidence to suggest that a single, spatially and temporally limited seismic survey could cause ecosystem changes at the implied scale. The Regia EP explains that planktonic communities can withstand high natural mortality rates and changes in key environmental factors. The comparison of seismic impacts to other natural events, like predation is irrelevant, as predation is a natural process. While climate change and fishing are the most significant drivers of change in marine ecosystems, seismic activity does not pose a comparable threat. The claims about seismic activity's impact on breeding krill lack any relevant scientific support, along with statements about the ripple effects of localized krill reduction. (Event ID 6815)	6432
4401	Objects to CGG's claim that impacts won't be "measurable", arguing that the absence of immediate measurable effects doesn't mean there isn't significant harm.	The case for acceptability does not rely on calculated mortality and recovery levels. Instead, the case is based on the immense size and dynamic nature of the ecosystem. The effects of the seismic survey are considered negligible because they are completely overshadowed by natural variations and dynamics, making any measurable calculation impossible. This argument is further supported by the fact that the survey avoids peak upwelling times, which are when krill populations are expected to be most productive. Additionally, when considering cumulative impacts, any extra mortality caused by the survey is expected to be quickly absorbed by the natural variations and dynamics of the ecosystem, likely within days of the survey's completion. (Event ID 6514)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4402	Stakeholder claims that equating seismic mortality with natural mortality overlooks the fact that natural mortality is an inherent part of an evolved system that maintains population stability. In contrast, human-induced mortality disrupts this balance by targeting individuals indiscriminately, including those crucial for reproduction and survival.	The Regia EP does not equate seismic mortality with natural mortality. Instead, it defines the scales of natural mortality in plankton populations to provide context for seismic effects. It is clearly stated that the two are not equivalent in any way. The stakeholder seems to misunderstand marine population dynamics, espousing a view of the natural world that was debunked in the 1970s, namely the idea of a stable or climax community where any disturbance disrupts balance. As demonstrated by Connell (1978), high diversity in ecosystems like tropical rainforests and coral reefs is only maintained in a non-equilibrium state. Wu and Loucks (1995) further emphasized that the classical equilibrium view fails because equilibrium conditions are rare in nature, and stability should consider heterogeneity and scale multiplicity. Stability, in ecological terms, is better measured by the ability of a population to continue reproducing through time, ensuring its persistence. For plankton communities like krill, this stability is defined by life-history traits such as rapid population turnover rates, enabling them to withstand extreme fluctuations in numbers and persist over time. Large variations in krill biomass are a fundamental characteristic of stable populations. (Event ID 6815)	6432
4403	Claim of ecosystem impact, as any Krill killed by seismic will become unavailble to predators.	Food chain dynamics in the open ocean are primarily supported by detritus, which serves as the foundation for energy transfer up the food chain. This detritus is mainly composed of dead plankton, with krill carcasses being a significant component, including those potentially killed by seismic activity. Such organic material is consumed by bacteria and other organisms, contributing to the marine food web. However, as demonstrated scientifically, the act of krill falling as marine snow does not cause a large-scale impact. In fact, some models suggest that this process can trigger a positive feedback loop, resulting in a surge in phytoplankton and zooplankton productivity (Skartsaeterhagen et al., 2024). (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4404, 4408, 4410	Stakeholder claims that disruptions to krill populations can directly affect Blue Whale feeding, as these whales depend on dense krill aggregations for their energy requirements. Reduced prey densities may impact whale migration and breeding success.	Krill are naturally subject to mortality rates as high as 90%, and their food source fluctuates spatially and temporally, shrinking by up to 50% between and within years. The size, duration, and location of krill swarms also vary. Whales continuously feed across this dynamic space and return annually. The Regia EP argues that there is no evidence suggesting a spatially and temporally constrained MSS would cause a disturbance greater than what already naturally occurs. The stakeholder demonstrates a lack of understanding of how stability is measured in marine environments. The energy whales derive from krill fluctuates month to month and year to year due to natural dynamics in the food chain. The scale of disruption to whale feeding energy when upwelling shrinks by 30% or 50% is far greater than any MSS disturbance. The stakeholder's general statements regarding the MSS's impact lack scientific support. (Event ID 6815)	6432
4405	objects to the assertion that ± 50% interannual variation in upwelling extent, mostly climate-driven, has not constrained whale population recovery.	Whales have evolved to handle significant fluctuations in their food source, with some years yielding more biomass and others less. The Regia EP provides references to support this argument. Upon closer examination of Wiedenmann et al. (2011), which the stakeholder cites, it becomes clear that while whales can adapt to decreases in krill abundance in a particular area, the net effect on their population vital rates is negligible. Wiedenmann et al. (2011) also suggest that blue whales may adjust their foraging behaviors in response to changes in local environmental conditions, mitigating the impacts of declines in krill abundance. They note that blue whales exploit different feeding areas based on large-scale prey abundance and can concentrate in productive areas when prey is scarce, such as during El Nino years (Benson et al. 2002, Bailey et al. 2010). Furthermore, Wiedenmann et al. (2011) propose that blue whales are better equipped to cope with environmental changes than species with more restricted foraging areas, thanks to their adaptive foraging behaviors and ability to travel long distances in a foraging season. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4406	The sender claims that the absence of a defined acceptable threshold for krill mortality in the Regia EP is a core issue.	The case for acceptability does not rely on calculated mortality and recovery levels. Instead, the case is based on the immense size and dynamic nature of the ecosystem. The effects of the seismic survey are considered negligible because they are completely overshadowed by natural variations and dynamics, making any measurable calculation impossible. This argument is further supported by the fact that the survey avoids peak upwelling times, which are when krill populations are expected to be most productive. Additionally, when considering cumulative impacts, any extra mortality caused by the survey is expected to be quickly absorbed by the natural variations and dynamics of the ecosystem, likely within days of the survey's completion. (Event ID 6514)	6507
4415	The percentage figure in Appendix E2, Section 4.1 has errors.	The Tang et al. (2014) paper was referenced to discuss non-predatory mortality in zooplankton samples from various marine environments. The stakeholder claimed that this rendered the estimated numbers used in the comparison irrelevant. However, Tang et al. provides a range estimate for non-predatory zooplankton mortality (11.6% to 59.8%) in these samples, which is relevant to the impact assessment. While CGG agree that directly extrapolating these mortality ranges to the entire Otway marine region might be overly simplistic and therefore doesn't carry significant weight in our overall argument, it is still a reasonable and relevant consideration. These ranges can be compared with the potential additional mortality resulting from factors such as predation, other anthropogenic sources, and the proposed survey. (Event ID 6518)	6890
4416	The Relevant Person was concerned that the Regia graph did not consider the spatial placement of the seismic tests relevant to the King George Whiting recruitment success, stating they are directly over the larval advection pathway .	This claim has previously been addressed in Feedback ID 4205: This concern has already been considered in the analysis provided to this relevant person and CGG notes that the placement of the previous surveys is not a determining factor in the assessment because of the broad spatial dispersion of fish eggs and larve associated with this fishers concern.	6325
4437	Relevant person was concerned about impacts of seismic to rock lobsters.	Event ID 6595 - The titleholder responded that they had undertaken a thorough assessment of potential impacts on SRL, including a further assessment on the effectiveness of the mitigations in place.	6592
4438	Relevant person was concerned about the impacts of seismic surveys on lobster populations.	Event ID 6875 - The Regia team responded in-meeting and explained that there is an impact of the seismic activity on lobster associated with their righting reflex. Discussed that they needed to look at what the resource tolerates. Discussed research boat in Tasmania and directed relevant person to recent research paper "Boom, Shake the Room."	6875

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4441	Concerned about the impacts of seismic activities on crab populations.	Event ID 6876 - The Regia team responded in-meeting that seismic can cause a physiological reaction in crab - delayed righting. Discussed that they will only go to 200m.	6876
4443	Concerned that the Regia team said there will be zero effect and that every historical seismic activity has had a worse effect.	Event ID 6876 - The Regia team responded in-meeting that they did not say there would be zero effect. Offered to analyse fishing data provided by commcercial fishers and reproduce long-term catchability analysis. An analysis is also included in Appendix F3, section 3.5.3	6876
4444	Concerned that there are no studies about the effect of seismic after adult malting.	Event ID 6786 - The Regia team responded in-meeting and discussed UTAS study which looked into effects of seismic during different stages of juvenile development. Explained that the sample size was very small. Study showed that there is a repairing period. Asked relevant person about malting seasons.	6876
4447	Asserted that non-productive catch areas are a result of seismic activity.	Event ID 6876 - The Regia team responded in-meeting that they could re-run their long-term catchability analysis with data provided by commercial fishers. Stated that they could reduce block size and make it granular.	6876

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4378	Stakeholder described the anthropogenic impacts on the Victorian Fairy Penguin populations, such as direct human interference, predation by dogs, cats, foxes and rats, trampling of burrows by humans and stock, plastic product pollution, oil spills, accidental entrapment, inundation of burrow sites from climate induced sea level rise and drowning in fishing nets and competition with fisheries. Claims that seismic blasting will be an additional pressure to these challenges and threats that marine life and the Fairy Penguins already face, and may result in local population reproduction failure or extintion if sufficient protections are not put in place.	Event ID 6882 (Doc ID 9096)- CGG agrees that predation from feral animals, particularly dog attacks, poses a significant threat. Recent research by Blamey et al. (2024) identifies dog attacks as the largest threat to Little Penguin colonies in Tasmania, and similar threats have been reported along Western Victoria (Norman et al., 2017). In response to the claim that CGG compared the potential impacts of the Regia MSS to the serious threats faced by penguins, CGG clarifies that such a comparison has never been made. CGG seeks clarification on the origin of this statement. CGG acknowledges the potential for behavioural impacts on Little Penguins but asserts that these impacts are of an acceptable level, as detailed in the EP. The justification for this conclusion includes: • Sound exposure results in only short-lived changes, which penguins can quickly habituate to. • There is no evidence suggesting a reduction in overall fitness, as demonstrated by their extensive foraging ranges and capabilities. • Breeding success and survival rates are unaffected, as breeding occurs on land and no mortal or potential injury (PTS) from sound exposure has been observed. This conclusion is based on an extensive review of scientific literature, alongside the mitigation measures implemented by CGG. While sound may act as a deterrent, CGG acknowledges that the sound source moves. To further mitigate any potential effects on Little Penguins, CGG has committed to using a low power setting if foraging flocks (which may indicate feeding penguins) are observed within 500 m of the sound source. Full power will only be employed when the seismic source is more than 500 m away from such flocks, ensuring that foraging birds are not startled and can continue to forage after the vessel has moved on.	6412

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4379	Claims that the proposed activity may cause chicks to be underfed or abandoned due to the seismic blasting activity meaning less access to food supply, leading to death and reproductive failure as Fairy Penguins can be potentially behaviourally affected up to 77km away from the airgun source, forcing them from their natural colony foraging area and impacting caring for their young during breeding season (June-February), as forced into more concentrated areas of limited breading season foraging range. This could result in eggs and chicks being abandoned due to lack of food and uncomfortable sound pressure.	Event ID 6882 (Doc ID 9096) - Previously responded to in Feedback ID 4138. Titleholder re states several studies related to penguin foraging behavior, outlining the following key points about the home range and feeding behavior of penguins, their foraging distances, and the lack of evidence suggesting seismic surveys have caused penguin chick mortality. 1. Feeding Range and Foraging Distances: o It is essential to distinguish between maximum, total, and mean/median foraging distances when describing home ranges. o Studies show that while penguins may occasionally travel distances exceeding 30 km from their nesting sites, the majority of their foraging occurs within 15-20 km of the nest (Berlincourt & Arnould 2014, Pelletier et al. 2014, Philips et al. 2019, Philips et al. 2022). o The longer foraging distances are exceptions rather than the norm, and this is consistent across multiple studies and locations. 2. Food Resources and Foraging Areas: o The Otway region is rich in sardines and squid, with food quality improving closer to upwelling areas, which are known to enhance the availability of these resources (Norman et al. 2017). o The presence of abundant food resources may allow penguins to meet their nutritional needs more efficiently without needing to travel far. 3. Penguin Condition and Foraging Effort: o Berlincourt and Arnould (2015) found that penguins breeding at the London Bridge colony did not show variation in body condition despite an increase in foraging effort. This could imply that these penguins have a greater capacity to increase foraging efforts if prey becomes scarcer. 4. Fledgling Weight: o Overeem Wallis (2003) reported that the mean fledgling weight at Middle Island was 1081.4g. Fledgling weight is an important indicator of the health and success of young penguins. 5. Seismic Surveys and Penguin Mortality: o There is no scientific literature to support the claim that seismic surveys result in the death of penguin chicks. o Despite numerous seismic surveys and other petroleum-related activities in the Otway region since the 1960s, no evidence of direct harm to penguins, including chick mortality, has been observed. o On the other hand, studies highlight that the primary threat to penguins, especially little penguins, comes from feral animal predation.	6412

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4386	objects to CGG's claim that the disturbance will be “short term” and “temporary”, stating that the seismic blasting project may disrupt the penguins' foraging behavior and potentially impact the population health of penguin colonies in the area, including increased competition and less area in which to forage.	Event ID 6882 - Whilst the Titleholder continues to acknowledge there may be some behavioural impacts to little penguins, there is no scientific evidence to support the claim that young chicks may be abandoned as a result of the survey. CGG has described the disturbance as being short term and temporary as this accurately reflects the activity relative to other disturbances, for example the continuous predation by feral animals.	6412
4387	Claims that CGG’s Environment Plan needs to be updated to the correct normal breeding season commencement time of June/July for the Fairy Penguins of Western Victoria.	Event ID 6882 - CGG agrees to amending the EP to reflect this: During consultation with relevant persons, it was noted that as referenced by the Middle Island Project (Event ID 6412) there were instances of breeding cycles beginning as early as June.	6412
4445	Concerned that divers had noticed a reduction in marine activity after a seismic activity.	Event ID 6876 - The Regia team responded in-meeting and went through their box plot analysis. Explained that the data used was landed catch data each month from 2016 - 2023. Also went through CPUE data set and stated that the analysis showed although landed catch was lower, CPUE was still in range in 2020. Explained the Regia team are looking at recruitment of the fishery. Explained that the fishers take 30% of the fishery. Stated there was evidence there was no stock level effect.	6876
4446	Raised concern that catch will drop off 5 years after seismic activity.	Event ID 6876 - The Regia team responded in-meeting and went through their box plot analysis. Explained that the data used was landed catch data each month from 2016 - 2023. Also went through CPUE data set and stated that the analysis showed although landed catch was lower, CPUE was still in range in 2020. Explained the Regia team are looking at recruitment of the fishery. Explained that the fishers take 30% of the fishery. Stated there was evidence there was no stock level effect.	6876

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4382	Claims that the 20km halo is insufficient for the penguin populations to forage without direct impact disturbance and questions the intent behind the 20km seismic-free halos around each Fairy Penguin colony apart from the Deen Maar colony which does not have the same exclusion buffer.	As described in Appendix F3, section 3.4, studies have shown that while little penguins can forage up to 30 km from their nesting sites, the majority of feeding during the nesting season occurs within 15–20 km. This pattern has been confirmed across multiple locations and studies. Research also shows that little penguins are highly adaptable foragers. Tagging studies at London Bridge revealed changes in foraging effort in response to sea conditions, yet body condition remained stable, suggesting the capacity to increase effort as needed. A tagging study confirmed that little penguins are shallow divers and forage close to shore. The study found that while individual penguins showed some consistency in foraging behaviour over short periods, their foraging locations varied across days, suggesting they adapt to shifting prey availability. There was no long-term consistency in their foraging patterns, indicating an ability to respond to prey that is unpredictable over time. Overall, the findings highlight little penguins' high behavioural plasticity and flexibility, with variation in foraging behaviour influenced by location, year, breeding stage, and clutch (Camprasse et al. 2017).	6412
4452	Stakeholder claims that potential impacts on World Heritage Values of Budj Bim and the life-cycle of Kooyang have not been properly assessed or addressed.	Regia team responded by referencing the relevant impact assessments in the Environment Plan (EP) (EVT070), this information was also provided in Event ID 7363. Previously provided in Event ID 2521, 2356, 2357, 2358, 2359, 2360, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417.	7136
4453	Stakeholder claims that potential impacts on World Heritage Values of Budj Bim and the life-cycle of Kooyang have not been properly assessed or addressed.	Regia team responded by referencing the relevant impact assessments in the Environment Plan (EP) (EVT070), this information was also provided in Event ID 7363. Previously provided in Event ID 2521, 2356, 2357, 2358, 2359, 2360, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417.	EVT070
4460	Claims that seismic blasting adds cumulative pressure to Fairy Penguins, leading to additional adverse effects beyond existing threats that could lead to population declines or local extinction, and that this cumulative impact has not been considered.	Species sensitivity, including threats from existing predation and robustness of food stocks, was included in Appendix F3, section 3.4, as per previous feedback (FB ID 4378).	7135
4461	Objection to the acceptability of behavioural impacts and displacements of Fairy Penguins from core foraging areas caused by seismic noise.	Assessment using up to date and relevant science has concluded that any impacts would be temporary and short-term with no population level impacts, as per previous feedback (FB ID 4386).	7135

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4462	Objection to claim that breeding and chick rearing is unaffected due to being on land, emphasing the need for adult penguins to forage at sea.	Assessment using up to date and relevant science has concluded that any impacts would be temporary and short-term with no population level impacts and no scientific evidence to support the claim, as per previous feedback (FB ID 4386).	7135
4463	Claims that mitigation measures for Fairy Penguins are insufficient to protect breeding success and health.	That the justification for the mitigation measures has been outlined in prior feedback (IDs 4027, 4119 and 4138). The environmental assessment aims to ensure population stability is not affected and that impacts are reduced to ALARP. The assessment concludes that the Little Penguin population is not at significant risk, based on the combined effect of the mitigation measures. These include scheduling the survey outside the core egg-laying and chick-rearing period, locating the survey outside primary feeding areas (typically within 20 km of nests), and exposure near Deen Maar to just five hours over three weeks. Because the seismic vessel is always moving, penguins have continuous opportunity to avoid the sound source. Feeding grounds extend widely along the coast, and anchovy stocks—the main food source—are currently healthy. In addition, if feeding flocks are observed within 500 m of an active seismic line, the source will be reduced to low power until the vessel is again beyond this distance. Collectively, these measures reduce impacts to ALARP and avoid any pathway to population-level effects.	7135
4464	Objection to proceeding with seismic surveys in the absence of published studies, based on precautionary principle.	The precautionary principle requires action to prevent environmental degradation even when full scientific certainty is lacking, but only where there is a threat of serious or irreversible harm. CGG states that the Regia EP demonstrates that, with the measures applied, the Regia MSS does not pose such a threat. Therefore, in CGG's view, uncertainty does not trigger the precautionary principle in this case, making debates about the extent of uncertainty irrelevant to its legal application.	7135
4465	Claims insufficient assessment of indirect effects on penguin food supply (Cluepid fish) from seismic activity.	This assessment has been undertaken and provides the EP reference, Appendix F3, section 3.4.1. States that the outcome (impacts are of an acceptable level) has previously been shared with the stakeholder (Feedback IDs 4378 & 4122). Confirms that the core food stocks for Little Penguin (Anchovy) are in good health, as confirmed via state fishing statistics.	7135
4466	Claims the EP does not provide consideration of how penguins, both chicks and adults, may be directly or indirectly affected during the guard and post-guard stages of the breeding season.	The guard and post-guard stage is already considered in assessment Appendix F3, section 3.4, quoting Berlincourt and Arnould's 2015 paper, as per previous feedback (FB ID 4228).	7135

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4467	Claims the EP underrepresents the early onset of egg-laying at colonies beyond Middle Island, despite previously provided evidence showing that breeding at other locations, such as the London Bridge colony, regularly begins as early as June or July. The stakeholder suggests that CGG has omitted relevant scientific data already shared with them, resulting in an incomplete picture of the species' breeding phenology in the region.	This is in the EP, as per the following reference in App F3, section 3.4.1, from Event ID 6412: During consultation with relevant persons, it was noted that as referenced by the Middle Island Project (Event ID 6412) there were instances of breeding cycles beginning as early as June.	7207
4468	Objection to claim that breeding and chick rearing is unaffected due to being on land, emphasizing the need for adult penguins to forage at sea.	Assessment using up to date and relevant science has concluded that any impacts would be temporary and short-term with no population level impacts and no scientific evidence to support the claim, as per previous feedback (FB ID 4386).	7207

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4469	Objects to the negative effects of seismic testing on the short-finned eel.	CGG undertook scientific assessment for underwater sound impacts on Fish (Appendix E3 and F3), including short-finned eels. Short-finned Eels possess a swim bladder and were grouped with other fish having swim bladders for acoustic impact analysis, following the guidance of Popper et al. (2014). For fish in general, and eels in particular, the key impact mechanisms considered were potential for hearing damage or physiological injury from intense sound close to the source, and behavioural disturbance (e.g. startle responses or avoidance movement) at various distances. The EP concluded that no fish, including eels, would be close enough to the seismic source to suffer mortality or physical injury, with measures in place such as soft-starts the free-swimming fish are able to move away from the sound source, and that they anticipate no direct fatalities or lasting injuries to adult eels in the water. The titleholder acknowledges that fish may exhibit behavioural reactions to seismic noise and they assumed a conservative scenario where fish might show avoidance responses at substantial distances. In the worst case, an eel migrating through the area might detect the seismic pulses at distance and alter its course or depth to avoid the highest sound levels. The EP considered such avoidance to be a temporary and localised effect and that any diversion would likely be on the scale of hundreds of meters to a few kilometres at most. Given that migrating eels travel thousands of kilometres to reach spawning grounds, a short detour or a brief pause is not expected to jeopardize their overall journey. The EP's finding was that behavioural changes would be temporary and would not have long-term impacts on individuals or the population. (Responded to in EVT346)	EVT178
4470	Objects to the insufficient consideration of the physical presence and migration interference caused by seismic activities in eel migratory pathways.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. The titleholder acknowledged that the Regia MSS Operational Area is offshore in the Otway Basin (south-west of Vic), which is adjacent to, with some limited overlap, to the potential migration corridor for these eels heading toward the western Tasman Sea. Appendix E3 identified "Eels (Anguilla spp.)" as a receptor in the environment that could be affected by underwater sound (section 4.1.6), precisely because Short-finned Eels are present in coastal catchments adjacent to the survey area and undertake marine migrations. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4471	Objects to the insufficient consideration of daily vertical migrations of the short-finned eel.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. CGG recognises that Short-finned Eels spend most of their life in freshwater/estuarine environments and undertake a once-in-a-lifetime spawning migration to the ocean. Specifically, the EP notes that mature adults (typically 8–20 years old, depending on sex) depart their rivers in late summer to autumn to migrate to oceanic spawning grounds. The EP also describes the return journey of the progeny: eggs hatch into larvae that drift southward on currents, metamorphose into “glass eels” and eventually enter coastal estuaries (with peak recruitment in winter–spring), which is consistent with established literature and references cited by the stakeholder (e.g. Gooley et al. 2002 , Jacoby et al. 2015). Appendix E3 incorporated the latest research on eel migration behaviour, notably Koster et al. (2021). The EP explicitly references Koster et al. and confirms the phenomenon of diel (daily) vertical migration in migrating eels: tagged eels from the Hopkins and Fitzroy Rivers exhibited a pattern of surfacing at night and diving deeper during the day while at sea. CGG acknowledges that this is a crucial behavioural detail that the EP does acknowledge. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4472	Objects to the insufficient consideration in Regia MSS Environment Plan's of the cultural value of the short-finned eel in South-West Victoria and South Australia beyond Budj Bim.	The Regia MSS EP was prepared and assessed under an objective based regulatory regime, which requires the titleholder to consider a broad definition of the environment which may be affected, including cultural heritage. The EP recognises the intangible cultural or spiritual connections to Sea Country and undertook research and assessment, including consultation with Traditional Owner groups, within the relevant Sea Country. While no significant impact is predicted, they remain committed to respectful ongoing engagement with Indigenous stakeholders regarding any spiritual or cultural concerns. Cultural heritiage to the eels is stated in Appendix E3 section 4.6.1, Appendix F3 section 3.7 and 3.16. Titleholder also explained that the EP contains a dedicated assessment of the Budj Bim Cultural Landscape (World Heritage Site) and its connection to Short-finned Eels and directed the stakeholder to Appendix F3 (Section 3.15). They stated that the conclusion of that assessment was that no threat or damage to Budj Bim's heritage values is expected from the proposed activity and that the cultural practices and eel stocks that underpin Budj Bim's value will not be materially affected. They stated that the EP goes further to acknowledge that beyond formally listed World Heritage values, there may be intangible cultural or spiritual connections to Sea Country that are difficult to quantify and that the Titleholder has regognised these and consulted Traditional Owner groups to better understand them.	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4473	Objects to the inadequate consideration of the habitat and lifecycle of the short-finned eel as their habitat includes all the areas essential to its lifecycle.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. The titleholder acknowledged that the Regia MSS Operational Area is offshore in the Otway Basin (south-west of Vic), which is adjacent to, with some limited overlap, to the potential migration corridor for these eels heading toward the western Tasman Sea. Appendix E3 identified "Eels (Anguilla spp.)" as a receptor in the environment that could be affected by underwater sound (section 4.1.6), precisely because Short-finned Eels are present in coastal catchments adjacent to the survey area and undertake marine migrations. The EP outlines the broad geographic distribution of Anguilla australi, extending from Queensland through Victoria, Tasmania, South Australia, and New Zealand, to demonstrate that eels from various regions may pass through or near the survey area. Accordingly, the EP did not overlook the potential for eels originating from rivers west of the survey area (such as the Glenelg River, Coorong, and Murray River) to travel along the continental slope. Instead, it treated the Short-finned Eel as a wide-ranging species and assessed it on that basis. The EP did not list each river individually because it considered the species at a regional population level. The evidence and conclusions therefore apply to all Short-finned Eels in the area, irrespective of origin, as their marine behaviour and sensitivities are expected to be consistent across populations. The EP also includes detailed description of lifecycles, referencing the latest science, including the migrations in these lifecycles. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4474	Claims that seismic sounds can cause sublethal and lethal impacts on short-finned eels, such as disorientation, reduced energy budgets, stress or mortality.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. The titleholder acknowledged that the Regia MSS Operational Area is offshore in the Otway Basin (south-west of Vic), which is adjacent to, with some limited overlap, to the potential migration corridor for these eels heading toward the western Tasman Sea. Appendix E3 identified "Eels (Anguilla spp.)" as a receptor in the environment that could be affected by underwater sound (section 4.1.6), precisely because Short-finned Eels are present in coastal catchments adjacent to the survey area and undertake marine migrations. The EP outlines the broad geographic distribution of Anguilla australi, extending from Queensland through Victoria, Tasmania, South Australia, and New Zealand, to demonstrate that eels from various regions may pass through or near the survey area. Accordingly, the EP did not overlook the potential for eels originating from rivers west of the survey area (such as the Glenelg River, Coorong, and Murray River) to travel along the continental slope. Instead, it treated the Short-finned Eel as a wide-ranging species and assessed it on that basis. The EP did not list each river individually because it considered the species at a regional population level. The evidence and conclusions therefore apply to all Short-finned Eels in the area, irrespective of origin, as their marine behaviour and sensitivities are expected to be consistent across populations. The EP also includes detailed description of lifecycles, referencing the latest science, including the migrations in these lifecycles. (Responded to in EVT346)	EVT178
4475	Objects to the inconsistent consideration of short-finned glass eels arriving during April to October as they have been recorded to arrive throughout the year.	The EP describes the Short-finned Eel migration from Victoria largely occurring during late summer through autumn consistent with prevailing scientific theory. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4476	Objects to the lack of consideration of glass eel feeding, or the potential of having to 'swim out of the way' of seismic testing on energy budgets.	The Environment Plan (EP) fully considered potential effects of seismic activity on Short-finned Eels, particularly in relation to their ability to detect, avoid, and respond to underwater sound while migrating. The assessment followed internationally recognised scientific frameworks (e.g., Popper et al. 2014) and incorporated conservative sound-modelling to determine thresholds for injury and behavioural disturbance. The assessment concluded that no eels would be close enough to the seismic source to suffer injury or mortality, as eels are free-swimming and capable of moving away from noise. A soft-start procedure will also allow animals to detect and avoid the source gradually. Behavioural responses such as temporary avoidance or course adjustment were acknowledged and assessed as the most likely effect. Any such diversion would be localised and short-term, on the scale of hundreds of metres to a few kilometres, and would not meaningfully affect the eels' long-distance migration or energy reserves, given their natural capacity for endurance. The EP therefore determined that behavioural changes would be temporary, reversible, and of low intensity, with no population-level consequences. Supporting evidence from global studies shows no recorded cases of eel mortality or population decline linked to seismic surveys, including in the Otway Basin, where over 80 surveys have occurred in the past six decades. The assessment concludes that Short-finned Eels may move away from the survey area when exposed to sound, but will resume migration without harm or delay, and that predicted impacts are minor, transient, and not significant at individual or population scales. (Responded to in EVT346) Appendix E3 section 4.1.6 has been updated to include: It has been noted by Van Wichelen, et al (2022) that glass eels feeding during their migration is highly restricted, therefore when discussing impacts to glass eels, this has been considered.	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4477	Objection about the lack of adequate recognition and consideration of non-lethal, cumulative, and long-term impact of seismic noise on short finned eel.	Short-finned Eels possess a swim bladder and were grouped with other fish having swim bladders for acoustic impact analysis, following the guidance of Popper et al. (2014). For fish in general, and eels in particular, the key impact mechanisms considered were potential for hearing damage or physiological injury from intense sound close to the source, and behavioural disturbance (e.g. startle responses or avoidance movement) at various distances. The assessment concluded that no fish, including eels, would be close enough to the seismic source to suffer mortality or physical injury, with measures in place such as soft-starts the free-swimming fish are able to move away from the sound source, and that they anticipate no direct fatalities or lasting injuries to adult eels in the water. The titleholder also acknowledged that fish may exhibit behavioural reactions to seismic noise and that they assumed a conservative scenario where fish might show avoidance responses at substantial distances. In the worst case, an eel migrating through the area might detect the seismic pulses at distance and alter its course or depth to avoid the highest sound levels. The EP considered such avoidance to be a temporary and localized effect and that any diversion would likely be on the scale of hundreds of meters to a few kilometres at most. Given that migrating eels travel thousands of kilometres to reach spawning grounds, a short detour or a brief pause is not expected to jeopardize their overall journey. The EP's finding was that behavioural changes would be temporary and would not have long-term impacts on individuals or the population. The Titleholder noted that the EP acknowledges the existing pressures on the Short-finned Eel population and was developed to demonstrate that the proposed seismic survey would not materially increase the cumulative impact on the species. The cumulative impact assessment concluded that, even when accounting for other regional activities, the incremental effect of the survey on overall conservation values would be neutral to negligible. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4478	Objection to CGG's statements of 'no predicted mortality' on short finned eels is not supported.	This conclusion is supported by conservative modelling, peer-reviewed scientific research, and a precautionary evaluation of worst-case scenarios. No new scientific information was identified in the submission that had not already been considered in the Environment Plan. References such as Koster et al. (2021) were already incorporated into the EP, which includes the IUCN listing of near threatened. CGG notes that while Jacoby et al. (2015) raised conservation concerns for the species, the EP's findings are consistent with ensuring that the proposed activities do not exacerbate those concerns. (Responded to in EVT346)	EVT178
4479	Objection to CGG's statements about proposed mitigation measures in relation to the short finned eel.	The Environment Plan (EP) adopts an evidence-based, risk-weighted, and precautionary approach, consistent with both the letter and spirit of the precautionary principle in Australian law. The EP concludes that the impacts and risks to Short-finned Eels have been reduced to As Low As Reasonably Practicable (ALARP) and remain acceptable, meeting the requirements for EP acceptance under Regulation 34. While recognising that NOPSEMA's independent review will make the final determination on the EP's adequacy, CGG's view is that the document meets the regulatory acceptance tests, including demonstrating no unacceptable impacts on World Heritage values and consistency with the principles of Ecologically Sustainable Development (ESD). (Responded to in EVT346)	EVT178
4480	Objection to CGG's frequency range of 0-200Hz on migrating eels, stating the EP minimises how seismic testing may affect the eels.	Short-finned Eels possess a swim bladder, though it is not primarily used for hearing, and were therefore grouped with other fish possessing swim bladders for the purpose of acoustic impact assessment. The Environment Plan (EP) applied the internationally recognised framework of Popper et al. (2014) to establish scientifically validated thresholds for potential injury and behavioural disturbance. The assessment considered possible hearing damage, physiological effects from intense sound near the source, and behavioural responses, such as avoidance or startle reactions, at varying distances. As no specific audiograms exist for Short-finned Eels, the EP adopted a conservative approach, assuming they would respond similarly to other fish with comparable anatomy. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4481	Claims that content provided in the Regia Environment Plan is inconsistent, incomplete, misleading and has multiple errors in logic and critical thinking and does not accurately represent the evidence about the life cycle of the short-finned eel.	The version of the EP referenced by the stakeholder (June 2024) had been substantively updated with multiple iterations during NOPSEMA's assessment and following public comment which addresses all scientific and policy related claims. Titleholder also explained that the Regia MSS EP was prepared and assessed under an objective based regulatory regime, which requires the titleholder to consider a broad definition of the environment, including cultural heritage and social values, not just the immediate onshore operational area.	EVT178
4482	Claims the inadequacy of the Regia MSS Environment Plan in applying the precautionary principle and using transparent, comprehensive evidence for impact assessment.	The claim that the process lacked transparency is not supported by record as the project ran an unusually open process where the EP and appendices were published on the Consultation Hub, and the public were provided with updates at every revision. The EP's approach is fully consistent with Australian regulatory requirements for EP's which demand evidence-based assessment and precaution in the face of uncertainty and that the Regia MSS EP applied conservative assumptions and safety margins wherever scientific uncertainty existed. CGG are confident that the EP's evidence-based, risk-weighted approach – supplemented by precautionary, worst-case scenarios – meets both the letter and spirit of the precautionary principle in Australian law. The EP applies precaution through conservative assumptions, rigorous modelling, and layered safeguards, while also ensuring that conclusions remain scientifically defensible and evidence based. CGG have taken precautionary measures without abandoning accuracy or overstating unverified threats.	EVT178
4483	Claims insufficient monitoring and need for application of conservation recommendations and the IUCN's ongoing monitoring advice.	The EP applies the precautionary principle and ESD, using a conservative risk assessment that predicts negligible impact and is consistent with avoiding any deterioration in the species' conservation status. The EP acknowledges the conservation concerns highlighted in scientific literature, noting that the Short-finned Eel is classified as Near Threatened on the IUCN Red List. However, this classification is attributed primarily to freshwater habitat issues, not marine threats. The EP did not propose species-specific monitoring for eels because the predicted impacts were deemed so low (minor, transient disturbances with no lasting harm to individuals or the population), however would be open to assisting researchers.	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4484	Claims that the Regia MSS assessment on mortality of eels shows a critical thinking error, confirmation bias, logical fallacy and exaggerated language.	CGG maintains that the EP contains no fundamental logical flaws and expresses confidence that NOPSEMA, as the independent regulator, would identify any such issues in fulfilling its statutory role. The EP applies a structured weight-of-evidence approach, drawing on multiple lines of scientific information rather than selectively minimising impacts; where uncertainty was identified, the EP adopts precautionary assumptions. CGG states that the EP meets all regulatory requirements by describing the activity and environment, identifying all credible impacts and risks, and demonstrating that they are reduced to ALARP and acceptable levels. Regarding eel mortality, CGG notes that the EP explicitly predicts no mortality or injury based on modelled sound levels. Acoustic modelling shows the distance at which injury could occur is limited (60–230 m), and because eels are mobile, combined with the soft-start procedure, the likelihood of harm is extremely low. In response to concerns about confirmation bias or minimising language, CGG explains that terms such as “low risk” and “no measurable impact” are technical descriptors supported by evidence, not value judgments. They state that contextual information—such as the species’ resilience and broader existing pressures—is provided to ensure accuracy rather than diminish concerns. CGG also acknowledges minor typographical errors in species names but clarifies that these do not affect the scientific assessment.	EVT178
4485	Claims the activity will exacerbate existing pressures on freshwater eel.	The EP directly acknowledges the conservation concerns identified in the scientific literature and states that its impact conclusions are designed to ensure the proposed activity does not exacerbate those threats. It contextualises the Short-finned Eel’s resilience by noting that the species faces far greater long-term pressures, such as overfishing, river barriers, drought, and climate-driven changes to ocean currents, and that its Near Threatened status on the IUCN Red List is primarily due to freshwater habitat issues rather than marine impacts. Within this broader context, the EP concludes that the Regia MSS survey will not materially add to the cumulative pressures on the eel population. The cumulative impact assessment predicts the survey’s incremental effect to be neutral to negligible, and that any impacts will be minor and temporary, with no risk of jeopardising migration success or the species’ viability.	EVT200

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4486	Claims that the overall ecological health of systems is impacted by stressors affecting the short finned eel.	The EP recognises the ecological significance of the Short-finned Eel within the wider system. It notes that the species plays an important dual role in aquatic food webs, as both predator and prey, and is an ecologically connected component of marine and freshwater ecosystems. The EP describes the species' resilience, highlighting that Short-finned Eels are broadly distributed, migratory, and have persisted through natural environmental fluctuations over millennia. The EP assesses whether any predicted impacts could translate into population-level or ecosystem-level consequences. It concludes that Short-finned Eels are expected to experience only minor and temporary behavioural disturbance from the seismic survey, with no lasting harm to individuals or the population. Because abundance and function are predicted to remain intact, the species' ecological roles are not expected to change. Consistent with defined acceptable impact criteria, the assessment finds that effects will be temporary, reversible, small-scale, and low intensity at the population level. On this basis, the EP concludes there will be no ripple effects on predators, prey, or ecosystem processes. The document further supports this conclusion by noting that more than 80 seismic surveys have taken place in the Otway Basin over six decades, with no recorded decline in Short-finned Eel populations attributable to seismic activity.	EVT200

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4487	Claims that CGG's proposed activities are inconsistent with the Recovery Plans made under the EPBC Act, the Southern Right Whale Recovery Plan and the Blue Whale Recovery Plan. GMTOAC states that these activities pose known physical and behavioural risks to the Eastern Population of Southern Right Whales and to Pygmy Blue Whales. These risks include impacts from anthropogenic underwater noise, particularly seismic noise, vessel strikes, climate-driven changes in prey availability, and the cumulative effects of these pressures, all of which have the potential to injure or kill individuals and affect populations. GMTOAC notes that under the EPBC Act Program and NOPSEMA's decision-making guidelines, an Environment Plan cannot be accepted if it is inconsistent with a recovery plan. It emphasises that both Recovery Plans contain "Very High" importance actions requiring that Blue Whales and Southern Right Whales must be able to continue using their Biologically Important Areas (BIAs) without auditory impairment, injury, or displacement. The plans also call for preventing disruption and displacement of Karntubul (Southern Right Whales) from BIAs due to anthropogenic noise such as seismic surveys.	CGG maintains that its approach aligns with statutory obligations and industry best practice. It asserts that all regulatory requirements under Regulation 34 have been met, and that its environmental performance outcomes and control measures are grounded in the best available science and tailored to the ecological and cultural sensitivities revealed through consultation. The Regia MSS Environment Plan (EP) was designed to ensure impacts and risks are reduced to As Low As Reasonably Practicable (ALARP) and to an acceptable level. Regarding whale protection, CGG highlights that the EP includes specific mitigation measures for culturally and ecologically significant marine fauna, including species noted in relevant Recovery Plans. Early correspondence in February 2023 identified Southern Right Whales and Pygmy Blue Whales as key sensitivities, and the EP commits to spatial and temporal avoidance measures, sound-source shutdowns, and exclusion zones to protect them. These measures explicitly consider cultural significance, such as timing restrictions to avoid the Karntubul (Southern Right Whale) birthing period. The whales, Karntubul and Wuuloc, are identified in the EP as sensitive receptors with dedicated protective measures. CGG confirms that these cultural and ecological sensitivities were incorporated into the environmental assessment. The EP acknowledges the sacred cultural status of Koontapool (Southern Right Whale) and Wuuloc (Pygmy Blue Whale) for the Gunditjmara people and includes them in impact and cumulative risk assessments. Appendix F3 references the Nyamat Mirring Plan 2023–2033 and recognises Gunditjmara spiritual connections, including to Karntubul. CGG substantively addresses the relevant issues, including underwater noise, vessel interactions, and cumulative effects. The EP sets out noise-management frameworks, timing restrictions, and cumulative impact analyses consistent with the concerns raised.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4488	Claims that CGG has not incorporated effective control measures to reduce impacts and risks to ALARP or to ensure those impacts will be acceptable. It maintains that several control measures in the Environment Plan (EP) are inconsistent or conflicting, making them difficult or impossible to implement. GMTOAC further contends that CGG has weakened its mitigation framework compared with the November 2024 EP by replacing required sound-source shutdowns with an undefined "low power zone" when Karntubul (Southern Right Whales) are present. Also, that CGG has not ensured its activity will avoid unacceptable impacts on Koorn Moorn, which feed in Nyamat Mirring waters extending 200 m around Deen Maar Island. It claims CGG has not used the best available science in its noise modelling and has relied on comparative analyses rather than updated models, making results difficult to interpret. Additionally, GMTOAC argues that the revised ALARP assessment methodology introduced in the April 2025 EP, intended to address flaws in the November 2024 version, is inadequate, less systematic, and less defensible than the earlier approach.	CGG maintains that the Environment Plan (EP) incorporates effective control measures and satisfies the legal requirements for demonstrating that impacts and risks have been reduced to As Low As Reasonably Practicable (ALARP) and to an acceptable level. It asserts compliance with Regulation 34 and emphasises that its environmental performance outcomes and controls are grounded in the best available science and tailored to the identified ecological and cultural sensitivities. Culturally significant species and features, including Karntubul and Koorn Moorn, are included in impact and cumulative risk assessments using a methodology intended to reflect both scientific evidence and cultural. CGG argues that GMTOAC's objections substitute personal disagreement for the regulatory test, noting that the legislation does not require stakeholder agreement or grant veto powers over EP design decisions. While GMTOAC criticises the revised ALARP assessment methodology (April 2025 EP), CGG reiterates that its approach satisfies the regulatory criteria. In response to claims that mitigation measures have "weakened", particularly the shift from sound-source shutdowns to a "low power zone", CGG characterises these changes as part of a normal, adaptive, and consultation-driven refinement process. It describes the evolution of the activity as a progressive reduction in operational footprint, increasingly targeted controls, and strengthened performance-based measures, noting that core protections such as timing restrictions to avoid Karntubul birthing seasons remain in place. CGG states that cultural and ecological sensitivities associated with Karntubul, Wuuloc, and Koorn Moorn have been integrated into the assessment, with Appendix F3 acknowledging their cultural significance and informing mitigation commitments. CGG reiterates that its control measures are based on contemporary scientific evidence and incorporate cultural and ecological sensitivities throughout the EP.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4489	Claims that CGG cannot determine what constitutes an "acceptable" level of impact or risk to Gunditjmara cultural values in Nyamat Mirring. States the April 2025 Environment Plan contains flawed cumulative impact assessments due to this lack of consultation. GMTOAC identifies several shortcomings: CGG's interpretation of potential impacts to Gunditjmara and other First Nations cultural heritage is too narrow; CGG wrongly assumes that acceptable ecological impacts equate to acceptable cultural impacts; and CGG's cumulative impact assessment for Karntubul (Southern Right Whale), previously criticised by NOPSEMA in its February OMR, remains unchanged.	CGG rejects GMTOAC's claim that inadequate consultation prevents CGG from determining "acceptable" levels of cultural impact, asserting that it fully met its consultation obligations. CGG argues that the legal test is whether the Environment Plan demonstrates impacts and risks are reduced to ALARP and to an acceptable level. It maintains that GMTOAC's critiques conflate subjective opinion with the regulatory standard under Regulation 34 and emphasises that the law does not grant stakeholders a veto over design decisions. In response to the assertion that its interpretation of cultural heritage is too narrow, CGG maintains that GMTOAC has already articulated its cultural values clearly and extensively through published materials and received during consultation. These values, encompassing ceremony, obligations, kinship systems, spiritual relationships, and ecological connections are thoroughly integrated across the EP. The EP references the Nyamat Mirring Plan 2023–2033, incorporates cultural values and sensitivities into Appendix F3, and identifies culturally significant species and places as sensitive receptors with tailored management measures, for example, timing restrictions to avoid birthing seasons. CGG states that it has incorporated analysis of cumulative effects on Sea Country, including those arising from the survey in combination with other activities. It confirms that Karntubul is included in cumulative risk assessments with corresponding mitigation commitments.	EVT352
4490	CGG has failed to adequately assess the impacts of its proposed activity on the Budj Bim World Heritage Cultural Landscape. GMTOAC further states that CGG did not sufficiently evaluate impacts on Kooyang, a culturally significant species whose lifecycle and migration underpin the world heritage values of the Budj Bim Cultural Landscape and extend well beyond its physical boundaries.	Culturally significant features, including the Budj Bim landscape, were included in both impact and cumulative risk assessments using a methodology that blends scientific evidence with cultural narratives. Regarding Kooyang (Eel), CGG maintains that this culturally important species, whose lifecycle is central to the world heritage values of Budj Bim, was addressed within the EP's impact and cumulative assessments. These assessments include both Kooyang's cultural significance and ecological role. CGG reiterates that its EP is consistent with statutory obligations, based on best-available science, and tailored to the cultural and ecological sensitivities identified. CGG maintains that the Budj Bim Cultural Landscape and Kooyang have been incorporated into the EP and that this inclusion meets regulatory standards for demonstrating ALARP and acceptable levels of impact.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4491	Claims about the SRW and BW BIAs. States proposed activity will cause unacceptable impacts to all Karntubul species, including temporary & permanent hearing loss, displacement from BIAs, vessel strike, prey depletion during peak feeding/migration period, calving interruption, and impact to ecosystems and cultural landscapes as a result of the cumulative impact of these.	CGG has identified all Biologically Important Areas (BIAs) relevant to blue whales (BWs) and southern right whales (SRWs) and incorporated seasonal BIA use into the survey design through substantial temporal and spatial restrictions detailed in the EP. Predicted underwater-sound impacts on these Karntubul species, along with mitigation measures presented in Appendices E7 and F3, demonstrate impacts will remain acceptable and will avoid auditory impairment or displacement from BIAs or Habitats Critical to Survival (HCTS). CGG further notes that vessel-strike risk is already extremely low during seismic surveys and that additional controls in Appendix D2 ensure this risk is prevented and acceptable. It concludes that no changes to ecosystem structure, diversity, or function are expected from the one-off survey, with sound exposure too limited in extent and duration to affect prey, food webs, or predator–prey relationships. A cumulative impact assessment found residual cumulative effects to be low, reduced to ALARP, and acceptable, with no impacts predicted for regional marine parks. CGG also asserts consistency with the National Recovery Plan for Southern Right Whales and the Blue Whale Conservation Management Plan, stating that their objectives and recommended measures have been incorporated. Finally, CGG maintains that all marine mammal species likely to occur in the region have been adequately assessed using up-to-date EPBC Protected Matters data, and that mitigation measures ensure impacts to all listed species will remain acceptable and not inconsistent with EPBC Act protection provisions.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4492	Claims that the eastern population of the Southern Right Whale, estimated at only 200–300 individuals, is at particularly high risk because its migration and reproduction Biologically Important Areas (BIAs) overlap directly with CGG's Operational Area and sound propagation footprint. According to the Southern Right Whale Recovery Plan, these whales use the affected region for reproduction between May and September and for migration between April and October. The Recovery Plan also notes that Southern Right Whales do not feed in coastal waters but are expected to feed, and possibly conceive, within the Australian Whale Sanctuary—an area entirely overlapped by the proposed Regia MSS activity. As a result, the seismic survey could occur within, or affect, conceiving, calving, and feeding grounds for this critically endangered sub-population. The species is particularly vulnerable to human impacts due to its low reproductive rate, long lifespan, and strong site fidelity to key habitats. The submission therefore emphasises the relevance of underwater noise, habitat degradation, and vessel-strike risks in the context of the proposed seismic activities.	The Recovery Plan explains that BIAs can be designated for key behaviours such as reproduction, foraging, migration, and resting. While Southern Right Whale BIAs in the Plan cover reproduction and migration, the Plan notes that foraging occurs across a much broader offshore latitudinal range (30°S–65°S) and is not linked to these BIAs. Because the Regia MSS is not located in Antarctic waters, it will not affect cetaceans that forage there. CGG states the survey will avoid peak SRW abundance in the mapped BIA and apply mitigation measures to ensure no SRWs are harmed, injured, or interfered with.	EVT352

4494	The claim highlights guidance from the Blue Whale Recovery Plan, which stresses the need for a precautionary approach when assessing threats at the population level. It notes that blue whales may continue feeding despite disturbance if alternative feeding grounds are limited, meaning that anthropogenic noise may still present significant risk even when behavioural responses are subtle. Drawing on the Recovery Plans, the submission identifies key threats relevant to assessing potential impacts of the Regia MSS activity: underwater anthropogenic noise, climate change, habitat degradation, vessel strikes, prey depletion, and the cumulative effects of these pressures. GMTOAC argues that CGG has not adequately assessed these threats, either individually or cumulatively, given that consultation on these matters remains ongoing. The submission states that, based on CGG's own impact metrics, the proposed seismic activities may result in moderate to major impacts from underwater noise, major risks of vessel strikes, major impacts associated with climate change, and potentially more severe cumulative impacts. It references the Commonwealth's Significant Impact Guidelines, which define significant impact and list criteria for determining when an action may threaten an endangered species' survival or recovery. GMTOAC concludes that moderate to major impacts, especially when cumulative effects are considered, meet the threshold of significant impacts and are therefore unacceptable. Finally, the submission notes that both Recovery Plans and EPBC Act Policy Statement 2.1 emphasise that seismic surveys should avoid biologically important areas during biologically important times and assess 3-4 years of baseline data. GMTOAC argues that this principle is not met in the timing and location of the proposed Regia MSS survey,	The EP is consistent with the Blue Whale Conservation Management Plan, which identifies seismic noise as a threat, by implementing measures that ensure blue whales can continue using the area without injury or displacement. This includes using MFOs and PAM, shutting down the seismic source if whales enter behavioural, or TTS-impact ranges, and complying with EPBC vessel-operation requirements such as maintaining a 300-metre caution zone. CGG states it will also avoid peak-abundance periods by commencing the survey after most SRWs have left the BIA and during months when blue whale numbers are low. Drawing on current scientific literature, the recovery plans, and detailed impact assessments, CGG maintains that all risks and impacts have been reduced to acceptable levels. While Appendix E7 initially identifies major impacts for SRWs and BWs due to their threatened status, CGG notes that both species were reassessed in Appendix F3, which added further measures for SRWs; Appendix F3 concludes that residual impacts to both species are reduced to an acceptable level.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	increasing the potential for displacement from critical habitats essential to whale survival and recovery.		
4496	GMTOAC objects to CGG removing a previous control measure limiting seismic discharge in the Pygmy Blue Whale foraging BIA during periods of low whale presence, replacing it with a vague condition requiring CGG to determine whether whale presence is "compatible" with proceeding. GMTOAC argues this new measure lacks detail on how whale presence or "unacceptable disturbance" will be assessed, and that it fails to reference Recovery Plans which define unacceptable impacts. GMTOAC warns that the proposed survey timing (April–June 2026) coincides with peak Pygmy Blue Whale foraging season and Southern Right Whale migration and calving periods, meaning the seismic survey is likely to occur when both species are using their BIAs. Preventing whales from accessing these areas, or exposing them to injury while they remain, would constitute unacceptable impacts inconsistent with Recovery Plan objectives.	CGG has further reduced the likelihood of interactions with marine mammals by excluding the April–June period and commencing the survey only after 15 September. Because blue whales typically do not arrive from Western Australia until November, CGG argues that most of the survey will occur when blue whales are absent from the area. It adds that sighting data show very few blue whales in November and December, with peak abundance occurring later, from January to March during the Bonney Upwelling.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4501	GMTOAC objects that the EP sets out CGG's own "Defined Acceptable Levels" for cultural impacts arising from underwater sound on marine mammals, concluding that any such impacts would be short-term, temporary, and recoverable. GMTOAC and Gunditjmara reject this assessment, emphasising that CGG did not properly consult them on what levels of harm to cultural values, including impacts to culturally significant species such as Karntubul, would be acceptable. As these standards were developed unilaterally, GMTOAC and Gunditjmara do not accept CGG's conclusions regarding cultural impacts.	PROPOSED RESPONSE SUMMARY - CGG applied a comprehensive, transparent, ISO 31000:2009-aligned risk-assessment methodology, drawing on peer-reviewed literature and approaches accepted in numerous Environment Plans, to determine acceptable levels of environmental impacts and risks on both tangible and intangible values. Environmental aspects were systematically identified, impact severity and duration were assessed, and mitigation measures were evaluated using evidence and consultation. Acceptable impact levels (Appendix B1) and the assessment method (Appendix B9) were publicly released in May 2023. CGG concluded that impacts and risks are acceptable because risks were fully identified, lower-level risks were eliminated or controlled, major risks were examined in detail, activity limitations constrain operations, predictions were assessed against defined acceptable levels, uncertainty was considered, and the activity complies with the EPBC Act and ecologically sustainable development principles. CGG also relied on relevant sources, including peer-reviewed studies and UNESCO guidance describing the deep interdependence of tangible and intangible values, to inform acceptable levels where Traditional Owner input has not yet been provided. GMTOAC and Gunditjmara have been invited to contribute to cultural-value management, and the EP includes an Implementation Strategy embedding a Sea Country Protection Plan to support ongoing engagement and adaptive management. The Regulations (Regs 17–18) further ensure that any significant new cultural or environmental information must trigger revision of the EP. CGG remains ready to continue collaboration with GMTOAC and Gunditjmara throughout the activity.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4502	GMTOAC objects to the seismic survey's potential impacts on krill populations, including larval krill, which form a foundational part of the marine food web in Nyamat Mirring and are a critical food source for culturally significant species such as Pygmy Blue Whales and Southern Right Whales. They state that CGG's EP downplays potential impacts by comparing them to natural fluctuations in krill abundance, a framing GMTOAC considers inappropriate because it subsumes an anthropogenic disturbance within natural variability rather than assessing it cumulatively. GMTOAC emphasises that Nyamat Mirring and the broader oceanic system are already under significant stress from climate change and other human impacts. They point to the catastrophic Karenia mikimotoi algal bloom in South Australia as an example of how cumulative pressures can destabilise marine ecosystems. GMTOAC also references the recent failure of the Panama Upwelling, the first such event recorded in over 40 years, as further evidence that natural oceanographic processes are increasingly vulnerable to cumulative stressors. They argue that these examples undermine CGG's assumptions about the robustness of the system and highlight the need for a more precautionary, cumulative-impact-focused assessment.	CGG undertook an extensive review of the scientific literature to understand regional upwelling systems and their dynamics, assessing more than 65 publications to support the confidence of its analysis. Detailed assessments of upwelling and krill are provided in Appendices E2 and F3 of the EP. CGG does not agree with the suggestion that the assessment is trivial and remains confident in the robustness of its findings. CGG also remains open to receiving questions or new relevant information. Additionally, CGG notes that references to Panama upwelling processes are not applicable to the Regia MSS assessment and maintains confidence in the supporting literature base.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4506	GMTOAC claims that NOPSEMA has repeatedly raised concerns about deficiencies in CGG's noise modelling, first in August 2024, and again in its February and June 2025 OMRs. Despite this, the April 2025 EP appears to rely on noise models last updated in May 2023 and June 2024, and GMTOAC notes that it is unclear how these outdated models could address NOPSEMA's concerns. NOPSEMA specifically found that CGG's modelling was not based on the best available science because it failed to incorporate the updated 2024 US NMFS noise-injury thresholds. Rather than rerunning its full acoustic models using the updated criteria, CGG instead hired a consultant to compare the new NMFS thresholds with its older modelling. NOPSEMA criticised this approach, stating it was unclear whether such a comparison could reliably be applied to historical model outputs, particularly since the consultant did not provide the underlying input data used to generate the new results. GMTOAC argues that under the precautionary principle, CGG should adopt whichever modelling outputs predict the greatest potential harm, rather than relying on older, less precautionary models. They express serious concern that foundational flaws in the noise-modelling approach mean the impacts to marine mammals may be significantly underestimated, calling into question the accuracy of the EP's impact conclusions and the adequacy of its proposed protective measures for Nyamat Mirring and its species and ecosystems.	CGG notes that how the titleholder responds to NOPSEMA's information requests is a matter between the titleholder and the regulator. CGG has completed updated acoustic modelling using the latest science, including NMFS 2024 guidance, and has refined the Regia MSS design to be more environmentally conservative. These updated results are included in the current EP, which remains robust and based on the best available information. CGG notes that GMTOAC may be relying on an outdated EP version or may not have fully considered the updated material.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4508	GMTOAC claims inadequate assessment of noise on culturally important Kooyang. GMTOAC notes that CGG's EP groups Kooyang with other fish possessing swim bladders, and acknowledges that fish with swim bladders may be more susceptible to physiological trauma from seismic noise. However, while the EP claims no studies have demonstrated direct mortality of adult fish from seismic emissions, GMTOAC highlights that it has repeatedly requested an independent study on Kooyang specifically, a request CGG has refused. Across multiple appendices, CGG's assessment appears inconsistent. Some sections state that eels fall within the category of fish whose hearing directly involves a swim bladder, while other parts of the EP fail to mention this heightened sensitivity or cross-reference relevant acoustic impact studies. GMTOAC argues these inconsistencies obscure the true risk profile and hinder meaningful evaluation of proposed controls. Finally, GMTOAC challenges CGG's conclusion that risks to adult Kooyang will be "extremely low" and indistinguishable from natural population variation. GMTOAC notes that this claim lacks scientific justification and appears to rely on the eel's behavioural avoidance or instinctual drive to migrate rather than on concrete control measures to prevent harm.	CGG recognises kooyang as a profoundly important Gunditjmara cultural value and not just an ecological species. The Environment Plan explicitly protects kooyang by applying culturally defined acceptability criteria, including ensuring no material reduction in kooyang abundance, recruitment, or sustainable harvesting that could impact Budj Bim practices or World Heritage values. This cultural framing underpins the entire assessment. CGG rejects claims that its underwater-noise assessment is inadequate, noting that it is detailed, conservative, peer-reviewed, and fully compliant with best-practice standards. Kooyang are assessed using the highest-sensitivity category under EPBC Policy 2.1, and predicted noise-effect zones are extremely small. The survey timing has been shifted to September–December, avoiding: peak adult silver-eel migration (Feb–May), most glass-eel recruitment (Oct–Feb), and juveniles that would already be inside river/estuary systems. This means minimal temporal or spatial overlap with key life stages. There is no credible pathway for population-level or culturally significant effects, and global evidence shows no seismic survey has ever been linked to effects on anguillid eel recruitment. Overall, the assessment is precautionary, culturally informed, and reduces risks to ALARP. CGG remains open to incorporating additional Gunditjmara knowledge or scientific evidence, but based on current information, no material impact on kooyang is credible.	EVT352

4509	GMTOAC claims that CGG's approach to assessing impacts on Kooyang is inconsistent with the precautionary principle under the EPBC Act, especially given Kooyang's cultural significance and its central role in the World Heritage–listed Budj Bim Cultural Landscape. GMTOAC states that CGG has repeatedly asserted, without scientific evidence, that juvenile eels will not be near the seismic activity, despite the absence of data tracking their migration from the Coral Sea to Gunditjmara Sea Country. They outline the well-established seasonal migration patterns of adult and juvenile Kooyang and state that these movements directly link the open ocean to the Budj Bim aquaculture systems. UNESCO inscribed Budj Bim as a World Heritage property because of Gunditjmara's long-standing eel aquaculture, which relies on the uninterrupted migration of Kooyang. GMTOAC highlights that published research, co-authored by Gunditjmara Elders and scientists, shows adult eels travel through areas that overlap with CGG's Operational Area and EMBA, meaning migrating Kooyang are likely to encounter the seismic survey if undertaken in April 2026. GMTOAC also raises concerns regarding CGG's framework for assessing impacts on World Heritage values. They argue that CGG wrongly limits its definition of "direct effects" to the physical boundaries of the property, failing to recognize that Kooyang moving through the marine environment outside the site are essential to the World Heritage values themselves. GMTOAC rejects CGG's categorisation of impacts to Kooyang and Gunditjmara cultural practices as merely "indirect," and notes the EP provides no explanation for its claim that such impacts are "immeasurable."	CGG affirms the deep cultural importance of kooyang to the Gunditjmara People and agrees that any activity causing a population-level decline in kooyang that recruit into the Budj Bim wetland systems would be unacceptable. However, the claims in paragraphs 118–132 are based on legal and factual misunderstandings. The World Heritage property is strictly limited to the freshwater Budj Bim wetlands on the lava flow and does not include estuarine, coastal, or oceanic waters. Under UNESCO rules, World Heritage protection applies only within the fixed site boundaries and cannot extend to migratory species outside them. No World Heritage site has ever been interpreted the way GMTOAC suggests. CGG clarifies that the OUV attribute "ecology and life-cycle of kooyang" refers specifically to the parts of the life cycle occurring within the engineered aquaculture systems inside the property, not the entire oceanic migration. International precedents—such as the Monarch Butterfly Reserve, the Yellow Sea Migratory Bird Sanctuaries, and the Wadden Sea, show that impacts outside property boundaries are not considered direct impacts on World Heritage values. Scientifically, the EP uses best-practice criteria, with predicted noise effects on kooyang limited to very small distances (<300 m), and the survey timing (Sept–Dec) avoids overlap with major migration and recruitment periods. No tracking data show a kooyang migration corridor through the survey area, and the contribution of one 60-day survey to cumulative pressures is negligible. Appendix F3 confirms alignment with relevant management plans, which only consider impacts inside the property's boundaries. CGG states it remains open to further Gunditjmara knowledge and evidence, and has updated the EP to consider the provided management plans, but concludes that no credible pathway exists for material impact on kooyang abundance within the Budj Bim wetlands or on the property's Outstanding Universal Value. The EP is therefore lawful, scientifically robust, and compliant with Australia's World Heritage and EPBC Act obligations.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	Further, GMTOAC states that CGG has only referenced one of the required Budj Bim management plans and has not demonstrated engagement with the others. They contend that CGG has not shown how the proposed activities align with or avoid contravening the management goals, especially those aimed at restoring healthy Kooyang populations. GMTOAC concludes that CGG's failure to properly account for the cultural, ecological, and World Heritage significance of Kooyang is unacceptable to Gunditjmara, whose stewardship of Budj Bim spans millennia and underpinned the site's World Heritage listing.		
4510	GMTOAC claim that CGG's proposed seismic survey would elevate chronic ambient noise levels and disrupt acoustic-dependent functions such as reproduction, feeding, navigation, predator avoidance and maintaining social structures. While CGG has acknowledged that an ambient noise assessment may be required to inform its impact analysis, GMTOAC contends that such a baseline must begin with an understanding of the natural, pre-industrial soundscape before incorporating existing anthropogenic sources such as shipping and offshore petroleum activity. GMTOAC suggests that this assessment could form part of a Gunditjmara Cultural Values Assessment (CVA). However, in the absence of a comprehensive baseline and analysis of how CGG's operations would contribute to cumulative noise levels, GMTOAC remains concerned that the Environment Plan does not adequately describe the affected environment, as required by the Regulations, and cannot reliably assess or reduce impacts on Nyamat Mirring, including chronic noise exposure, to acceptable or ALARP levels.	CGG acknowledges GMTOAC's concerns about acoustic impacts on Nyamat Mirring but notes that the EP already includes a rigorous, science-based assessment of underwater sound and its interaction with culturally and ecologically significant species. The assessment incorporates five years of ambient noise data, current international scientific guidance, calibrated sound-field modelling, and real-time acoustic monitoring during operations. CGG has also committed to additional pre-survey ambient noise monitoring in sensitive nearshore areas, such as Southern Right Whale nursery habitat. The EP demonstrates that the survey's noise contribution will be temporary, spatially limited, and tightly managed through shutdowns, PAM, exclusion zones, and adaptive scheduling. Overall, CGG maintains that GMTOAC's suggestion that the EP lacks adequate baseline information or understanding of acoustic impacts is incorrect, and that the approach integrates strong science, cultural input, and real-time validation to ensure responsible management of any acoustic effects.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4511	GMTOAC claims that, without proper consultation and completion of a Gunditjmara Nyamat Mirring Cultural Values Assessment (CVA), CGG cannot legitimately determine what constitutes an "acceptable" level of impact on Gunditjmara cultural values. They highlight deficiencies in CGG's cumulative impact assessment, which adopts an unduly narrow definition of First Nations cultural heritage. In the EP, CGG limits cultural impacts largely to obligations to maintain spiritual connections and care for culturally significant species, despite having access to far broader definitions through documents it relied upon, such as the Gunditjmara Nyamat Mirring Plan and native title determinations. These sources make clear that Gunditjmara cultural responsibilities encompass Country, Ceremony, Lore, language, relationships, and rights to use and manage resources. GMTOAC also challenges CGG's unsubstantiated assumption that ecological acceptability equates to cultural acceptability, noting that this equivalence has never been expressed or endorsed by Gunditjmara.	CGG has relied on peer-reviewed literature, management plans, policy documents, and guidance to define acceptable levels for cultural values, including sources such as McConnell et al., which outlines the interdependence of tangible and intangible cultural values. CGG emphasises that it does not claim these values are equal in weight, and has repeatedly invited GMTOAC and the Gunditjmara to contribute directly to how their cultural values should be managed. The EP includes an Implementation Strategy with a Sea Country Protection Plan to ensure ongoing involvement of Traditional Owners and to enable adaptive management if new information emerges. Regulations 17 and 18 require CGG to revise the EP if any new or increased cultural or environmental impacts arise, ensuring that future cultural information can be formally incorporated. Appendix F3 (section 3.16) draws on documents such as the Nyamat Mirring Plan and native title determinations to describe cultural features and assess related impacts and risks. CGG remains willing to continue collaborating with GMTOAC and the Gunditjmara in ongoing consultation and environmental management.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4512	GMTOAC claims significant concerns about CGG's definition of "acceptable levels" of impact on Blue Whales and Southern Right Whales. CGG maintains that impacts are acceptable so long as each offshore operator conducts activities in a manner consistent with relevant Conservation and Recovery Plans, ensuring whales can continue using the area without injury or displacement. However, NOPSEMA has already criticised this approach, noting that measures designed for individual projects cannot simply be assumed to prevent cumulative impacts from overlapping noise fields without a clearer understanding of combined exposure regimes. Despite this critique, CGG appears to have carried this same rationale forward from its November 2024 EP into the April 2025 version, without addressing the deficiencies identified by NOPSEMA. GMTOAC argues that this is inadequate, especially in light of current environmental pressures affecting Nyamat Mirring.	CGG notes that GMTOAC appears to have referenced an outdated version of the Environment Plan. In the current EP, acceptable impact levels for Blue Whales and Southern Right Whales are defined using each species' Recovery Plan, and these levels are assessed through rigorous, literature-supported impact assessments in Appendices E7 and F3. In response to NOPSEMA's advice, the cumulative impact assessment was updated to include the sound sources and timing of all future and reasonably foreseeable activities. This added detail ensures that any potential cumulative impacts from additive sound exposure are assessed with appropriate contextual information.	EVT352

4514	GMTOAC objects to CGG refusing to address how its seismic survey, being the first step in a chain of petroleum exploration and production, will contribute to climate change impacts on Nyamat Mirring. When asked about future gas extraction or data purchasers, CGG dismissed these questions as "speculation" or commercially irrelevant, but GMTOAC argues that such information is essential for assessing indirect risks arising from the activity, as required by the Regulations. GMTOAC emphasises that Gunditjmara, not CGG, will live with the long-term consequences of industrialisation, environmental degradation, and climate impacts. They highlight that climate change already disrupts Gunditjmara cultural obligations, seasonal knowledge systems, native title rights, and their broader responsibilities to Country. Because seismic surveys are the initiating step enabling gas expansion, GMTOAC argues that CGG must evaluate the indirect environmental risks associated with likely future production and emissions. GMTOAC notes that international legal developments, including the recent ICJ Advisory Opinion on climate obligations, support the need to consider how exploration licensing contributes to harmful downstream emissions. They argue that CGG's refusal to disclose who it plans to sell seismic data to undermines transparency and prevents informed assessment by Traditional Owners in accordance with UNDRIP and Gunditjmara's Consultation & Negotiation Protocol. GMTOAC also challenges CGG's claim that exploration aligns with intergenerational equity under the principles of ESD. They assert that expanding gas fields contradicts both the EPBC Act's definition of intergenerational equity and	CGG explains that the Environment Plan (EP) is legally required to assess only the environmental impacts of the seismic survey itself, not hypothetical future emissions from possible gas developments by other parties. The Regulations and NOPSEMA's guidelines confirm that downstream combustion emissions, occurring years later, at unknown locations, by unknown proponents, are outside the scope of a non-production seismic survey EP. CGG's activity will not extract hydrocarbons, will not emit industrial greenhouse gases beyond normal vessel operations, and cannot predict whether any future development will occur. GMTOAC's request for CGG to quantify emissions from future gas fields is scientifically impossible, as it depends on unknown variables such as reserve size, technology, production emissions, market conditions, policy settings, and end-use combustion pathways. Producing such an assessment would be speculative and indefensible. Australia already regulates climate impacts through national GHG accounting, the Safeguard Mechanism, fuel and emissions policies, and export regulations—frameworks designed for activities that actually produce emissions, not exploration surveys. CGG also refutes the idea that the ICJ's 2025 climate advisory opinion applies to seismic surveys. The opinion concerns State obligations regarding global greenhouse gas emissions and does not mention seismic activities. It is nonbinding and cannot override Australia's existing regulatory framework. Where courts have restricted seismic surveys, they have done so under marine biodiversity law, not climate law. Similarly, GMTOAC's claim that ESD (ecologically sustainable development) blocks the survey is incorrect. ESD guides how development proceeds, not whether it is allowed. CGG has transparently assessed its impacts, addressed vessel-related emissions, and applied all practicable mitigation, consistent with ESD principles. Finally, the demand that CGG disclose future seismic data purchasers is both legally baseless and irrelevant to environmental risk. Such information is unknowable, commercially sensitive, and has no bearing on the impacts of the survey. Any future project would require its own approvals and environmental assessments. Overall, CGG concludes that GMTOAC's claims misinterpret the law, expand the EP scope beyond what the Regulations allow,	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	scientific consensus requiring rapid emissions reductions. In GMTOAC's view, presenting exploration as beneficial to future generations is misleading, particularly when climate change is the primary threat identified in the Gunditjmara Nyamat Mirring Plan. They add that providing information about data purchasers would be essential for enabling future generations of Gunditjmara to make informed decisions about resource use in Nyamat Mirring.	and rely on speculative links that have no legal or scientific basis. Appendix F3, section 3.16.1 has been updated to include First Nations seasonal calendar.	

REGIA
Marine Seismic Survey

Acceptable Levels Assessment

Appendix F4: REG-EP-033-F4

Rev 5

December 2025

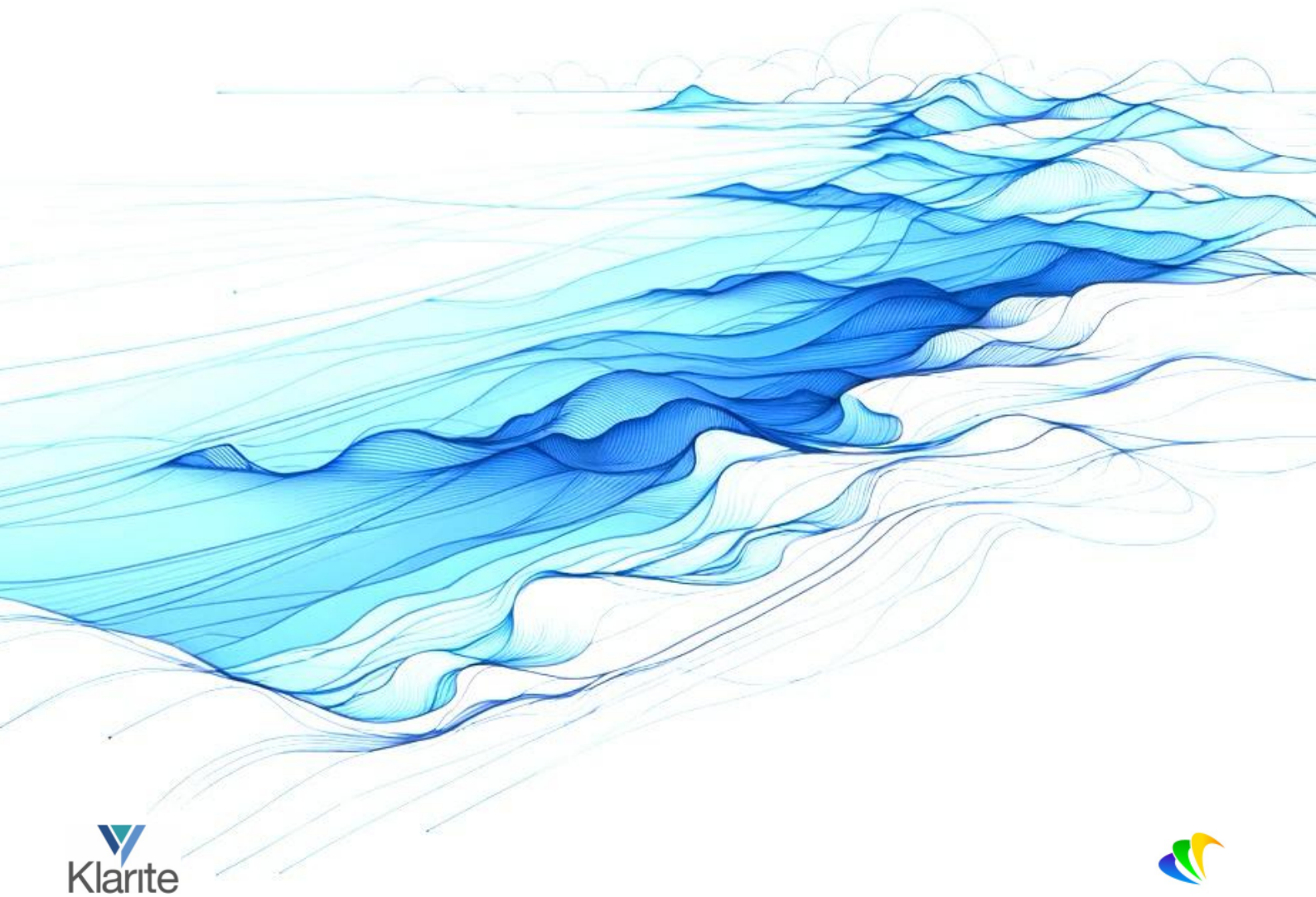

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Table of Contents

1 Introduction 3
2 Purpose and Scope 3
3 Consultation Input 3
4 Defining Acceptable Levels 4
5 Acceptable Level Demonstrations 6
5.1 Identification of all Impacts and Risks 6
5.2 Screening and Control of Lower Order Impacts and Risks 7
5.3 Higher Order Impacts and Risks have been Comprehensively Assessed 7
5.4 Activity Limitations Comprehensively Bound the Activity and the Environmental Assessment 9
5.5 Predicted Impacts and Risks are of an Acceptable Level 9
5.6 Predicted impacts are of an acceptable level 15
5.7 Consideration of Predictive Uncertainty 26
5.8 Quality of the Environmental Assessments 26
5.9 Compliance with the EPBC Act 27
5.10 Search for Unacceptable Environmental Impacts 47
5.11 Consistency with the Principles of ESD 49
6 Conclusion 55
7 References 56
8 Document Control 58
Annex 1 59
Objections and Claims Raised from Consultation 59

1 Introduction

This document is a collection of demonstrations that the Regia Marine Seismic Survey (**Regia MSS**) is an activity that can be carried out in a manner:

- In which the environmental impacts and risks of the proposed activity will be of an acceptable level.
- Consistent with the principles of ecologically sustainable development (**ESD**).

The principles of ESD play an important role in responsible decision-making. ESD encompasses the integration of economic, social, and environmental considerations in pursuit of a shared goal: meeting the needs of the present without compromising the ability of future generations to meet their own needs. Although ESD lacks a precise, accepted definition, it is generally recognised as an important concept as it ensures environmental factors and future generations are considered in assessing a current development, in this case the Regia MSS.

Readers of this document are encouraged to have read and understood the following documents at a minimum which provide important context to this assessment and underpinning evidence.

1. Description of the Activity (Appendix A2)
2. Environmental Assessment Process (Appendix B3 – Implementation Strategy)
3. Environmental Performance (Appendix G1)

The remaining documents that make up the Regia MSS Environment Plan (**EP**) also provide context to this assessment.

2 Purpose and Scope

This document was prepared prior to first submission of the EP, and has been updated for each new submission to address any new information, changes in assessment outcomes and feedback from relevant persons and the regulator. This document assesses the Regia MSS EP preparation process, through multiple methods to demonstrate how this activity will have environmental impacts and risks that will be of an acceptable level and can be carried out in a manner consistent with the principles of ESD.

3 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in

Annex 1.

4 Defining Acceptable Levels

This section outlines the framework for defining acceptable levels of environmental impact and risk for the Regia MSS. Our approach aligns with best practices and regulatory requirements. Figure F4-1 is a copy of the conceptual framework for defining acceptable levels and establishing levels of environmental performance from NOPSEMA guidance documents. CGG has adopted this framework in application to the Regia MSS EP.

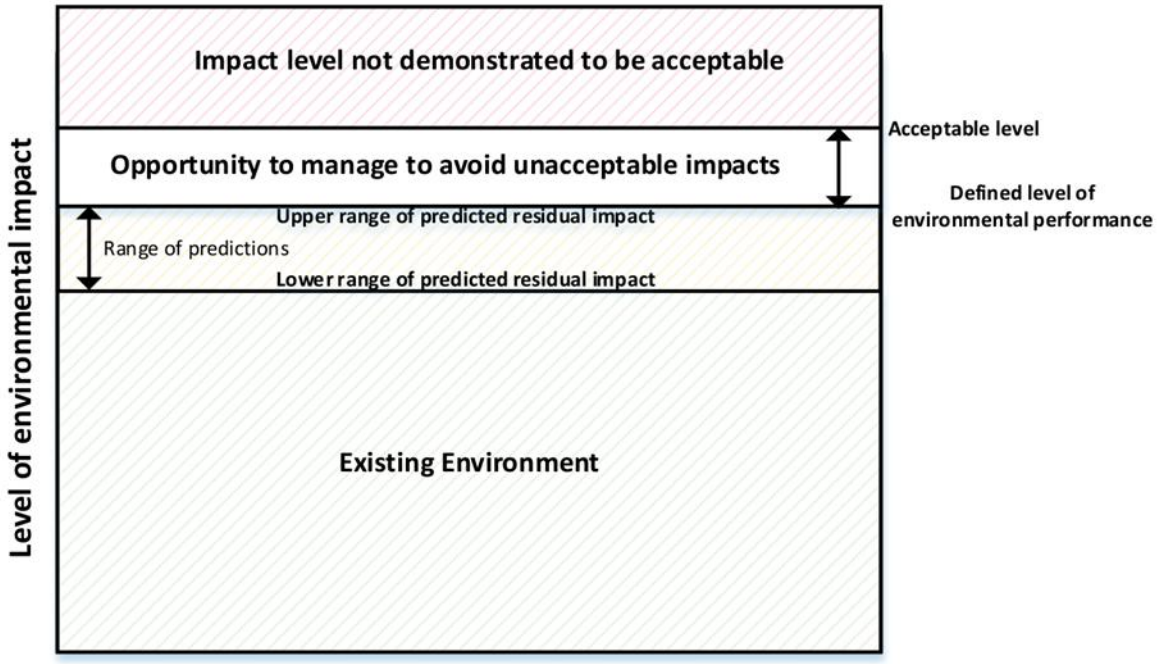

Figure F4-1 - Framework for defining acceptable levels of impact and associated levels of environmental performance (N-04790-GN1663).

In Figure F4-1, the terms used have the following meaning:

- ***Existing environment*** is the condition of the existing environment before the implementation of the project.
- ***Range of predictions*** illustrates that impact prediction processes can result in a range of residual impacts after the implementation of control measures due to a degree of uncertainty attributed to limitations in impact prediction tools, shortfalls in knowledge in the way that the environment responds to pressures.
- ***Opportunity to manage*** is the window that the titleholder must undertake responsive management measures to prevent the impact exceeding the defined acceptable level.
- ***Defined level of environmental performance*** is a level of performance of a proponent in relation to environmental performance outcomes (and environmental performance standards in EPs).
- ***Acceptable level*** is the maximum level of change in environmental parameters before the environmental effects become unacceptable.

- ***Unacceptable impact*** is the change in the environment that has exceeded the acceptable level and usually indicates that a change has occurred that is not acceptable from a socio-economic, ecological, biological, or cultural values perspective.

This conceptual framework considers the defined acceptable level, accounts for limitations in the impact and risk analysis undertaken (Appendices D1 – D4 and E1 – E9) and helps to establish levels of environmental performance in a manner that enables management response to prevent the acceptable level of impact from being exceeded. This framework highlights the opportunity for titleholders to manage their activities to prevent environmental impacts from becoming unacceptable by setting levels of environmental performance such that they represent a level that is better than or at least equivalent to the 'acceptable level' and therefore a precursor to unacceptable impact. By applying this approach, inaccuracies in the impact prediction process and uncertainties in the effectiveness of management controls can be accounted for using responsive management to avoid exceeding the acceptable level.

Table F4-1 establishes five parts of the framework used in this EP as the basis of defining acceptable levels. CGG used specific, defined acceptable levels of impact and risk for the Regia MSS based on these contexts. These levels are tailored to the unique aspects of our project, ensuring a responsible and well-informed approach to environmental management.

Table F4-1 - Framework for defining acceptable levels.

Acceptable Levels Framework	Description
Principles of ESD	We considered the principles of ESD, as set out in the Environment Protection and Biodiversity Conservation Act (EPBC Act), into our impact and risk assessment processes. These principles guide our efforts to manage environmental impacts and risks responsibly, ensuring long-term sustainability. The assessment of the consistency of CGG's decision making with the principles of ESD can be found in Appendix F4 Section 5.11.
Environmental Context	We considered the biological, ecological, economic, social, and cultural features relevant to the Regia MSS in each impact and risk assessment (Appendices D1-4 & E1-9). This comprehensive approach allows us to understand and respect the environment's inherent values and sensitivities.
Legislative Context	Our acceptable levels are consistent with legislation and other regulatory requirements, including relevant policy documents, guidelines, and conservation plans. This ensures our activities align with national standards and objectives.
Company (Internal) Context	Management of the activity is aligned with CGG's impact and risk assessment process and implementation strategy. This internal alignment ensures consistency and reliability in our environmental management practices.
External Context	We assess, respond to, and adopt measures in response to objections and claims received from relevant persons, attempting to satisfactorily address concerns in our environmental management strategies.

CGG applied a comprehensive and transparent methodology in defining acceptable levels of impacts and risks for the activity. CGG's impact and risk management method is grounded in the principles, framework, and processes defined by ISO 31000:2009 Risk Management. The method included steps for:

- Identifying and analysing environmental aspects associated with the activity for environmental impacts and risks.
- Predicting the extent, duration, and severity of those environmental impacts and risks.
- Assessing mitigation and management measures.

This process was systematic and evidence-based, incorporating consultation at all stages. Furthermore, the methodology placed a significant emphasis on establishing the context of assessments, incorporating both internal and external environmental factors. This included a detailed examination of the activity description, as well as preliminary information gathered through

independent assessments and relevant person feedback. This ensured that acceptable levels of environmental impact and risk are not only in line with legislative requirements but also consider the specific environmental, social, and economic contexts of the Otway Basin.

The defined acceptable levels in Appendix B1 were published in May 2023 on the Consultation Hub alongside our environmental assessment process (Appendix B9) to provide an opportunity to the community and relevant persons to understand the assessment process and influence the criteria used in the assessment process. The opportunity to comment was open for 60 days.[1]

5 Acceptable Level Demonstrations

The environmental impacts and risks of the activity are of an acceptable level because:

1. All environmental impacts and risks have been identified and assessed.
2. Lower order impacts and risks have been screened and eliminated or managed.
3. Higher order impacts and risks have been assessed by:
    a. Gathering knowledge about relevant environmental values and sensitivities.
    b. Defining acceptable levels for relevant environmental values and sensitivities.
    c. Predicting the levels of impact and risk.
    d. Evaluating the effectiveness of measures that protect the environment.
4. Activity limitations comprehensively bound the activity and environmental assessment.
5. Predicted impacts and risks of the activity have been compared to acceptable levels of impact and risk.
6. The titleholder has considered predictive uncertainty in the environmental assessments.
7. The environmental assessments are appropriate to the nature and scale of the activity.
8. Once managed, no pathways to unacceptable impacts were identified.
9. The proposed activity will comply with the requirements of the EPBC Act.
10. The proposed activity is consistent with the principles of ecologically sustainable development.

Each of these reasons is explained below, in detail, to demonstrate that environmental impacts and risks arising from the proposed activity are of an acceptable level.

5.1 Identification of all Impacts and Risks

CGG commissioned a Preliminary Environmental Impact and Risk Assessment (**PEIRA**) to identify all impacts and risks of the activity. Appendix B4 documents this first stage of the environmental assessment process and demonstrates that all environmental impacts and risks of the activity will be of an acceptable level because:

- Proper identification allows for a thorough assessment of the impacts and risks. This includes understanding both direct and indirect impacts, ensuring that all potential pathways to marine life, ecosystems, and socio-economic factors are considered.
- Identifying all impacts enables the development of targeted mitigation measures reduces the likelihood of unforeseen consequences that could exceed acceptable impact levels.
- Accurate identification of environmental impacts supports the analysis of the legislative and other requirements that apply to the activity. Demonstrating compliance with environmental

[1] Appendices B1 and B9 have since been merged into Appendix B3.

laws, regulations, and guidelines, which often specify that impacts must remain within acceptable limits. This has been completed in Appendix B2.

- Proper identification of impacts increases transparency and builds trust among relevant persons, including local communities, Traditional Owners, and environmental groups. This helps prevent conflicts and ensures that all concerns are addressed before the survey begins.
- Identifying all impacts allows for data-driven decisions regarding when, where, and how to conduct seismic activities to minimise impacts and risks. This includes selecting appropriate survey timings (e.g., avoiding breeding seasons) and using technologies that reduce sound intensity or directionality.

5.2 Screening and Control of Lower Order Impacts and Risks

The PEIRA also performed a screening of all impacts and risks to understand those that were negligible and those which required further assessment. Benthic disturbance, atmospheric emissions, and planned discharges were identified as lower order environmental aspects that could be treated with legislative requirements and industry standards. These required no further assessment because:

- By categorising impacts and risks into higher-order and lower-order, it becomes easier to prioritise the most critical issues. This ensures that efforts and resources are focused on managing and mitigating impacts that have the greatest potential to cause significant harm.
- Environmental assessments often involve limited resources in terms of time, budget, and manpower. Screening helps in allocating resources efficiently by focusing more detailed studies and mitigation efforts on higher-order impacts, while lower-order impacts can be managed with simpler, standardised measures.
- Screening helps organise the environmental assessments by breaking down complex interactions into manageable components. This separation makes it clearer to relevant persons and decision-makers which impacts and risks are more pressing, allowing for better understanding and informed decision-making.
- Higher-order impacts typically require more stringent, tailored mitigation strategies, while lower-order impacts may be managed with generic or standard procedures. This differentiation allows for more precise and effective mitigation planning, reducing unnecessary measures for minor risks.
- Environmental systems can be highly complex, with numerous interacting variables. Screening simplifies the assessment by categorising impacts, which makes the analysis more manageable and reduces the cognitive load on assessors. It helps break down the assessment into bite-sized pieces that are easier to evaluate.
- Without screening, assessments can become bogged down by minor details that detract from significant issues. Screening filters out lower-order impacts from intensive analysis, ensuring that the assessment remains focused and concise, without overwhelming readers with excessive details on low-significance data.

5.3 Higher Order Impacts and Risks have been Comprehensively Assessed

CGG then commissioned experts to undertake specific analysis of the higher order impacts and risks, including quantitative modelling and analysis to underpin the understanding of the environment and reinforce a demonstration that environmental impacts and risks will be of an acceptable level. The higher order assessments found in Appendix D1 to D4 and E1 to E9 are comprehensive because:

- Comprehensive baseline data was relied upon to establish the existing environmental conditions. This data served as a reference point for predicting and assessing the potential magnitude and significance of higher-order impacts. High-quality data on species, habitats, ecosystem functions, and socio-economic factors demonstrate a robust foundation for assessment.

- A combination of quantitative (e.g., modelling, statistical analysis) and qualitative (e.g., expert judgment, relevant person input) methods have been employed to assess higher-order impacts. This ensures that complex interactions are examined from multiple perspectives, providing a thorough understanding.
- Experts in relevant fields (e.g., marine biology, ecology, geology, socio-economic) have been employed during the assessment process to provide insights into the significance of higher-order impacts. Their expertise helps identify the most significant impacts and risks and supports evidence-based conclusions.
- Recognised frameworks and methodologies have been applied to categorise, rank, and analyse higher-order impacts. This provides a structured and reproducible approach to assessing the risks and impacts of the proposed activity.
- A cause-effect analysis has been conducted to identify the pathways through which activities may lead to significant environmental changes. Understanding the chain of events that link project activities to environmental outcomes shows that potential higher-order impacts have been explored in depth.
- Worst-case scenarios have been considered to evaluate the most severe potential outcomes of higher-order risks. Assessing worst-case scenarios helps ensure that even rare but high-consequence impacts are accounted for and appropriately mitigated.
- Relevant persons, including local communities, Traditional Owners, regulatory authorities, and industry experts, have been consulted throughout the assessment process. Their input provided insights into perceived higher-order impacts and ensure that all significant concerns were addressed.
- Best available science, industry standards, and technological tools have been used to evaluate higher-order impacts. This includes advanced modelling, simulations, and remote sensing technologies, demonstrating that the assessment is based on cutting-edge and reliable information.
- Specific, measurable, and enforceable mitigation measures for higher-order impacts have been developed. The presence of well-defined management plans, including monitoring programs, contingency plans, and adaptive management strategies, shows that potential impacts and risks have been fully evaluated and prepared for.
- A comprehensive monitoring plan has been established to track higher-order impacts during and after the activity. This includes baseline comparisons, performance indicators, and triggers for adaptive management, demonstrating a commitment to monitoring and managing risks over time.
- The assessment has included a detailed cumulative impact analysis that considers other existing and potential future projects in the area. This demonstrates that the evaluation is not limited to isolated impacts but addresses the broader environmental context.
- Clear and transparent documentation, including methodologies, assumptions, data sources, and limitations, has been provided in the assessment report. This demonstrates that the process is rigorous, unbiased, and subject to scrutiny, supporting the credibility of the conclusions about higher-order impacts and risks.
- The assessment has been conducted in accordance with local, national, and international regulatory requirements, guidelines, and best practices. Meeting or exceeding these standards provides confidence that higher-order impacts have been assessed comprehensively and responsibly.
- Independent peer reviews or third-party verifications have been conducted to validate the findings of the assessment. External validation ensures that higher-order impacts have been evaluated from multiple perspectives and meet scientific and regulatory standards.

- The assessment has evaluated alternative project designs, locations, and technologies to avoid or reduce higher-order impacts and risks. Applying the mitigation hierarchy - eliminate, minimise, administrate - demonstrates a commitment to managing higher-order impacts and risks responsibly.
- A focused assessment of impacts on sensitive and vulnerable environmental receptors (e.g., endangered species, critical habitats, protected areas) has been conducted. This ensures that the most ecologically and socially significant aspects have been given appropriate attention.

The assessment explicitly addresses uncertainties and the level of confidence in the predictions. This includes sensitivity analysis, consideration of data gaps, and conservative assumptions to account for uncertainty, showing that higher-order impacts have been carefully evaluated even in the face of unknowns.

5.4 Activity Limitations Comprehensively Bound the Activity and the Environmental Assessment

CGG has adopted several activity limitations that provide the scope and boundaries of the proposed activity. Activity limitations also provide the scope and boundaries of the environmental assessment. They eliminate or substitute environmental impacts and risks and are the most effective way of management environmental aspects.

The adoption of activity limitations was for one or more of the following reasons:

1. To design an activity that fulfilled the geophysical objectives of the survey.
2. To reduce an impact or risk because of the findings from the environmental assessments.
3. Required because of meritorious objections or claims raised by a relevant person.

Activity limitations proposed through consultation or identified through the NOPSEMA assessment process were identified and assessed with some being discarded and others being included to bound the activity.

Crucially, compliance with these activity limitations is a significant part of managing environmental impacts and risks of the activity to an acceptable level. As such, they are included in the Environmental Compliance Register and form part of the ongoing audit and inspection program in the Implementation Strategy (Appendix B3).

5.5 Predicted Impacts and Risks are of an Acceptable Level

Throughout the preparation of the EP, CGG reviewed and reassessed whether the impacts and risks of the proposed activity could be managed to an acceptable level. That process can be found in Appendix B3 and included:

- Publishing defined acceptable levels at the beginning of the consultation and preparation process.
- Sharing with the public the assessment process we would undertake and how impacts and risks would be quantified.
- Publishing draft impact and risk assessments and inviting input.
- Creating additional assessments so that more detail could be assessed and communicated with relevant persons.
- Detailing the scientific literature being relied on.
- Considering all EPBC Act literature, policies, advice, and plans and demonstrating that the activity (action) is consistent with them.
- Comparing the predicted levels of impact with the defined acceptable level (general and aspect-specific).

- Adopting environmental performance outcomes and control measures that ensure all impacts and risks will be of an acceptable level.

There is evidence in each assessment (Appendix D1-4 and E1-E9) that this process was followed and with each submission, an opportunity to improve the content, context, and decision-making associated with environmental management of the activity was taken to improve environmental outcomes.

The further assessments undertaken in Appendix F3 evaluated the quality of the previous assessments with a focus on levels of predictive certainty. Those assessments either resulted in confirmation of the adequacy of the original assessment or the adoption of further improvements in environmental management of the activity. Any necessary modifications were subsequently incorporated into the original assessments. This feedback loop demonstrates the iterative process that was followed.

5.5.1 Release of materials or fuel overboard

Category	Predicted Level of Risk
Principles of ESD	An accidental release of materials or waste is not predicted.
	Available literature and government management plans, recovery plans and conservation advice were used to inform the risk assessment. There is high confidence in the prediction of risks to environmental components that are at risk from an accidental release of materials or waste.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans as detailed in Appendix B2.
Biological	The risks of an accidental release of materials or waste to biological features would be temporary and small scale and would not result in environmental damage at population levels.
Ecological	The risks of an accidental release of materials or waste to ecological features is not predicted.
Economic	The potential risks of an accidental release of materials or waste is predicted to be confined to a one-off event that would not result in affected persons being worse off because of the activity. As per the Adjustment Protocol an adjustment process will be implemented in the event there is a financial loss to marine users from an accidental release of materials or waste.
Cultural	The risks of an accidental release of materials or waste is predicted to be confined to a one-off event that would have a temporary / reversible, small scale, and low intensity risk to cultural values.
Company	All reasonably practicable measures have been adopted to reduce environmental risks as detailed in the following section.
	The predicted risk level is medium.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the risk.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons as per the following stakeholder feedback; - We want to be assured that your activities out at sea will not result in increased rubbish washing up. The dominant form of rubbish we collect is from ocean sources such as rubbish discarded from international shipping and fishing boats. We would like to see your waste management plan and have assurances that you will commit to zero rubbish disposed of at sea. - A whale and seal and bird watch for pelagic and shorebirds along the southwest coast of Victoria and are concerned about their welfare in relation to the Regia MSS. The CGG Marine Assurance System will be implemented to ensure no waste material is disposed of overboard and all vessels used for the Regia MSS will be required to have a Garbage Management Plan. The risk assessment undertaken predicted that if an accidental release of materials or waste did occur and impacted marine fauna, it would be restricted to an individual and not affect the

	species at a population level. Thus, impacts to marine fauna watching along the southwest coast of Victoria is not predicted to be affected.
	No public comments have been received in relation to an accidental release of materials or waste.

5.5.2 Collisions with marine fauna

Category	Predicted Level of Risk
Principles of ESD	Predicted risks are low intensity environmental damage as risks would be restricted to individual fauna and will not affect the species at a population level.
	Available literature and government management plans, recovery plans and conservation advice were used to inform the risk assessment. Serious or irreversible environmental damage is not predicted as risks would be restricted to individual fauna and will not affect the species at a population level. There is high confidence in the prediction of risks to species that are at risk from vessel collisions.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans.
Biological	Predicted risks are low intensity environmental damage as risks would be restricted to individual fauna and will not affect the species at a population level.
Ecological **Economic**	Predicted risks to ecological features associated with marine fauna are temporary / reversible, small scale, as risks would be restricted to individual fauna and will not affect the species at a population level.
Cultural	Predicted risks to cultural features associated with marine fauna are temporary / reversible, small scale, as risks would be restricted to individual fauna and will not affect the species at a population level.
Company	All reasonably practicable measures have been adopted to reduce environmental risks as detailed in the following section.
	The predicted risk level is medium.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the risk.
Social	To date no objections or claims in relation to fauna and vessel collisions have been made by relevant persons. A relevant person raised that they whale and seal watch along the southwest coast of Victoria and are concerned about their welfare in relation to the Regia MSS. A collision with a whale or seal is a rare event and has not been reported during seismic surveys. The implementation of the Fauna Management Plan will ensure that fauna collision risk is as low as reasonably practicably. The risk assessment undertaken predicted that if a collision did occur with marine fauna, it would be restricted to an individual and not affect the species at a population level. Thus, risks to marine fauna watching along the southwest coast of Victoria is not predicted to be affected.
	To date there have been no views from the public in relation to fauna and vessel collisions.

5.5.3 Introduction of marine pest species

Category	Predicted Level of Risk
Principles of ESD	The introduction and establishment of marine pests is not predicted.
	Available literature and government management plans, recovery plans and conservation advice were used to inform the risk assessment. The introduction and establishment of marine pests is not predicted. There is high confidence in the prediction of risk to environmental components that are at risk from the introduction of marine pests.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans.
Biological **Ecological**	The introduction and establishment of marine pests could lead to reduced native species diversity, displacement and shifts in ecosystem dynamics. The likelihood of a marine pest being present on a Regia MSS vessel and becoming established is assessed as rare due to the implementation strategy. The predicted level of risk is assessed as low. The introduction and establishment of marine pests is not predicted.
Economic	The introduction and establishment of marine pests could lead to reduced native species diversity, displacement and shifts in ecosystem dynamics impacting commercial fisheries. The likelihood of a pest being present on a Regia MSS vessel and becoming established is assessed as rare due to the implementation strategy. The predicted level of risk is assessed as low.
Cultural	The introduction and establishment of marine pests could lead to reduced native species diversity, displacement and shifts in ecosystem dynamics. If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. The likelihood of a marine pest being present on a Regia MSS vessel and becoming established is assessed as rare due to the implementation strategy. The predicted level of risk is assessed as low.
Company	All reasonably practicable measures have been adopted to reduce the risk of introducing a marine pest as detailed in the following section.
	The predicted risk level is medium.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the risk.
Social	To date no objections or claims in relation to marine pests have been made by relevant persons.
	To date there has been no views from the public in relation to marine pests.

5.5.4 Accidental release of fuel

Category	Predicted Level of Risk
Principles of ESD	A vessel oil spill is not predicted to occur but if it occurred impacts would be temporary / reversible, small scale, and/or low intensity environmental damage due to the low volumes and light nature of marine diesel.
	Available literature and government management plans, recovery plans and conservation advice were used to inform the risk assessment. A vessel oil spill is not predicted. There is high confidence in the prediction of risks from a vessel oil spill.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans.
Biological **Ecological** **Economic** **Cultural**	A vessel oil spill is not predicted to occur but if it occurred risks would be temporary / reversible, small scale, and/or low intensity environmental damage due to the low volumes and light nature of marine diesel.
Company	All reasonably practicable measures have been adopted to reduce the risk of a vessel oil spill.
	The predicted consequences range from Minor to Moderate depending on the report with the likelihood of a vessel collision considered rare as it would only occur in exceptional circumstances. Thus, the risk level ranges from Low to Medium.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the risk.
Social	Some relevant persons reported finding oily residues and tar balls on beach walks along the Otway coastline. This information has been included in this risk assessment and is expected given the hydrocarbon prone geology of the area. From relevant person consultation, objections and claims have been made regarding: Impacts to beaches and shorebird nesting areas. This risk assessment shows that impacts to beaches and shorebird nesting area would be temporary / reversible, small scale, and/or low intensity environmental damage due to the low volumes and light nature of marine diesel. Balls of crude oil along beaches and how these will be disposed. Diesel being a light fuel is not prone to forming crude oil balls. Notification to the DNP in the event of oil/gas pollution incidences which occur within a marine park or are likely to pose a risk to a marine park as soon as possible. This requirement is covered in the Regia MSS Implementation Strategy and Oil Pollution Emergency Plan.
	To date there has been no views from the public in relation to a vessel oil spill.

5.6 Predicted impacts are of an acceptable level

In evaluating the proposed activity against acceptable levels of environmental impact and risk, CGG has followed its Decision-Making Criteria as outlined in its environmental assessment process.

Category	Defined Acceptable Level
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.
Economic	Affected persons will not be worse off because of the activity.
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts and risks.
	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.
	The implementation strategy includes specific measures to ensure that measures adopted continue to be effective in managing the impact or risk.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons.
	The views of public have been considered in the impact and risk assessment.

Comparing the predicted levels of impact or risk from the environmental assessments with the pre-defined acceptable levels was completed for each aspect and carried significant weight in CGG determining whether the activity complied with its corporate policies and the Regulations. These comparisons are shown in the below sections using the category as the link to the defined acceptable level.

5.6.1 Physical presence

This table provides a self-assessment of the predicted levels of impact assessed in Appendix E1 against the defined acceptable levels in the table above.

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts are temporary, reversible, and small-scale. The predicted impacts from physical presence are 90 days, absent when the activity is concluded and limited to the moving geographic footprint of the survey. Therefore, the impacts confirm to be below the defined acceptable level.
	Available literature and government data were used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts to marine users.
Biological	Not applicable.
Ecological	Not applicable.
Economic	Predicted impacts are temporary and in most cases avoidable. A compensation process will be implemented in the event displacement cannot be avoided and there is a financial loss to the marine user.
Cultural	Impacts to cultural features including cultural values, traditions, or practices, are not predicted. This distance of the activity offshore means that no Traditional Owners will be excluded from Sea Country. No indirect impacts to connection to Country is predicted as no displacement or affects to species at populations levels, to ecosystem integrity, or biodiversity preservation.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in Appendix F2.
	The predicted effect level is moderate.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons as per the stakeholder feedback of: Ensure continued liaison with the Australian Hydrographic Service (AHS) for Notices to Mariners (NOTMAR), ensure that the AHS is notified three weeks prior to the actual commencement of activities. This information is critical to maritime safety and reduces negative impacts on other maritime users. This is addressed in the Consultation Plan. CCG have adopted an adjustment protocol that will ensure that no fisher will be worse off because of the Regia MSS and that reasonable, evidence-based claims will be paid.
	No public comments have been received in relation to the physical presence of the vessels and equipment in relation to impacts to marine users.

5.6.2 Underwater sound – Plankton

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts to zooplankton will be temporary, reversible, small-scale, and/or within natural variations in mortality.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature.
	No EPBC Act Management Plans and Recovery Plans were identified relevant to plankton.
Biological	Predicted impacts to zooplankton are temporary, reversible, small-scale, and within natural variations in mortality.
Ecological **Economic** **Cultural**	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. As predicted impacts to zooplankton are temporary, reversible, small-scale, and within natural variations in mortality, impacts to primary production and ecosystem function are not predicted.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in Appendix F2.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation the following objections and claims have been made: Impact of the survey on the Bonney Upwelling. - The impacts of the noise on marine ecosystems, can kill zooplankton. - Seismic blasting will kill zooplankton which have a fundamental role for ecological integrity as food for krill and subsequently krill are food for whales. Impacts to zooplankton and the Bonney Coast Upwelling and the role they both play in ecosystem function and productivity, are not predicted as: • Impacts to phytoplankton are not predicted. • Mortality or injury effects to zooplankton will be well within natural mortality rates. Upwelling systems in the region are highly dynamic with large variations in biomass a normal process. Zooplankton communities demonstrate high rates of turnover and will be constantly replenishing even as the seismic survey occurs. • Mortality or mortal injury effects to zooplankton, including krill, do not impact on marine fauna being able to feed on them as they will still be available within the water column.

5.6.3 Underwater sound – Fish

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts to EPBC Act listed fish species are temporary / reversible and small-scale behavioural response or recoverable temporary threshold shift. Predicted impacts to fish are low intensity damage at population levels and within currently accepted levels of impact to these species as applied by the commercial fishing industry.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature.
	No EPBC Act Management Plans and Recovery Plans identified for fish identified underwater sound as a threat and no actions relevant to the seismic survey were identified.
Biological	Predicted impacts to fish are low intensity damage at the population level and within currently accepted levels of impact to these species as applied by the commercial fishing industry.
Ecological	Impacts to ecological features are not predicted.
Economic	Via stakeholder consultation commercial fishers have raised concerns in relation to seismic impacts to commercial fisheries and the Otway Adjustment Protocol will be implemented to ensure that affected fishers will not be worse off because of the activity.
Cultural	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Via consultation, impacts to the Budj Bim Cultural Landscape World Heritage Area eel traps and *kooyang* (Short-finned Eel) from the seismic survey has had been raised. The eel traps are protected under the World Heritage Area listing, the eels themselves are not. No impacts to the World Heritage Area are predicted. The predicted impacts to eels are low intensity at a population level and within current accepted levels of impact as applied to the commercial fishing industry.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation the following objections and claims have been made: - Commercial fishers and some other marine users have raised concerns about the impacts to fish populations and the long-term effects of seismic on the sustainability of the fisheries. The impacts of the Regia MSS have been assessed and the predicted levels of impact to each commercial fish species are all sub-lethal and mostly behavioural. There is no evidence of reduced fecundity nor developmental effects in any fish species, so long-term effects over multiple fishing seasons are not predicted. This has been communicated to the individuals who raised these concerns.

5.6.4 Underwater sound – Invertebrates

Category	Predicted Level of Impact
Principles of ESD	Of the invertebrates known to be present within the Operational Area and predicted to be impacted by seismic sound, individual Southern Rock Lobster within close proximity to the seismic may suffer permanent injury and individual Giant Crab may suffer similarly. However, there is no evidence for scaling of effects to population levels. Impacts to molluscs are not predicted while impacts to octopus and squid are predicted to be behavioural only. Whilst the impacts may be irreversible for individual Southern Rock Lobsters and Giant Crabs the extent of impacts will not affect population levels. Fishing removes up to 30% of adult standing stock each year and the population is resilient to this. The impacts to molluscs, octopus, and squid are predicted to be negligible.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature.
	No EPBC Act Management Plans and Recovery Plans were identified relevant to invertebrates.
Biological	Predicted impacts to molluscs, octopus, and squid are temporary, reversible, and small-scale. Predicted impacts to Giant Crab and Southern Rock Lobster are low intensity damage at population levels and well within currently accepted and sustainable levels of impact to these species as applied by the commercial fishing industry.
Ecological	Impacts to ecological features are not predicted.
Economic	Through consultation commercial fishers have raised concerns in relation to seismic impacts to commercial fisheries and the Otway Adjustment Protocol will be implemented to ensure that affected fishers will not be worse off because of the activity.
Cultural	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Predicted impacts to molluscs, and squid are temporary, reversible, and small-scale. Predicted impacts to Giant Crab and Southern Rock Lobster are low intensity damage at population levels and well within currently accepted and sustainable levels of impact to these species. From consultation to date no cultural features including cultural values, traditions, or practices have been identified associated with invertebrates that may be impacted.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation the following objections and claims have been made: - Some fishers have raised a claim that they will be worse off because of the activity either through direct displacement, loss of gear, through knock-on effects, or through long-term effects to stock levels. A compensation process will be adopted to pay reasonable, evidence-based claims. - Local businesses and interested individuals have claimed unacceptable levels of impact to fish stocks and the ripple effects that this would have to the coastal developments of the Otway.

	Local businesses once removed from the fisher (i.e., fish markets or point of sale handlers) will be able to submit claims under the compensation process.

5.6.5 Underwater sound – Birds

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts to diving birds and penguins are temporary / reversible and small-scale behavioural responses that are likely to be within natural variation of foraging behaviours.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature.
	No EPBC Act Management Plans and Recovery Plans identified for birds identified underwater sound as a threat and no actions relevant to the seismic survey were identified.
Biological	Predicted impacts to diving birds and penguins are temporary / reversible and small-scale behavioural response that are likely to be within natural variation of foraging behaviours.
Ecological	Impacts to ecological features are not predicted.
Economic	Impacts to economic receptors are not predicted.
Cultural	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Predicted impacts to short-tailed shearwaters with implemented controls are temporary / reversible and small-scale behavioural responses or recoverable temporary threshold shifts, with no impacts at a population level are predicted. Impacts to cultural receptors are not predicted.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation the following objections and claims have been made: - Behavioural disturbance impacts to Little Penguin colony at Middle Island resulting in further distance to forage and impacting breeding success. The active seismic area will be at least 25km distant from Middle Island at its closest point and ever further away after that. Key foraging habitat and access to regular food sources will not be affected.

5.6.6 Underwater sound – Turtles

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts to EPBC Act listed turtle species are temporary / reversible and small-scale behavioural response or recoverable temporary threshold shift. No impacts at a populations level are predicted.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans as detailed in Annex 1 of this document.
Biological	Predicted impacts to EPBC Act listed turtle species are temporary / reversible and small-scale behavioural response or recoverable temporary threshold shift. No impacts at a populations level are predicted.
Ecological	Impacts to ecological features are not predicted.
Economic	Impacts to economic features are not predicted.
Cultural	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Predicted impacts to EPBC Act listed turtle species are temporary / reversible and small-scale behavioural response or recoverable temporary threshold shift. Impacts to cultural features are not predicted.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation no objections and claims have been made regarding underwater sound and turtles. A single individual raised awareness about the presence of marine turtles in the Otway region and this information was included in this impact assessment.

5.6.7 Underwater sound – Marine Mammals

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts to marine mammals with implemented controls are temporary / reversible and small-scale behavioural responses or recoverable temporary threshold shifts. No impacts at a population level are predicted.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature. There is medium confidence in the prediction of when foraging whales and Southern Right Whales are present in BIAs and thus monitoring will be undertaken to validate the presence and/or absence of whales.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans.
Biological	Predicted impacts to marine mammals with implemented controls are temporary / reversible and small-scale behavioural response or recoverable temporary threshold shift. No impacts at a populations level are predicted.
Ecological	Impacts to ecological features are not predicted.
Economic	Impacts to economic features are not predicted.
Cultural	Impacts to cultural features are not predicted. If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Predicted impacts to marine mammals with implemented controls are temporary / reversible and small-scale behavioural responses or recoverable temporary threshold shifts. No impacts at a population level are predicted. Via stakeholder consultation the cultural value of Deen Maar (Lady Julie Percy Island) has been raised, hence, an activity limitation has been implemented such that no acquisition will occur (i.e. full power discharge of the sound source) within 17 km of Deen Maar. [Distance updated in response to Matters M31, M32, M33 and F17].
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is minor to moderate.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation, objections and claims have been made regarding underwater sound and marine mammals. These have been addressed by changing the Regia MSS temporal and spatial boundaries to: Avoid the period when Blue Whale and other foraging whales are present in the Blue Whale foraging BIA in significant numbers. Not operating the sound source within 17 km of Deen Maar. Distance updated in response to Matters M31, M32, M33 and F17. Not operating the sound source within 42 km of the SRW Reproduction BIA when SRW's are present in the BIA, ensures the activity does not affect calving, resting, nursing, or any other biologically important behaviour for calf-cow pairs No discharge of the sound source in the Southern Right Whale reproduction BIA at any time.

5.6.8 Underwater Sound – Divers, Swimmers & Surfers

Category	Predicted Level of Impact
Principles of ESD	Impacts to divers, surfers and swimmers are not predicted as the Regia MSS has been redesigned so that the received sound level at 13 representative coastal locations and at Deen Maar is below the human health safety criterion for divers and swimmers of 145 dB re 1 µPa.
	Available literature was used to inform the impact assessment. There is high confidence in the prediction of impacts which are based on peer reviewed and published literature. The sound modelling was revisited with a deliberate effort to assess received sound levels at 13 representative coastal locations and at Deen Maar adjacent to the Survey Acquisition Area. The outcomes showed that the survey could not exceed the safety criterion on the coastline except from a small area. This area has now been removed from the acquisition area where the sound source would operate at full power.
	No EPBC Act Management Plans or Recovery Plans were identified that are relevant to divers, surfers or swimmers.
Biological	Impacts to biological features are not predicted.
Ecological	Impacts to ecological features are not predicted.
Economic	Impacts to economic receptors are not predicted. The sound source will not be discharged at full power in areas from where it is determined that exceedances of the human health safety criterion may occur.
Cultural	Impacts to divers, surfers and swimmers are not predicted as the Regia MSS has been redesigned so that the received sound level at 13 representative coastal locations and at Deen Maar is below the human health safety criterion for divers and swimmers of 145 dB re 1 uPa. The distance of the activity offshore means that no Traditional Owners will be excluded from Sea Country. Impacts to cultural receptors are not predicted.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is negligible.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation the following objections and claims have been made: - Impacts to divers and surfers from underwater acoustic impacts. A second modelling report was commissioned which deliberately assessed whether exceedances of the human health safety criterion could be realised on the coastline adjacent to the Survey Acquisition Area or at Deen Maar. The discharge of the sound source at full power has been constrained and the Survey Acquisition Area will not include the area from where exceedances on the coastline were predicted.

5.6.9 Artificial light

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation.
	Available literature and government management plans, recovery plans and conservation advice were used to inform the impact assessment. Serious or irreversible environmental damage is not predicted from light emissions. There is high confidence in the prediction of impacts to light sensitive receptors.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans.
Biological	Predicted impacts to biological receptors (fish, invertebrates, birds, turtles) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation.
Ecological	Predicted impacts to ecological receptors (e.g. zooplankton) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation.
Economic	Predicted impacts to economic receptors (e.g. squid) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation, thus commercial squid fishers will not be worse off as a result of the activity.
Cultural	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Predicted impacts to biological receptors (fish, invertebrates, birds, turtles) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation. Light emissions are not predicted to impact cultural receptors.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	To date no objections or claims in relation to light emissions have been made by relevant persons. - A relevant person raised that they bird watch for pelagic and shorebirds along the southwest coast of Victoria and were concerned about their welfare in relation to the Regia MSS. The impact assessment undertaken identified several pelagic and shorebird species, including BIAs, that occur within the area potentially affected by light. Some of the species identified are threatened or migratory species with a subset of species identified as undertaking biologically important behaviour such as breeding and/or foraging/feeding. As such the CGG Marine Assurance System will ensure that vessels implement a Vessel Lighting Management Plan to ensure light emissions do not impact on pelagic and shorebirds. Thus, impacts to bird watching for pelagic and shorebirds along the southwest coast of Victoria are not predicted.
	To date there has been no views from the public in relation to the activity's light emissions.

5.7 Consideration of Predictive Uncertainty

In any environmental impact assessment process, predictive uncertainty plays a pivotal role in shaping our understanding and management of potential impacts. This section delves into the complexities and inherent uncertainties associated with predicting environmental effects on sensitive marine species and habitats.

It outlines our methodologies for quantifying and managing these uncertainties, emphasising the limitations of current predictive models. By transparently addressing these uncertainties, we aim to enhance the robustness of our environmental assessments and decision-making processes, ensuring a responsible and adaptive approach to environmental management.

Each impact analysis (Appendix E1 – E9) explicitly considered the levels of uncertainty in our predictions of impact in accordance with the process outlined in Appendix B9. Through this consideration it has been possible to identify areas where uncertainty is highest, or confidence in the predictions is low. In such circumstances there has been a further consideration of whether the uncertainty levels can be reduced prior to the proposed commencement of the activity, during the activity, of afterward.

Application of the precautionary principle is required when there are threats of serious or irreversible environmental damage and a lack of full scientific certainty. There are examples in the analysis where a lack of full scientific uncertainty was identified, however, there were no instances where threats to environmental values and sensitivities were serious or irreversible. Despite this CGG routinely applied precaution in its assessment; selecting conservative effect thresholds for sound, adjusting the activity design to avoid overlap with sensitive species protected areas (e.g. KEFs), and implementing buffers around marine protected areas.

Ultimately, the Implementation Strategy in Appendix B3 is how all uncertainties are managed adaptively. Appendix B3 discusses various parts of the environmental management system that facilitate adaptive management strategies to ensure there is a dynamic approach to manage and mitigate environmental impacts and risks effectively. Adaptive management is pivotal in this context, allowing for flexible responses to changes and uncertainties identified during the survey. It involves continuous monitoring, evaluation, and modification of management strategies based on real-time data and feedback.

5.8 Quality of the Environmental Assessments

The analysis completed in Appendices D1 – D4 and E1 – E9 are appropriate to the nature and scale of the activity because they:

- Cover all environmental aspects, and all environmental components including air, water, land, flora, fauna, and human health including the social, economic, and cultural features of these.
- Follow a structured methodology to identify environmental impacts and risks.
- Clearly document the assessment process and findings for relevant person review and they have been publicly available for months prior to submission.
- Apply caution in uncertainty, preferring preventative measures and properly applying the hierarchy of controls concept.
- Will be maintained in a ‘live’ status throughout the duration of the EP to enable the incorporation of new data and adjust management and mitigation measures as needed.
- Have applied greater effort to analysis of impacts and risks with lower predictive confidence and higher effect/consequence meaning the EP has prioritised actions based on the severity of impacts and risks.
- Comply with relevant laws and regulations.
- Address the social and cultural impacts on local communities.

The analyses completed derive their credibility through evidence gathered from peer-reviewed scientific literature, utilisation of high-quality and verifiable data (e.g. fisheries), use of rigorous and

established scientific methodologies, and full transparency regarding methods and data sources. Thus, ensuring reproducibility of results. It also exercises objectivity, avoiding any conflicts of interest by using qualified external experts, and follows international standards for environmental impact assessments. Comprehensive documentation throughout the assessment process further underpins its scientific integrity.

5.9 Compliance with the EPBC Act

The primary environmental legislation within Australia is the *Environmental Protection and Biodiversity Conservation Act* 2002 (**EPBC Act**). NOPSEMA's authorisation processes have a Part 10 approval that applies to offshore petroleum activities as per the NOPSEMA EPBC Act Program. This program ensures that impacts on matters protected under Part 3 of the EPBC Act are not unacceptable.

Matters protected by the EPBC Act that have been considered in this EP include:

- World Heritage properties
- National heritage values of declared National Heritage Places.
- Wetlands of international importance.
- Listed threatened species and ecological communities.
- Listed migratory species.
- Commonwealth marine environment.

CGG maintains a register of all legislation, including all EPBC Act materials, which has been provided in Appendix B2 of the EP. This appendix has been reviewed prior to each submission and will be updated in accordance with the requirements in the Implementation Strategy (Appendix B3).

Each impact and risk analyses has considered relevant matters from Appendix B2 and provides evidence backed by appropriate primary information sources, that the proposed activity is not in conflict with any recovery plans or threat abatement plans for listed threatened species or ecological communities. It respects the management plans in place for Commonwealth reserves, such as Australian Marine Parks, and upholds the Australian IUCN Reserve Management Principles. It shows that the activity will not have unacceptable impacts on the values of these protected areas.

Moreover, the EP content confirms that the proposed activity does not contravene any management plans for World Heritage properties, National Heritage places, or Ramsar wetlands. In the absence of specific management plans, the EP shows that all reasonable steps have been taken to ensure consistency with the Australian World Heritage Management Principles, National Heritage Management Principles, Australia Ramsar Management Principles, and Commonwealth Heritage Management Principles.

The EP also demonstrates due regard for relevant policy documents, guidance, bioregional plans, wildlife conservation plans, management plans, gazettal instruments under the EPBC Act, conservation advice, marine bioregional plans, and other pertinent information, including spatial data, available on the DCCEEW website.

Objectives and values of the relevant south-east marine parks, presented in the South-east Marine Parks Network Management Plan (DNP 2025) are described and discussed in Table F4-2 and Table F4-3 below – to demonstrate that the activity is not inconsistent with the relevant management plan, and that impacts will be of an acceptable level.

Table F4-2 - Demonstration that the activity is not inconsistent with the objectives of the South-east Marine Parks Network Management Plan

Goals/Visions/Objectives – *South-east Marine Parks Network Management Plan (DNP 2025)*	**Demonstration of Consistency with this Goal/Vision/Objective within the Regia MSS EP**
Management program goal: Respect and support the ongoing cultural responsibilities and connections of First Nations people to care for and manage Sea Country in marine parks	The following activity limitation is set: • No activities within a designated Australian Marine Park (State and Commonwealth).
Management program goal: Reduce the impacts of pressures and environmental changes on marine species, habitats and ecosystems	
Vision: The South-east Marine Parks are healthy and resilient for current and future generations	The methodology applied for all impact and risk analyses (Appendices D1-D4 and E1-E9) involved the consideration of all relevant matters protected by the EPBC Act. This process also involved providing evidence that the proposed activity is not in conflict with any recovery plans or threat abatement plans for listed threatened species or ecological communities. It respects the management plans in place for Commonwealth reserves, including Australian Marine Parks. It shows that the activity will not have unacceptable impacts on the values of these protected areas.
Objective (a): To protect and conserve biodiversity and other natural and cultural values	The following Environmental Performance Outcomes are set: • No death or injury to fauna, including listed threatened or migratory species, from the activity. • No disruption to critical life-cycle behaviours. • Biologically important behaviours within a BIA or outside a BIA can continue while the activity is being undertaken.
	The Regia MSS EP is assessed under a Part 10 approval under the EPBC Act, and an endorsed Program implemented by NOPSEMA.
	Appendix F2 demonstrates that all reasonably practicable measures to protect relevant receptors have been adopted and therefore minimised.
	Where potential impacts or risks relating to cultural features have been identified, these potential impacts/risks including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.

Goals/Visions/Objectives – *South-east Marine Parks Network Management Plan (DNP 2025)*	**Demonstration of Consistency with this Goal/Vision/Objective within the Regia MSS EP**
	The following points include relevant legislation and other requirements that currently apply to environmental management of the proposed activity (full list available in Appendix B2): • Underwater Cultural Heritage Act 2019 - The act provides for the protection of underwater cultural heritage, which may be affected by the activities associated with seismic surveys. • National Parks Act 1975 - This act establishes a framework for the protection and management of national parks in Australia. It provides for the conservation of natural and cultural resources, the provision of recreational opportunities, and the management of park use. • Victorian Marine National Parks and Sanctuaries Management Plan - The management plan provides guidance on the management of marine national parks and sanctuaries in Victoria, including the protection and conservation of marine environments that may be impacted by seismic surveys. • EPBC Act Policy Statement 1.1 – Significant Impact Guidelines – Matters of National Environmental Significance - The policy statement provides guidance on the assessment and management of activities that may have a significant impact on matters of national environmental significance, including marine habitats and species. • All conservation and listing advice, and management and recovery plans for relevant EPBC Act-listed receptors were considered to inform and identify actions required for conservation and recovery of the threatened species or ecological community.
Objective (b): Ecologically sustainable use and enjoyment of the natural resources within marine parks, where this is consistent with objective (a) (above)	The proposed Regia MSS activity is consistent with the principles of Ecologically Sustainable Development as assessed in Section 5.11.

Table F4-3 - Demonstration that the activity is not inconsistent with the values of the South-east Marine Parks Network Management Plan.

	Apollo Marine Park Values	Franklin Marine Park Values	Nelson Marine Park Values	Zeehan Marine Park Values	Justification for why the activity will not have unacceptable impacts on the values of AMP values
Ecosystems, habitats, communities, and notable features	The park contains habitats, species and ecological communities associated with the 2 provincial bioregions – Western Bass Strait Shelf Transition and Bass Strait Shelf Province – and the Central Bass Strait mesoscale bioregion.	The park contains habitats, species, and ecological communities associated with 2 provincial bioregions – Tasmanian Shelf Province and Western Bass Shelf Province – and the Otway and Franklin mesoscale bioregions.	The park contains habitats, species and ecological communities associated with the West Tasmanian Transition provincial bioregion.	The park contains habitats, species, and ecological communities associated with 3 provincial bioregions – the West Tasmania Transition, the Western Bass Strait Shelf Transition, and the Tasmania Province – and the Otway mesoscale bioregion.	There are no pathways for direct impact to ecosystems, habitats, communities, or notable features within AMPs that are permanently located within the boundaries of the park, given their sessile/permanent nature. Relevant predicted impacts to these in the greater region are assessed and discussed in Appendices E1-E9.
		Ecklonia radiata kelp forests, brown and red macroalgae, sponges, gorgonians, hard bryozoans and tube worms.		Benthic communities of fan worms, sponges, sea whips, and hard bryozoans, diverse sessile fauna and associated mobile fauna, including giant crabs, ascidians (sea squirts), corals, hydroids, crustaceans, sea stars, brittle stars, molluscs and fish.	
				The biodiversity and productivity in the park are influenced by the southward-flowing Zeehan Current (an extension of the Leeuwin Current from Western Australia) interacting with the canyons.	

	Apollo Marine Park Values	Franklin Marine Park Values	Nelson Marine Park Values	Zeehan Marine Park Values	Justification for why the activity will not have unacceptable impacts on the values of AMP values
Biologically Important Areas	Shy albatross, Black browed albatross, Campbell albatross, Indian yellow nosed albatross, Wandering albatross, Bullers albatross, Common diving petrel, Wedge-tailed and short-tailed shearwaters - Foraging	Antipodean albatross, Black browed albatross, Campbell albatross, Indian yellow nosed albatross, Wandering albatross, Bullers albatross, White faced storm petrel, Common diving petrel, Little penguin, Australasian gannet, and Short-tailed shearwater - Foraging	None identified	Antipodean albatross, Black browed albatross, Campbell albatross, Indian yellow nosed albatross, Wandering albatross, Bullers albatross, Common diving petrel, Wedge-tailed and short-tailed shearwaters - Foraging	No direct impacts to this species or its BIA within the AMP are predicted due to absence of any overlap with relevant EMBAs. Relevant predicted impacts to these in the greater region are assessed and discussed in Appendices E1-E9.
	Pygmy Blue Whale - Foraging	Pygmy Blue Whale - Foraging		Pygmy Blue Whale - Foraging	
	Southern Right Whale - Migration	Southern Right Whale - Migration		Southern Right Whale - Migration	
	White Shark - Foraging	White Shark - Foraging		White Shark - Foraging	
Key Ecological Features	Shelf rocky reefs and hard substrate – includes the mesophotic and rariphotic reefs in the north-west corner of the park.	Shelf rocky reefs and hard substrate – includes the mesophotic and rariphotic reefs in the north, east and south sections of the park.	None identified	West Tasmanian canyons • shelf rocky reefs and hard substrate – includes the rariphotic reefs on the mid and outer shelf.	There are no pathways for direct impact to KEFs within AMPs that are permanently located within the boundaries of the park, given their sessile/permanent nature.

	Apollo Marine Park Values	Franklin Marine Park Values	Nelson Marine Park Values	Zeehan Marine Park Values	Justification for why the activity will not have unacceptable impacts on the values of AMP values
Species and key behaviours	Benthic communities dominated by sponges, with some octocorals, bryozoans and encrusting macroalgae, and southern rock lobsters.	The park is a core foraging area for early incubating Tasmanian Shy albatross from the nearby Albatross Island breeding colony.	Many whales migrate through the park when travelling between the cold food-filled southern waters and the warmer waters north where they breed.	The park is a core foraging area for early incubating Tasmanian Shy albatross from the nearby Albatross Island breeding colony.	No direct impacts to these species or their key behaviours within AMPs are predicted due to the absence of any overlap with relevant EMBAs. Predicted impacts to relevant species and associated behaviours in the greater region are assessed and discussed in Appendices E1-E9.
	Fish communities are dominated by velvet leatherjackets, Degen's leatherjackets, six spine leatherjackets, jackass morwong, rosy wrasse, butterfly perch, bluethroat wrasse, pink snapper, common gurnard perch, barracouta, sand flathead, draughtboard shark, spikey dogfish, and gummy shark.				
Native Title, Sea Country, and Cultural Heritage	The MV City of Rayville shipwreck, an American freighter, lies near the western boundary of the park in a depth of 80 m.	None identified	None identified	None identified	There are no pathways for impacts to this shipwreck due to its fixed location within an AMP that is not predicted to be directly impacted by the activity.

	Apollo Marine Park Values	Franklin Marine Park Values	Nelson Marine Park Values	Zeehan Marine Park Values	Justification for why the activity will not have unacceptable impacts on the values of AMP values
Other marine park users, including other planned or existing offshore petroleum activities	Commercial fisheries operating in the park include: • South-east Scalefish and Shark Fishery – gillnet, hook and trap sector • Southern Bluefin Tuna Fishery • Victorian Rock Lobster Fishery • Victorian Ocean General Fishery • Victorian Wrasse (Ocean) Fishery • Victorian Commercial Permit and Small Sales Commercial Permit Fishery.	Commercial fisheries operating in the park include: South-east Scalefish and Shark Fishery – gillnet, hook and trap sector • Tasmanian Octopus Fishery • Tasmanian Rock Lobster Fishery • Tasmanian Giant Crab Fishery • Tasmanian Scalefish Fishery.	None identified	Commercial fisheries operating in the park include: • Tasmanian Rock Lobster Fishery • Tasmanian Giant Crab Fishery	There are no pathways for direct impact to commercial fisheries operating within AMPs due to the absence of any overlap with relevant EMBAs. Predicted impacts to relevant targeted species and fisheries in the greater region are assessed and discussed in Appendices B6 and E3.
	Commercial shipping routes into and out of Melbourne			Six existing petroleum titles (exploration permits at the commencement of this DNP (2025) plan) overlap the northern section of the park.	There are no pathways for direct impact to shipping routes operating within AMPs due to the absence of any overlap with relevant EMBAs. Relevant predicted impacts to other marine users are assessed in Appendix E1.

Under the EPBC Act, a National Recovery Plan exists for the endangered Southern Right Whale (*Eubalaena australis*). This plan identifies anthropogenic underwater noise as a Very High priority threat and sets out Action Areas designed to meet recovery targets, address key pressures, and guide species-specific conservation efforts. Action Area A5, also identified as Very High priority, focuses on the need to *"assess, manage, and mitigate impacts from anthropogenic underwater noise."*

This threat is classed as likely and a moderate consequence for the eastern portion of the population. The Recovery Plan also states that the behavioural impacts of sound to southern right whales is largely unknown and, therefore, a precautionary approach should be taken to the management of potential impacts, particularly in the context of cumulative impacts.

As detailed in Appendix E7 and shown in Map 085 (MAP-REG-EPM-085_C), the acquisition area overlaps a migratory BIA for SRWs. SRWs are likely to migrate through this area from April through October. Pregnant cows may pass through early in the season as they travel to aggregation areas, while cows with calves are likely to pass through later in the season as they depart for summer foraging grounds. Isolated individuals may be present outside this period. The acquisition area does not overlap the reproduction BIA; however, sound propagation may overlap this area when acquiring. Consequently, actions have been considered below based on effects to reproduction and effects to migration.

Only those actions within Action Area A5 that are applicable to the Regia MSS and within CGG's sphere of influence have been considered in this assessment. CGG has evaluated each relevant action and demonstrated that the Regia MSS is not inconsistent with these actions, as outlined below.

Action 1: CGG will improve baseline understanding of southern right whale acoustic communication to better inform potential impacts from anthropogenic underwater noise because:

1. The survey will deploy hydrophones, PAM systems, and fixed buoys that may detect low-frequency SRW calls, generating a spatially resolved dataset of SRW vocal activity in the western Otway region.
2. These systems will record ambient noise, sufficient to attempt identification and measurement of communication space, natural variability in noise levels, and in-situ signal-to-noise ratios relevant to mother–calf communication (if present and detected).
3. By analysing SRW calls (if present and detected) alongside environmental and oceanographic conditions, CGG will collect data to support an understanding of when and where SRWs are acoustically active and possibly how well calls propagate under local conditions.
4. Collected data will reduce uncertainty in the assessment of masking, disturbance thresholds, and the reliability of detection systems, strengthening future ALARP decisions and allowing more precise mitigation tailored to SRW acoustic ecology.
5. All data collected will be used to calibrate and assess the effectiveness and appropriateness of current models of sound transmission in the region. Filling data gaps with empirically derived location specific data will improve the quality of such models.

This monitoring will be published to contribute to the Recovery Plan priority to improve understanding of SRW communication and interactions with anthropogenic noise, providing empirical data to support regional cumulative assessments and future protection measures.

Action 2: This EP has demonstrated that the Regia MSS does not prevent any southern right whale from utilising the migration BIA nor the reproduction BIA or cause auditory impairment because:

1. The activity will not occur during April – August, avoiding the period when mothers and calves are most likely to arrive in and utilise coastal habitats and hence are most sensitive to disturbance.
2. While the Regia MSS overlaps with the final six weeks of the SRW presence window (mid-September–October), the activity is not predicted to prevent any southern right whale from utilising the Reproduction BIA because:

a. By the final six weeks of the season, most biologically important behaviours relevant to presence within the Reproduction BIA are expected to have already occurred, as approximately 75% of the reproduction season will have already elapsed by the time the Regia MSS commences.
    i. Arrival, initial migration into the BIA, calving, early calf-cow bonding, and the early developmental period for calves are all more likely to take place earlier in the season, as per the SRW National Recovery Plan.
    ii. Very late in the season in the latter stages of September, most SRW calf-cow pairs have completed the most sensitive life-stages and are departing the Reproduction BIA.
    iii. Migration from the reproduction BIA can occur at any time and a 10,500 km^2 shutdown zone is in place for SRW during this movement, with significant detection capability deployed such that detection is likely before threshold effect distances for PTS and TTS are reach and behavioural disturbance may occur.

b. Acquisition will commence in deeper waters, greater than 42 km from the reproduction BIA, and will not progress into shallower waters where sound may overlap the reproduction BIA until SRW's have been confirmed to not be present in the relevant section of the reproduction BIA. SRWs within the BIA will not be exposed to levels that would cause auditory injury or displacement. Modelling for deeper waters >42 km from the reproduction BIA shows:
    i. No exceedance of SRW injury thresholds within the reproduction BIA, and
    ii. Received levels within the reproduction BIA remain below a conservative behavioural disturbance threshold of 140 dB SPL.

    In addition, shutdown measures are in place if there is detection of an impulsive sound signature above an ultra-conservative threshold of 120 dB in the reproduction BIA in September or October.

c. As outlined in the National Recovery Plan, SRWs using the Reproduction BIA in late season predominantly engage in resting, nursing, and preparing for offshore departure.
    i. These behaviours occur in shallow, nearshore habitats (<20 m depth).
    ii. The seismic survey will be conducted in deep offshore water, spatially separated from the Reproduction BIA, while calf-cow pairs are present in this area.

    Therefore, utilisation of the reproduction BIA is predicted to continue unimpeded, as the survey will not alter habitat quality, accessibility, or suitability while SRW are present.

d. Calves later in the season are larger, more mobile, resilient and capable of accompanying their mothers into deeper waters, reflecting reduced reliance on the highly sheltered conditions required during the early weeks post-birth, as described in the Recovery Plan.

e. SRWs can continue to ulitise the migration BIA as the Regia MSS does not overlap the period when SRWs begin arriving from April onwards. The survey area overlaps less than 1% of the migration BIA, and 24-hour shutdown and relocation procedures are in place should a migrating whale be detected. The Reproduction BIA remains entirely undisturbed due to the activity limitations and control measure in place. Accordingly, the activity does not:
    i. prevent SRWs from utilising the migration BIA, and to arrive and enter the reproduction BIA.

ii. prevent SRWs from remaining within or utilising the reproduction BIA during calving and nursing.

iii. prevent SRWs from undertaking reproductive behaviours within the reproduction BIA.

iv. cause auditory impairment to SRWs within either the migration or reproduction BIAs.

v. cause displacement from HCTS or the reproduction BIA; or

vi. prevent SRWs from utilising the migration BIA to depart the region at the end of the season.

3. The sound source will not operate within 42 km of the SRW Reproduction BIA when SRW's are present in the BIA, ensuring the activity does not affect calving, resting, nursing, or any other biologically important behaviour for calf-cow pairs given:

    a. Auditory injury effects may begin to occur within 59 m of the sound source.

    b. TTS effects may begin to occur within 2.9 km of the sound source, assuming the whale remains within that distance for 24 hours.

    c. Behavioural responses may occur within:

        i. 3.15 km of the sound source at the 160 dB SPL threshold used in the NMFS guidance.

        ii. 12.43 km of the sound source at the more precautionary effect threshold of 140 dB SPL.

        iii. 30.97 km of the sound source at the ultra-precautionary effect threshold of 120 dB SPL.

    Multiple effective methods in place to detect SRWs before these distances are reached and will trigger immediate shutdown of the sound source. None of the predicted effect distances overlap with the SRW reproduction BIA when the survey is >42 km from the reproduction BIA.

4. Regarding underwater sound effects within the migration BIA, real-time monitoring (MFOs, spotter vessel, towed PAM, sound source verification, and aerial observations) ensures high detection probability, enabling shutdowns prior to migrating whales encountering distances associated with auditory impairment.

5. Shut down measures will occur if any SRW is detected anywhere within a 10,500 km^2 (Map 193). This ensures shutdowns occur well before auditory injury or TTS could occur whether the SRW is utilising the migration or reproduction BIA.

Based on independent expert modelling, underwater sound from the Regia MSS is not predicted to result in a deviation of natural soundscape within the reproduction BIA, to an extent that would prevent biologically important reproduction behaviours, as defined in the SRW Recovery Plan from occurring (courtship, mating, birthing, nursing or accompanying a dependent young). Therefore, SRW are not predicted to be prevented from utilising the BIA or be exposed to auditory impairment.

Action 3: The Regia MSS EP has demonstrated that the risk of behavioural disturbance is minimised because:

1. The required actions contained within the National Recovery Plan were used as the defined acceptable levels of impact, along with other levels in the impact assessment, ensuring all efforts and environmental performance outcomes were aligned with the National Recovery Plan from the commencement of the environmental assessment.

2. The survey footprint, timing and operating envelopes have been substantially reduced through iterative design, and extensive consultation, resulting in far less overlap with the migration BIA and peak biological periods than originally proposed.

3. The sound source will never operate within 17 km of the SRW reproduction BIA nor within 42 km of it while SRW are expected to be present, eliminating potential impacts during the most sensitive life-cycle stages.
6. Independent expert sound modelling predicts that PTS/TTS thresholds for SRW are not exceeded within the reproduction BIA, and shutdowns will occur well beyond the predicted ranges within the migration BIA noting that:
    a. A conservative approach has been taken in the modelling, such that the received sound levels and effect distances are likely to be lower than those predicted. The modelled outputs will be verified throughout the survey.
    b. The impact assessment has been informed by contemporary peer-reviewed literature and internationally accepted, conservative effect thresholds.
    c. The shutdown procedures are based on even more conservative effect threshold distances.
7. The shutdown zones applied for migrating SRWs are highly conservative, far exceeding EPBC Act requirements.
8. A multi-layered detection system (involving MFOs, spotter vessel, PAM, sound source verification, aerial surveillance, and external PAM detections) maximises detection probability across visual and acoustic ranges, materially reducing the likelihood of undetected close approaches. A full list of control measures and associated environmental performance standards can be found in Appendix G1.
9. A dedicated PAM-enabled spotter vessel will operate in dynamic 'sentry' and 'scouting' modes, targeting SRW movement pathways by adjusting positions based on real-time detections.
10. Adaptive management, with oversight from a Whale Expert Panel, applies real-time expert judgement to detections, trends, environmental cues, and uncertainty, increasing the reliability of behavioural protection measures.
11. Soft-start and low-power modes will prevent sudden introduction of sound into the environment, giving migratory SRW the opportunity to avoid the source voluntarily.
12. Night-time operations are managed by acoustic monitoring and extended shutdown periods, reducing residual uncertainty in low-visibility conditions.
13. Capped speed limits (up to 6 knots) reduce the risk of vessel-related disturbance and allow more time for detection and shutdowns.
14. Pre-survey seasonal acoustic and visual monitoring validates presence/absence expectations and ensures environmental conditions match predictive modelling.
15. The activity's acoustic impacts are temporary, reversible, and spatially limited, with modelling showing that behavioural responses would be short-lived and not sustained.
16. Cumulative impacts have been assessed as low, owing to staggered timing of other Otway Basin activities, minimal temporal overlap, and industry-wide mitigation commitments.
17. The EP incorporates relevant requirements of Recovery Plans, Conservation Advice, and the Australian National Guidelines, ensuring species are not prevented from utilising BIAs or subjected to auditory impairment.
18. Mitigation measures have been taken through ALARP and other 'acceptable level' assessments, demonstrating that no reasonably practicable additional measures are available that would further reduce behavioural disturbance.

Collectively, the points above demonstrate that this EP ensures the Regia MSS has minimised the risk of behavioural disturbance (as defined in the SRW National Recovery Plan) to SRWs within the reproduction BIA.

Action 4: CGG has ensured its environmental assessments associated with underwater noise generating activities include consideration of national policy (e.g., EPBC Act Policy Statement 2.1) and guidelines related to managing anthropogenic underwater noise and implement appropriate mitigation measures to reduce risks to southern right whales to the lowest possible level because:

1. CGG has adopted a 10,500 km^2 shutdown area (Map 193) well in excess of the shutdowns that must occur at a minimum of 5 km for PTS, TTS, and behavioural disturbance. These far exceed EPBC Act Policy Statement 2.1, which recommends a 500 m shutdown zone for all whales.
2. CGG's assessment relies on detailed numerical sound modelling calibrated to site-specific bathymetry, propagation, and species-specific thresholds rather than the generic source-level assumptions in Policy Statement 2.1, providing a more accurate, conservative prediction of exposure risk. Additionally, CGG has committed to in-field sound source verification of the modelling predictions and adaptive management should these distances have been underestimated.
3. CGG applies multi-platform detection (including MFOs, spotter vessel, PAM, sound source verification, aerial surveillance, and external PAM detections), exceeding the minimum single-platform visual monitoring described in Policy Statement 2.1, thus reducing the probability of undetected close approaches. A full list of control measures and associated environmental performance standards can be found in Appendix G1.
4. Shutdown procedures are triggered earlier, under more conservative conditions, and for a wider set of effects than required under Policy Statement 2.1, ensuring SRW are protected long before exposure to thresholds that could cause disturbance or auditory impairment.
5. By employing ambient noise monitoring and multiple detection systems, CGG can adjust mitigation beyond the approaches contemplated by Policy Statement 2.1.

The combination of spatial exclusions, ultra-conservative shutdown zones, multi-layered detection, and timing limitations results in a risk profile that is substantially lower than that assumed under Policy Statement 2.1.

Action 7: CGG will improve understanding and characterisation of marine soundscapes, including the application of new technologies for data processing, within southern right whale BIAs to facilitate quantification of anthropogenic noise in the marine environment because:

1. CGG will deploy a network of hydrophones, a PAM network capable of long-duration, broadband (including low-frequency) acoustic monitoring, generating a spatially and temporally detailed soundscape within and adjacent to the SRW reproduction BIA in southwest Victoria.
2. These systems measure ambient (~baseline) noise, biological noise, and anthropogenic noise allowing CGG to characterise the soundscape, including diel, weather-driven, and seasonal variability across the SRW communication band.
3. The hydrophone array enables source separation, allowing CGG to distinguish seismic pulses, other anthropogenic sources, biological signals, and natural geophysical sounds, which is important for quantifying the proportion of anthropogenic noise in the wider soundscape.
4. Sensors will operate before and during, the survey, so that CGG can quantify changes in soundscape composition attributable to the activity, enabling assessment of incremental anthropogenic noise contributions relative to baseline conditions.
5. The monitoring locations are positioned to capture propagation into the SRW reproduction BIA, meaning the resulting data will improve understanding of how offshore noise transmits toward SRW calving and migration habitats.
6. The integrated dataset (ambient noise metrics, PAM detections, species-call presence, and vessel activity logs) will support the development of empirical noise budgets, quantifying anthropogenic contributions across frequencies important for SRW communication.

The Recovery Plan identifies improved understanding of anthropogenic noise in SRW habitats as a priority, and the baseline and impact-related acoustic information required will be published to meet support meeting this objective.

Rationale for why a biological response is consistent with the SRW National Recovery Plan

The National Recovery Plan for the Southern Right Whale (2024) defines an impact as "*a biologically significant effect that reflects a change whose direction, magnitude and/or duration is sufficient to have consequences for the fitness of individuals or populations*" (Glossary, p.1). The Plan further explains that, due to the species' life-history traits, "*any long-term response to disturbance and impacts… are unlikely to be detectable, or even reliably identified to a specific threat, over short timescales (i.e. 1 to 3 years*)" (p.13). Accordingly, only effects that alter fitness or population trajectory, or disrupt biologically important behaviours within key habitats, constitute impacts relevant to recovery planning. The National Recovery Plan identifies that the risk from anthropogenic underwater noise is greatest "*within or close to southern right whale reproductive BIAs and HCTS, where whales… are resident for long periods… and young calves are present*" (Action A5, p.71).

The Regia MSS:

- Temporally overlaps with 2 weeks of SRW's likely presence in the reproduction BIA at the end of the reproduction season.
- Occurs entirely outside the reproduction BIA and will come no closer than 42 km during SRW utilisation months.
- Has shown sound propagation will be verified to be below 120 dB (an ultra-precautionary threshold).

Therefore, the Regia MSS cannot interfere with calving, nursing, or the prolonged residency behaviours that define reproduction BIAs. Action A5 requires that proponents "*demonstrate that [the action] does not prevent any southern right whale from utilising the area or cause auditory impairment*" (A5.2, p.71), and independent expert modelling confirms that received levels within the reproduction BIA remain below thresholds for auditory injury or behavioural disruption of biologically important behaviours.

Disturbance is separately defined as "*behavioural changes in response to an activity that can result in disruption to biologically important behaviours (i.e., reproduction, foraging, migration, resting)*" (Glossary, p.1).

The EP has put in place stringent measures to ensure that behaviours that meet this definition will not occur because of the Regia MSS. Any remaining behavioural responses observable may or may not be attributable to the Regia MSS. Hypothetically, if a behavioural response below 'disturbance' were attributable to the Regia MSS these effects are still consistent with the National Recovery Plan because they don't meet the definition of 'disturbance' and therefore cannot met the definition of 'impact'. On a strict reading of the Recovery Plan, a biological response to the Regia MSS (if one were to occur) does not constitute an impact, because it does not affect fitness, does not occur or emit sound at unacceptable levels within the reproductive BIAs or HCTS where sensitive behaviours occur, does not prevent use of critical habitat, does not cause auditory impairment, and does not disrupt reproduction, calving, nursing, or resting. Accordingly, the activity remains fully consistent with the Recovery Plan's objectives and specific actions relating to anthropogenic underwater noise.

While the Regia MSS EP conservatively acknowledges behavioural changes may occur at received levels below 120 dB SPL, this does not imply such responses are ecologically or regulatorily meaningful. Based on the best available evidence, and consistent with the behavioural variability typical of large mysticetes, any such responses are unlikely to constitute disruption to biologically important behaviours as defined by the National Recovery Plan. Moreover, where behavioural response probabilities have already been incorporated into impact predictions through conservative modelling and empirical thresholds, invoking residual uncertainty in the absence of demonstrable harm is neither necessary nor proportionate because:

- It is impossible to show or measure the point at which a behavioural change becomes a behavioural disturbance. The permissible behavioural changes under the National Recovery

Plan are those behaviours that do not result in disruption to biologically important behaviours.

- The following studies indicate that the transition between a behavioural change (i.e. within the expected behavioural repertoire) and a behavioural disturbance likely occurs somewhere between the ~110 dB SPL and >160 dB SPL thresholds. Behavioural changes in response to sound exposures below 120dB SPL are unlikely to be distinguishable from the normal range of biological behaviours as demonstrated by numerous scientific studies:
  - In an early field study, Malme et al. (1984) exposed gray whales to industrial sounds during migration and feeding. Migrating gray whales avoided a single airgun in their path starting around 164 dB re 1 µPa (rms), with about half deflecting course by ~170 db. In feeding areas, playbacks of continuous drillship noise suggested a much lower disturbance threshold. Whales showed no clear avoidance below ~110 dB and only began to possibly move away as levels approached ~119 dB. Malme et al. recommended 120 dB re 1 µPa as the received level at which there is a 50% probability of feeding gray whales interrupting feeding and leaving the area. This study, albeit with limited sample size, became a key benchmark for regulation, implying that sound below ~120 dB is unlikely to cause noticeable disturbance in baleen whales. For Southern Right Whales, which are also large mysticetes, these findings support the idea that maintaining received levels under 120 dB would avoid significant behavioural disruption (though the 120 dB criterion is recognized as a precaution based on sparse data). It must also be pointed out that the 120 dB level only applied to continuous noise with the same 50% probability estimate for seismic noise set at 170dB, some 50dB or 41% louder.
  - A series of studies in the 1980s and 1990s observed bowhead whale reactions to airgun noise in the Alaskan Beaufort Sea. In controlled exposure trials with a single airgun, migrating bowheads began orienting away from the approaching source at distances ~7–8 km (received levels roughly in the 120+ dB range) and all whales showed clear avoidance by 2 km, where received levels were at least 134 dB re 1 µPa. In contrast, no overt responses were detected when whales were exposed to distant seismic operations (received levels 107–158 dB) that were not directly in their path. During playbacks of airgun sounds, normal behaviour was observed at 3–5 km from the source (118–133 dB) until some whales finally moved away at ~124–134 dB (at closer ranges ~0.2–4 km). These studies show that bowheads can tolerate moderate noise if not directly confronted, but individuals will actively avoid an oncoming source once levels exceed roughly 120–130 dB. These studies concluded that contextual factors (whether the whale is feeding or migrating, and the nature of the approach) mediate the response threshold. In effect, 120 dB re 1 µPa was a conservative lower bound for disturbance. Most bowheads were unperturbed below this level, though a few sensitive individuals might react slightly above it. Applied to Southern Right Whales, this suggests sound under ~120 dB is unlikely to cause disturbance, especially if the noise source is not closing distance (which it is not), supporting the use of 120 dB as a precautionary criterion (Richardson 1985, 1986, 1999). It must also be pointed out that Richardson et al 1986 concluded the following: On 21 occasions in the summers of 1980–84, general activities of bowheads exposed to pulses of underwater noise (107–158 dB re: 1 μ Pa) from seismic vessels 6–99 km away were observed. Activities were indistinguishable from those without seismic noise; there was no detectable avoidance. In general, bowheads exhibit avoidance reactions when they receive seismic pulses stronger than about 160 dB re: 1 μ Pa. Evidence of reactions to lower received levels remains inconclusive.
  - Nowacek et al (2004) conducted playback experiments on North Atlantic right whales (*Eubalaena glacialis*) and revealed that the nature of the sound can be as important as its level. Tagged right whales were exposed to three stimuli – an approaching ship noise, a conspecific social call, and an artificial “alert” signal – all at similar received levels (~130–140 dB range). Strikingly, the whales did not show any significant avoidance or interruption of normal diving when they heard the actual ship noise (or the social sounds). In contrast, 5 out of 6 whales exposed to the alert signal (a complex tone designed to get their attention) dramatically changed behaviour: they prematurely aborted their foraging dives, rapidly ascended at shallow angles with increased fluke

strokes, and then stayed near the surface abnormally long. This response, which represents a disturbance (cessation of feeding and atypical surfacing), occurred at received levels around 133 dB re 1 µPa, statistically indistinguishable from the ship noise levels that produced no reaction. The authors concluded that right whales tend to ignore continuous low-frequency noise from vessels even when they can hear it, yet a novel or alarming sound can trigger an immediate disturbance response at similar or even lower levels. A limitation is the small sample size and the fact that the "alert" sound was not a typical environmental noise. Nonetheless, the study highlights that received level alone (e.g. 120 vs 130 dB) is not the sole predictor of behavioural disturbance and sound characteristics matter. In terms of management, the science supports the position that most low-level anthropogenic noises (<120 dB) are unlikely to disturb Southern Right Whales. The lack of response to ship noise around 130 dB supports the notion that sub-120 dB noise would rarely cause disturbance in right whales.

- Controlled exposure work on migrating humpback whales exposed to airguns has reported startle or brief orienting responses at received levels around 110–120 dB SPL, with more consistent avoidance or changes in movement patterns becoming evident at ≥130 dB SPL when animals were within a few kilometres of the source. These studies also reported no "abnormal" behaviours such as abandoning migration or sustained high-speed flight, highlighting that responses were modest adjustments within the normal behavioural repertoire (McCauley et al., 2000, Dunlop et al., 2018).
- Bowhead and grey whale studies further illustrate this pattern and the importance of context. Migrating bowheads have shown avoidance and course deflection at approximately 120–130 dB SPL, whereas feeding bowheads tolerated substantially higher levels (~158–170 dB SPL) before showing comparable displacement, indicating that the same species can respond quite differently depending on behavioural state (Weilgart 2013). Similarly, migrating grey whales altered course in response to airgun exposures around 110–130 dB SPL but continued their migration and did not abandon the area altogether (Gomez et al., 2016). Western gray whale studies off Sakhalin also detected changes in movement and respiration associated with higher received levels, while emphasising that detecting population-level effects requires very large sample sizes and that many responses remain within natural variability (Gailey et al 2016).
- McCauley et al., (2000) conducted a controlled study in Western Australia that tracked migrating humpback whales during exposure to a single airgun. Avoidance behaviour (deflection of course and/or increased speed) was observed once whales experienced about 140 dB re 1 µPa (rms) – for example, at 1.3 km from the source (received ~143 dB) whales consistently veered away. Notably, when the airgun was first fired, some humpbacks showed a startle or sudden dive response at relatively low levels (~112 dB), but they did not flee at that level. Mother–calf pairs resting near the surface were more sensitive. They avoided the source at greater distances (up to 7–12 km away, corresponding to received levels still on the order of 140 dB). A key limitation is that the vessel could not approach closer than 1.2 km for ethical reasons, so true threshold distances were estimated by extrapolation. McCauley et al. (2000) concluded sustained avoidance in humpbacks begins around 140 dB, with lower-level reactions limited to brief startle responses. This finding indicates that humpbacks (and by analogy, right whales) are unlikely to be disturbed by received levels below ~120 dB; indeed, the whales in this study showed no lasting displacement at such low exposures. In the Regia MSS context, McCauley's results reinforce that a 120 dB cutoff is very conservative – well below the ~140 dB level where humpbacks altered course. It must also be pointed out that the methodology of McCauley et al (2000) did not use soft-start procedures for the seismic tests. It is unlikely that an initial startle response would have been observed under a soft-start procedure, which is now an entrenched part of seismic survey methodology.
- Gailey et al (2016) found a gray whale changed its behaviour from feeding/travelling in a northeast direction to travelling in a northwest direction and increased its swim speed at received sound levels ranging from 127 to 139dB SEL. The authors noted the response was observed in conjunction with other factors such as direction of the sound source relative to the whale's position combined with increasing sound exposure levels. This

study was part of a seismic survey in Russia which implemented an extensive monitoring program to examine the effects of a 4D seismic survey on an endangered gray whale population. The authors theorised the lack of evidence that the whales responded to seismic survey sound and vessel traffic by changing either their movement or respiration patterns could indicate that the mitigation strategy was effective. This study used linear modelling to try and quantify the contribution of seismic amongst other variables to behavioural patterns in grey whales. After considering natural variation, none of the response variables were significantly associated with seismic survey or vessel sounds. A whale's distance from shore and its orientation relative to the closest vessel were found to be significantly influenced by vessel proximity, which suggested some non-sound related disturbance.

- Wood et al. (2012) provided an expert review and updated recommendations on noise impact criteria, building on studies like Malme (1980s) and Southall et al. (2007). For behavioural disturbance, they advocated a dual-threshold approach that many regulators (e.g., NOAA) had adopted: for impulsive noise (such as seismic airguns), use ~160 dB re 1 µPa (rms) as the threshold for potential disturbance in baleen whales, whereas for continuous or non-impulsive noise, use ~120 dB re 1 µPa. These values were not derived from new field experiments but rather from the consensus of earlier data – notably the 120 dB level traces back to Malme et al.'s findings for gray whales response to continuous noise only, and 160 dB to observations that pulses above that tend to provoke avoidance in various species. Wood et al. noted that the 120 dB criterion had become a de facto standard despite the "paucity of our knowledge" about its precision. They treated it as a conservative, broadly protective threshold to trigger mitigation, given the uncertainties. The authors' conclusion was essentially to retain these precautionary thresholds for management until better species-specific data are available. Legally and scientifically, this positions <120 dB exposures as unlikely to cause more than minor or transient behavioural changes in low-frequency cetaceans. In the context of the Regia MSS and Southern Right Whales, the Wood et al. (2012) guidance supports the assertion that keeping noise below 120 dB will avoid disturbances. It is in line with international best practice and provides a defensible, although ultra-conservative rule for protecting whale behaviour in the absence of more refined data.
- Blackwell et al. (2013) monitored calling behaviour of bowhead whales during seismic surveys in the Arctic, providing insight into gradual behavioural responses over a range of sound levels. They discovered two behavioural response thresholds in calling rates. At lower noise exposures, bowheads increased their call output – reaching a plateau of elevated calling when 10-minute cumulative sound exposure level (CSEL) was around 94 dB re 1 $\mu Pa^2 \cdot s$ (a likely reaction to mild noise by calling more). However, once noise exposure exceeded an upper threshold (approximately 127 dB re 1 $\mu Pa^2 \cdot s$ CSEL, over 10 minutes), the whales' calling rates began to drop significantly. At the highest exposure levels (CSEL >160 dB), bowheads almost fell silent, indicating a strong avoidance or cessation of normal communication. This study, based on extensive acoustic monitoring, links biologically significant behaviour (calling associated with migration and socialising) to received levels. A key point is that the initial adverse effect – reduced calling – corresponded to moderate received levels (the 127 dB SEL threshold likely equating to SPL on the order of 115–125 dB for the intermittent airgun pulses). The authors suggest that the drop in calling reflects disturbance (whales either left the area, stayed silent, or both), which could impact breeding or migration if prolonged. One limitation is that calling rate changes are an indirect measure of disturbance, but in bowheads vocal silence is strongly associated with area abandonment. Blackwell et al. (2013) conclusions support the idea that responses can initiate at low exposure levels, in this case, well below traditional 160 dB criteria for impulses. For Southern Right Whales, which are also vocal baleen whales, this implies that subtle behavioural changes (like altered calling or listening behaviours) could begin at or below 120 dB in some cases. However, the more overt disturbance (ceasing calls and presumed avoidance) occurred at higher levels (on the order of >120 dB). In practice, this study underscores using caution: while prolonged sound below 120 dB is unlikely to drive whales away, even mild noise can have small effects. It overall does not contradict the 120 dB threshold adopted for the Regia survey

for avoiding clear disturbance and indeed supports using it as a conservative threshold to protect normal communication in right whales.

- Pirotta et al. (2022) provide one of the most sophisticated mechanistic models to date linking individual behavioural responses in marine mammals to population-level consequences. Using blue whales exposed to sonar in the eastern North Pacific as a case study, the authors integrated multi-year biologging data, prey density, controlled exposure experiments, and simulations of disturbance scenarios. They demonstrated that while behavioural responses such as feeding interruptions were frequently observed during exposure to mid-frequency sonar, these did not translate into measurable reductions in survival or reproductive success under the current sonar regime. Their findings reinforce that observable behavioural change is not inherently indicative of biological significance, and that the spatial-temporal overlap between sound exposure and biologically sensitive activity is a more critical driver of population-level effect than received level alone. Importantly, Pirotta et al. (2022) emphasise the need to quantify cumulative energy loss, recovery capacity, and prey availability to assess fitness impacts, rather than if any behavioural response constitutes disturbance. In the context of the Regia MSS, where exposures within SRW BIAs remain below the 120 dB SPL behavioural threshold and spatial-temporal overlap is limited, these findings support the conclusion that any behavioural responses, if they occur, are unlikely to have population-level consequences or meet the definitions of impact or disturbance under the National Recovery Plan.
- Southall et al. (2023) provide the most comprehensive synthesis to date of behavioural response studies in marine mammals exposed to anthropogenic sound, including seismic airguns. Their review confirms that behavioural responses are highly variable and context-dependent, influenced by factors such as behavioural state, prior exposure history, group composition, environmental setting, and proximity to important habitat. Crucially, they highlight that while received sound level is one of many contributing factors, it is not a reliable predictor of behavioural outcome on its own. The authors caution against over-reliance on single-value thresholds, such as the frequently cited 120, 140, or 160 dB re 1 µPa SPL values, which they note have often been "erroneously applied as step-change indicators of biological effect." Instead, Southall et al. (2023) advocate for probabilistic, dose–response approaches that acknowledge uncertainty, individual variability, and the importance of response severity and duration when assessing ecological significance. With respect to low-frequency cetaceans, they summarise evidence that the probability of any behavioural response begins to increase above ~120 dB re 1 µPa SPL, with stronger or more sustained reactions becoming more likely above 140 dB. Responses at or above 160 dB are more consistently observed but remain variable in type and consequence. Most importantly, Southall et al. (2023) distinguish between observable responses (e.g. slight changes in orientation, surfacing intervals, or dive behaviour) and biologically significant disturbance stating clearly that not all responses constitute disturbance, and that significance must be evaluated in terms of whether the response disrupts biologically important behaviours such as calving, resting, or migration.

  In the context of the Regia MSS, the findings of Southall et al. support the use of 120 dB SPL as an ultra-conservative, precautionary threshold for managing the risk of behavioural disturbance to Southern Right Whales. When considering the small temporal overlap, the modelled sound levels within the reproduction BIA, the shutdown rules, and spatial exclusions, Southall et al. (2023) conclusions reinforce the assessment that any potential behavioural response would be minor, reversible, and highly unlikely to meet the National Recovery Plan's definition of disturbance.
- Darias-O'Hara et al. (2025) derived a median behavioural threshold of 139 dB for low-frequency cetaceans using expert elicitation informed primarily by humpback whale data and adjusted for other species. Although this study did not include calf-cow pairs, the authors suggested mother-calf pairs more likely to elicit more adverse, and quicker responses to sound sources than their conspecifics. As the Regia MSS has adopted a precautionary 140 dB threshold for October and an ultra-precautionary threshold of 120

dB for September, extended shut down measures, and excluding 75% of the calving season, CGG is confident a behavioural response (if any) experienced by a SRW would not result in *disturbance* or *impact* as per the National Recovery Plan.

While numerous behavioural response studies have been conducted on mysticetes exposed to seismic and other underwater sound sources, none demonstrate a direct causal relationship between received noise levels and biologically significant disturbance. These studies rely on inference rather than proof, using observed patterns of movement, dive behaviour, or vocalisation as proxies for disruption. However, whale behaviour is naturally variable, driven by a complex mix of environmental, social, and physiological factors that make attribution to a single source of noise inherently complex (Southall et al., 2007, Nowacek et al., 2007, Ellison et al., 2012, National Academies of Sciences 2017, Southall et al., 2023, Darias-O'Hara et al., 2025). As a result, the evidence base depends on constructs such as probability curves, threshold estimates, and expert elicitation. These are tools which help identify patterns but also increase epistemic uncertainty. This makes it difficult to determine the biological relevance of observed responses with confidence. The work of Pirotta et al (2022) comes closest to addressing the biological relevance of disturbance to whales. By utilising multiple sources of data on environmental parameters, food source dynamics and military sonar they were able to model the predicted effects on female blue whale vital rates and whether this translated into effects on the fitness of individuals and populations. They found environmental changes (~disturbances) were able to severely affect long term health while sonar activities did not. This type of study provides a more insightful analysis of what constitutes a disturbance that translates into an impact. Clearly there can be multiple disturbance scenarios around sound that do not translate to changes in fitness.

Despite this, at the precautionary exposure levels adopted for the Regia MSS, there is evidence of a decreased probability of behavioural changes equating to a disturbance noting that such responses are context-dependent, typically short-lived and reversible, and unlikely to constitute biologically significant disturbance as defined by the National Recovery Plan. Given the extensive control measures and temporal exclusions implemented by CGG, any behavioural change from a SRW can confidently be said to be unlikely to constitute a disturbance as defined by the National Recovery Plan.

In short, the Regia MSS EP has demonstrated that any behavioural changes observed during the Regia MSS will fall within the normal behavioural repertoire of the species such that the Regia MSS:

- is not an impact as defined by the National Recovery Plan.
- is not disturbance as defined by the National Recovery Plan.

This is further evidence that the environmental impacts of the Regia MSS will be of an acceptable level.

Table F4-4 below describes how acceptable levels for impacts to SRWs is being met regarding the Regia MSS.

Table F4-4 - Demonstration that behavioural impacts to SRW from underwater sound are consistent with the SRW National Recovery Plan.

Action (Acceptable Levels)	Environmental Context	Activity Context	Supporting Facts and Evidence	Residual Uncertainty	Management of Uncertainty	Conclusion/Claim
Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment (Commonwealth of Australia 2024).	SRW migrate from Antarctica to Southern Australia, starting in May. SRW migrate from Southern Australia to Antarctica ending in October. Between May and October, SRW utilise the reproduction BIA/HCTS for courting, breeding, birthing, and rearing. Data shown in Figure F3-1 confirms that sightings are significantly lower in October, and zero in the last 6 years. Ambient sound levels are variable between 90 dB and 158 dB, with a 110 dB mean.	The Regia MSS will not occur in May, June, July, August or the first 2 weeks of September. This leaves the last 2 weeks of September and October as the only months of potential overlap. The survey overlaps with <1% of the migration BIA with overlap expected on SRW departure from the reproduction BIA, likely in September/October. The survey does not overlap with the reproduction BIA and is never closer than 41 km in September of October.	75% of the temporal overlap with the known presence of SRW in the BIA/HTCS has been avoided. The survey is never closer than 23 km from the reproduction BIA. The survey will acquire lines 30-67 in September and October, resulting in a minimum 41 km separation from the reproduction BIA. Modelling results predict SRW behavioural effects at 13 km (140 dB).	No activity proposed from April to August, therefore no uncertainty during this period. Remaining uncertainty about SRW presence in September and October. Sound modelling is a predictive process which, may have errors. Effects that prevent utilisation behaviours may occur below 140 dB (see Appendix F3 for details).	Received sound level monitoring acquired in near real-time through SSV buoys, and if statistically significant increase from stated threshold is exceeded, then implementation of shut down procedures or relocation of survey in September and October. Monitoring of the SRW reproduction BIA/HCTS from May to end-August to estimate total numbers, estimate calf/cow pairs, track patterns of movements of SRW, monitor residency to inform/confirm departure from reproduction BIA.	There is no uncertainty about being able to meet the acceptable level in the months of April, May, June, July, August or the first half of September. In later September, the Regia MSS will not prevent any SRW from utilising the migration or reproduction BIAs and that behavioural response is not attributable to the survey. It has been demonstrated that the Regia MSS will not have impacts of an unacceptable level to SRW.

Action (Acceptable Levels)	Environmental Context	Activity Context	Supporting Facts and Evidence	Residual Uncertainty	Management of Uncertainty	Conclusion/Claim
Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it minimises behaviour disturbance.	SRW migrate to Southern Australia starting in May. Common reproductive behaviours in the absence of impulsive sound are known and documented in Southall 2023 (though they are not tied to received level thresholds). SRW residency/ high site fidelity, is a common assumption in the literature. NMFS 2024 recommends activities use a 160 dB SPL as the starting point for management.	The Regia MSS may result in elevated sound levels in the SRW migration BIA and HCTS for the southern migration only. The Regia MSS may result in elevated sound levels in the SRW reproduction BIA and HCTS between Cape Otway and Cape Bridgewater, which is <2% overlap with the reproduction BIA.	Peak sound levels above 120 dB may be exceeded within the reproduction BIA between Cape Otway and Cape Bridgewater. Peak sound levels above 140 dB may be exceeded within the reproduction BIA between Logans Beach and Portland Port. Peak sound levels above 160 dB are not predicted to reach the reproduction BIA. Preliminary results from monitoring in 2025 have returned 1 resident cow/calf pair at Logans Beach with 8 days of detections for the season to date. (Detections between July 16 to Aug 7).	Behavioural responses can occur below the recommended NMFS threshold of 160 dB SPL. There is no consensus on a relationship between any threshold of impulsive sound and a nominated behavioural response. Therefore, any sound above ambient levels may cause a behavioural disturbance. SRW presence in the reproduction BIA at commonly observed sites is insufficient to monitor behavioural disturbance. Observed behaviours in ambient noise settings are difficult to distinguish from disturbed behaviours. Therefore, an in-situ behavioural monitoring program with appropriate shut down procedures cannot be feasible implemented.	In-field sound source verification through the SSV buoys to confirm predicted attenuation. Position of SSV buoys near entry to BIA to monitor received sound levels and implement shutdown/relocation procedures if exceedance triggers are met within September and October. As a result, sound levels within the reproduction BIA are not predicted to exceed baseline levels	As the monitoring focus is now using pre-determined and ultra-conservative threshold levels for ambient sound levels, sound exposures within the reproduction BIA will not exceed statistically significant levels, and if exceedance did occur, the source of sound will be eliminated, thus ensuring no behavioural response attributable to the Regia MSS. This meets the requirement to ensure behavioural disturbance is minimised.

5.10 Search for Unacceptable Environmental Impacts

Whilst all the impacts arising from the Regia MSS have been evaluated looking at the cause-effect pathways to environmental components, it is also important to evaluate impacts from the survey more holistically to understand if there are unacceptable impacts. This search looked for unacceptable impacts by considering whether the Regia MSS maintains biological diversity and ecosystem integrity.

5.10.1 Maintenance of Biological Diversity

Biological diversity underpins resilient and durable ecosystems. High biodiversity is closely linked to ecosystem functions and services, with more diverse systems being seen as more resilient to change (Oliver et al 2015 and references therein). A primary mechanism allowing species to endure and thrive in complex environments is heterogeneity. This occurs in a multi-dimensional framework as reflected in the spatial and temporal differences that exist in all aspects of a species' environment (Wu & Loucks 1995).

Preferred habitat is usually never uniformly available and will be shared and competed for by other species and individuals. For invertebrates and fish with a planktonic larval stage, recruitment back to a location is highly variable in space and time with usually weak stock-recruitment relationships (e.g. Cury et al 2014). Strength of recruitment pulses are often correlated with better-than-usual environmental conditions during their larval phase resulting in more food and greater survival. These conditions are themselves highly variable in space and time. For marine mammals that aggregate to feed on concentrations of krill, these food sources are equally variable in space and time with strong intra and inter year variations in the upwelling systems that drive the production of krill.

The environmental assessments considered all key organisms likely to interact within the Operational Area and Survey Acquisition Area and have indicated that these areas are not primary habitat within the ecosystem. There is no evidence to support the Survey Acquisition Area as either a major source-or-sink for species inhabiting the greater area. This heterogeneity is key to population stability with minimal reliance on the Survey Acquisition Area as a key provider to the greater population of species in the region.

Direct disturbance to those species that are site attached within the Active Source Area is the most likely manifestation of impact from use of seismic. However, there has been no experimental evidence of mortality to fishes and invertebrates from this type of activity. Seismic surveys have been conducted across the greater region for many years however existing long-term datasets on key species within the area have not been able to identify impacts that can be unequivocally linked to seismic activity. While some individuals may suffer permanent injury as discovered in experimental work, these effects will be highly variable in space and time due to changes in habitat across areas and the continual movement of the seismic array. The size of impacts will be negligible at a population level and will be virtually impossible to quantify once natural variations and other anthropogenic effects, primarily from fishing, are accounted for.

5.10.2 Maintenance of Ecosystem Integrity

Maintenance of biological diversity leads naturally to an expectation that ecological integrity will be maintained. At its most fundamental, ecological integrity means the ability of all species within an ecosystem to survive and reproduce such that the overall health of their ecosystem is maintained. Population structures should persist, supported by processes such as connectivity and dispersal that are key to sustaining systems. Associated habitat must also remain capable of supporting critical population levels.

By looking for ecosystem vulnerabilities and comparing these to impacts from the Regia MSS it may be possible to identify unacceptable impacts. Table F4-5 identifies the potential ecosystem vulnerabilities were considered in the context of the Regia MSS.

Our assessments have identified that no measurable changes to ecological integrity or population structures are likely because of the Regia MSS. Any potential changes to standing stock will not be measurable relative to the scale of changes that are manifest through fishing, or relative to the degree

of uncertainty that already exists around quantifying abundance and health of large highly mobile marine animals. The one-off, "spatially constrained", and highly mobile nature of the survey will not by-definition cause population level impacts. The highly connected nature of stocks along the south coast ensures a regular supply of new recruits will be available to settle into habitat that has been surveyed by sonar arrays. Stocks are historically limited by recruitment levels rather than habitat shortages. Seismic surveys will not damage habitat given there is no interaction with the seabed proposed by this activity.

Table F4-5 - Potential ecosystem weaknesses and unacceptable impacts.

Potential Ecosystem Vulnerabilities	Description of potential unacceptable impacts
Low Biodiversity	Ecosystems with few species lack ecological redundancy, meaning there are fewer species that can perform similar roles. This makes the ecosystem more susceptible to disturbances because the loss of any single species can have disproportionate effects on the ecosystem's overall functionality.
Simplified Food Webs	Simple food webs have fewer connections among species, which means energy and nutrients have fewer paths to flow through the ecosystem. This simplicity can lead to instability if a link in the chain is disrupted, as there are fewer alternative pathways to compensate for the loss.
Non-native or Invasive Species	The introduction of species from other ecosystems can create weaknesses by disrupting established relationships among native species. Invasive species often have no natural predators in the new ecosystem, allowing them to outcompete and displace native species, which can lead to reduced diversity and altered ecosystem functions.
Degraded or Fragmented Habitats	Damage to or division of habitats can isolate species populations, limit resource availability, and disrupt the interactions necessary for ecosystem processes. This can weaken the ecosystem's ability to support species diversity and maintain ecological functions.
Overexploited Resources	Overexploitation occurs when the rate of resource use exceeds the ecosystem's capacity to regenerate. This can lead to a decline in species, as well as a decrease in the ecosystem's ability to provide goods and services, such as food and clean water.
Climate Change Vulnerabilities	Ecosystems that are particularly sensitive to temperature changes, sea-level rise, or alterations in weather patterns may struggle to adapt to the rapid pace of climate change. This can lead to shifts in species distributions, loss of habitat, and increased susceptibility to diseases.
Limited Genetic Diversity within Species	When species have limited genetic variability, they may not have the necessary traits to adapt to changing environmental conditions or to resist diseases and parasites, making the species and the ecosystem more vulnerable.
Lack of Keystone Species	Keystone species have a disproportionate influence on their ecosystem. Their removal can lead to significant changes in ecosystem structure and function, which may not be easily reversible and could lead to ecosystem collapse.
Over-dependence on Keystone Species	Heavy reliance on a single keystone species makes the ecosystem vulnerable to any changes that affect that species. If the keystone species declines or goes extinct, there may not be another species that can fill its role, leading to ecosystem degradation.
Insufficient Regenerative Capacity	If an ecosystem cannot recover from disturbances such as natural disasters or human activities, it can become stuck in a degraded state (often known as a phase-shift), losing its ability to support a diverse community of organisms and provide ecological services.
Overfishing and Unsustainable Fishing Practices	Overfishing reduces populations of key species to below sustainable levels, disrupting the balance of the marine food web. Practices like bottom trawling can also cause irreversible damage to marine habitats, further weakening the ecosystem.
Narrow Timing of Important Life-Cycle Events	Species that rely on specific environmental cues for timing critical life-cycle events, such as breeding or migration, can be thrown off by changes in climate or habitat conditions. This can lead to mismatches in timing that disrupt reproduction and survival rates.
Areas of Concentrated Abundance	Regions with high densities of organisms are critical for the ecosystem but can become points of vulnerability if conditions supporting these concentrations change or if these areas are disproportionately affected by human activities.

Potential Ecosystem Vulnerabilities	Description of potential unacceptable impacts
Narrow Distribution or Ranges	Species with limited geographical distribution are at a higher risk of extinction due to habitat loss or environmental changes that directly affect their small living area.
Sensitive Life-Cycle Stages of Species	Certain life-cycle stages may be more vulnerable to environmental stresses and impacts on these stages can affect the survival and recruitment of individuals into the population, thereby affecting the overall health of the ecosystem.

5.11 Consistency with the Principles of ESD

ESD is a foundational concept in environmental decision-making and management, with its principles deeply rooted in international agreements and enshrined in Australian legislation. The core tenet of ESD is to ensure that the needs of the present generation are met without compromising the ability of future generations to meet their own needs. Several key principles guide the application of ESD:

1. **Precautionary Principle:** In cases where there are threats of serious or irreversible environmental damage, a lack of full scientific certainty should not delay measures to prevent environmental degradation. This principle acknowledges the inherent limitations of scientific knowledge and encourages a proactive approach to environmental protection.
2. **Inter-generational Equity:** ESD mandates that the current generation acts as stewards of the environment, maintaining or enhancing its health, diversity, and productivity for the benefit of future generations. It underscores the moral obligation to preserve the planet's natural wealth for those to come.
3. **Conservation of Biological Diversity and Ecological Integrity:** Biodiversity, including ecosystem, species, and genetic diversity, forms the foundation of social and economic systems. The conservation of biological diversity and ecological integrity should be fundamental considerations in all environmental planning and decision-making processes.
4. **Valuation, Pricing, and Incentives:** Environmental factors should be included in the valuation of assets and services. The "polluter pays" principle holds that those responsible for pollution should bear the costs of containment, avoidance, or abatement. Pricing should reflect the full life cycle of costs, including natural resource use and waste disposal. Moreover, environmental goals should be pursued through cost-effective incentive structures and market mechanisms.
5. **Integration of Considerations:** ESD emphasizes the effective integration of social, economic, environmental, and equitable considerations in decision-making processes. It recognizes that decisions must balance both short-term and long-term perspectives.

These principles are integral to Australia's environmental legislation, including the federal Environment Protection and Biodiversity Conservation Act 1999 (**EPBC Act**). They guide the evaluation of projects, ensuring that they align with the principles of ESD, protect biodiversity, and promote sustainable development. Consistent adherence to these principles is essential for responsible and sustainable environmental management in Australia. There follows and assessment of each principle of ESD having regard to the Regia MSS and the preparation process of the EP.

5.11.1 Precautionary Principle

The precautionary principle is an approach in environmental management that suggests taking proactive action to prevent harm to the environment when there is scientific uncertainty about potential negative impacts. It is often invoked as a guiding principle in decision-making processes for various activities that have the potential to affect the environment adversely. However, the application of this principle is not always straightforward or appropriate, particularly when considering the impacts of a single activity within a larger environmental context.

Consider, for instance, the case of a minor activity whose potential impact on marine biodiversity is not fully understood. The principle might dictate that in the absence of clear evidence of

harmlessness, action should be taken to prevent the activity or mitigate its potential impacts. However, when the levels of natural variation in the marine environment are demonstrably high - such as variations in salinity, temperature, and currents that can have significant effects on marine life - the effects of a single, limited-duration activity may be demonstrably low, even when the uncertainties are factored in.

In such scenarios, the baseline environmental variability can often dwarf the impact of a single activity. For example, the migration patterns and breeding cycles of marine life may be subject to greater influence from natural seasonal changes than from the noise generated by a seismic survey. The introduction of noise into the marine environment from a survey may be a minor addition to the existing soundscape, which includes not only anthropogenic sources like shipping traffic but also natural sources like storms or the vocalizations of marine animals.

It is crucial to clarify that the precautionary principle does not equate to preparing for the worst-case scenario. The precautionary principle advocates for measures that are proportional to potential harm and the level of scientific uncertainty, not necessarily the most extreme outcomes. It is based on examination of the full corpus of relevant literature and aligning with the scientific consensus whilst acknowledging the extremes (or the range) of scientific outcomes.

Conceiving of the worst-case scenario involves planning or making decisions based on the most severe possible outcome in each situation, often regardless of the probability of such an outcome occurring. This method is typically used in contexts where the cost of failure is exceedingly high, such as in emergency preparedness or nuclear safety, and may lead to measures that go beyond what the precautionary principle would dictate.

There are clear examples of this in the context of the Regia MSS. There has been much conjecture about which effect threshold distance to use as the basis for the impact assessment for underwater sound effects to plankton. Relevant persons have advocated for application of McCauley et al (2017) which would have seen adoption of a 1.2 km effect distance when most other scientific papers have a reduced distance, in some cases down to meters from the sound source. Applying the precautionary principle does not mean one should take a scientific outlier and manage to that outcome. Rather, having considered the range of outcomes across the body of relevant research, application of a consensus or modal outcome is the appropriate and proportionate position to take.

Similarly, for protection of Southern Right Whales, one could take a view that behavioural disturbances to low frequency cetaceans have been observed at levels below the adopted behavioural effect threshold of 160 dB re 1 μPa^2 SPL (i.e. HESS 1999 and McCauley 2003). However, doing so in isolation would ignore Southall et al (2007) findings that behavioural response from sound exposure below 160 dB re 1 μPa^2 SPL “would almost certainly not constitute biologically significant disturbance.” This matter is discussed in detail in other parts of the Regia MSS EP and serves in this instance to show that the starting point of any impact assessment is to select and justify the use of appropriate (i.e. consensus or modal) scientific outcomes as the starting point for later considering whether a threat may result in serious or irreversible harm.

In this context, it is essential to consider the proportionality aspect of the precautionary principle. The principle should not be applied in isolation but rather in consideration of the relative scale of impact. If the contribution of an activity to the overall environmental impact or risk is minimal and the natural resilience and variability of the ecosystem are high, the application of the precautionary principle may not be warranted. This is particularly relevant when there is an absence of significant threat or when the threat is negligible compared to the baseline environmental variability.

The principle is most relevant when there is a possibility of serious or irreversible damage, and the activity in question contributes significantly to that impact level. When the activity's impact is minimal and the environmental system exhibits high levels of inherent variability, applying the precautionary principle without the context of the significance of the harm would be disproportionate and could potentially divert resources from addressing more significant environmental threats.

Thus, the application of the precautionary principle should be calibrated to the scale and significance of potential impacts in relation to the broader environmental context. This ensures that environmental management remains focused on significant threats and does not become an

impediment to activities with lower order impacts, especially when these activities are conducted responsibly.

The Regia MSS EP preparation process is consistent with the Precautionary Principle because:

1. The EP preparation process recognised the presence of environmental impacts and risks associated with the activity, particularly in terms of underwater sound impacts, atmospheric emissions, and accidental fuel releases. It acknowledged that these impacts and risks, if unmitigated, could lead to serious or irreversible environmental harm.
2. In response to the identified impacts and risks, the process took proactive measures to minimise and mitigate potential harm. It did not rely solely on full scientific certainty before acting but instead acted in anticipation of possible adverse effects.
3. The EP preparation process resulted in the implementation of robust monitoring and evaluation strategies (Appendix B3). It recognised that ongoing assessment and monitoring were essential to detect any unforeseen impacts or changes in environmental conditions promptly.
4. Acknowledging the uncertainty surrounding certain impacts and risks, the process kept flexibility in its mitigation strategies. It is shown through evolution of the activity design and through the consultation process that CGG was prepared to adapt and adjust its survey objectives and proposed mitigation measures based on emerging information and changing circumstances.
5. The process implemented a range of safeguards and best practices to ensure that environmental impacts and risks, particularly underwater sound emissions, were kept within acceptable levels of impact and risk. It recognised that taking precautionary steps was appropriate in preventing potential harm to marine ecosystems and species.
6. The EP preparation process engaged with scientific experts and researchers to assess environmental impacts and risks. It sought advice from specialists who could provide insights into the best available science and mitigation technologies related to the project's environmental aspects (Appendices B4, B5, B6, B7, B8, and F5).
7. To uphold the Precautionary Principle, the process kept transparency in its decision-making and reporting. It ensured that relevant persons, regulatory authorities, and the public were informed about the identified impacts and risks, the measures taken, and any updates regarding the project's environmental impact.
8. In line with the Precautionary Principle, the EP preparation process prioritised the prevention of irreversible harm to the marine environment. It recognised that some environmental damage, once done, might be impossible to reverse or remedy, and therefore acted prudently to avoid such scenarios.

In summary, the Regia MSS EP preparation process aligned with the Precautionary Principle by acknowledging the presence of environmental impacts and risks associated with the proposed activity. CGG has proactively taken steps to prevent harm, monitor environmental conditions, and remaining flexible in its approach. It prioritized the protection of the marine environment whilst meeting enough of the original geophysical objectives to ensure a viable project. CGG has acted to appropriately to avoid serious or irreversible environmental damage, even in the face of scientific uncertainty.

5.11.2 Intergenerational Equity Principle

The Regia MSS EP preparation process adhered to the Inter-generational Equity Principle through the key actions and considerations described below:

1. The process acknowledged that the marine environment, including its ecological and biological diversity, is a shared resource. It recognised the responsibility to manage and conserve these resources for the benefit of both present and future generations (Appendix B1).

2. During its decision-making and planning, a long-term perspective was adopted, ensuring that actions taken today would not compromise the ability of future generations to enjoy the same environmental benefits. It considered the consequences of activities on a multi-generational timescale (Appendix B1).
3. To protect the health, diversity, and productivity of the marine environment, the process implemented a range of safeguards and mitigation measures (Appendix G1). These measures were designed to minimise negative impacts of the Regia MSS on the environment, ensuring that it will remain intact and functional for future generations.
4. The EP preparation process engaged with scientific experts and conducted comprehensive assessments to understand associated environmental impacts (Appendices B4, and E1 to E9) and environmental risks (Appendices B4, and D1 to D4). The EP provided robust scientific evidence, essential for informed decision-making to safeguard the environment for generations to come.
5. Consistent with inter-generational equity, the process prioritised identifying and preventing irreversible environmental damage. CGG understood that once certain ecological harm occurred, it might be impossible to rectify or restore, disproportionately affecting future generations. Consequently, there is no irreversible environmental damage predicted from the Regia MSS.
6. The process actively consulted with indigenous communities, other marine users, policy and regulatory authorities, and the public, regarding environmental values and sensitivities and protection measures. CGG put no restrictions on who could self-identify as a relevant person recognising that the voices and perspectives of current and future generations needed to be heard and considered in shaping the EP.
7. The process kept transparency in its actions, decisions, and reporting, demonstrating accountability to current and future generations. The EP documents CGG's commitment to preserving environmental values and ensuring that actions taken today will benefit those who come after.
8. Recognising that unforeseen circumstances and new information might emerge over time, the process incorporates a mean of adapting to changing circumstances in its environmental management system (Appendix B3). This approach allows for the ongoing adjustment of strategies and actions to align with the evolving understanding of environmental impacts.
9. The process implemented mitigation strategies to minimise the environmental footprint of the Regia MSS. It actively sought ways to reduce ecological harm, particularly in sensitive areas and habitats, with a view to preserving these areas for the enjoyment of future generations.
10. Impacts to marine plants, animals and other cultural features associated with culturally important non-tangible values might impact the intergenerational transmission of knowledge of Sea Country, including connection to Country and songlines when individuals can no longer witness or interact with the cultural features tied to Country. Therefore, managing tangible cultural features required mitigation to protect species at a population level, including songline related migratory routes. Physical features comprising a component of a songline are important to protect to prevent the fragmenting or breaking apart of songlines and loss of sacred cultural knowledge. This was achieved through identification and assessment of values and adoption of the Sea Country Protection Plan to allow ongoing consideration of cultural values.

In conclusion, the Regia MSS EP preparation process prioritised responsible management and ecological conservation, demonstrating commitment to the Inter-generational Equity Principle by safeguarding the marine environment, actively engaging with the community, and ensuring that actions taken today promote the well-being and environmental quality of future generations.

5.11.3 Conservation of Biological Diversity and Ecological Integrity Principle

Ecological integrity refers to the ability of an ecosystem to maintain its structure, functions, and processes, including its biodiversity, dynamics, and resilience. It is important in environmental assessments because it is crucial to understand how proposed activities might affect the natural balance and health of ecosystems. The Regia MSS EP preparation process consistently upheld the Conservation of Biological Diversity and Ecological Integrity Principle through various actions and considerations as described below:

1. Throughout the EP preparation process, there was a clear commitment to preserving the biodiversity of the marine environment. This included changing the economically preferred timing of the activity to move to a time of the year when biodiversity will be lower (Appendices A2 and G1). The process recognised the intrinsic value of diverse ecosystems and species, understanding that they contribute to ecological integrity and overall environmental health.
2. Detailed ecological assessments and studies were conducted to evaluate the impacts of the activity on marine biodiversity. These assessments aimed to identify sensitive habitats, critical species, and potential threats to ecological integrity (Appendices D1 – D4 and E1 – E9).
3. The process incorporated protection measures to safeguard key biological diversity and maintain ecological integrity. These measures included activity limitations (Appendix A2) and control measures (Appendix G1) designed to minimize any disturbances to marine habitats, breeding grounds, and migratory routes of sensitive species. Further commitments have been made to the protection of cultural heritage and other key receptors.
4. Areas of high ecological significance, including critical habitats and migration corridors, were identified and marked for additional attention. The process recognized the importance of these areas in maintaining ecological integrity and prioritised their protection. Further scientifically justified impact management zones were adopted because of consultation and to eliminate scientific uncertainty.
5. To mitigate potential harm to biodiversity, the process implemented a range of mitigation measures (Appendices A2 and G1). These measures aimed to reduce the footprint of the seismic survey in sensitive zones, minimise disruption to marine life, and prevent significant adverse effects on species and ecosystems.
6. The process engaged with experts in marine biology, ecology, and conservation to inform decision-making. This collaboration ensured that the EP's provisions were aligned with the best available scientific knowledge regarding biodiversity and ecological integrity.
7. The process sought to avoid activities that could harm biological diversity and ecological integrity wherever possible. This included planning the survey timing, sail lines and other operations to avoid critical areas and sensitive habitats.
8. Acknowledging the dynamic nature of ecosystems, the process incorporated an adaptive management approach to both the management of the activity holistically and to key receptors. This approach will allow for real-time adjustments during the survey to respond to unexpected ecological conditions and ensure minimal disruption to biodiversity.
9. Comprehensive monitoring and reporting systems have been put in place to assess the survey's impact on biological diversity and ecological integrity. This data-driven approach will track changes, identify potential issues, and support the implementation of corrective actions as needed.
10. The process engaged with relevant authorities and environmental agencies to align its efforts with broader conservation goals and regulations aimed at preserving biodiversity and ecological integrity.

In conclusion, the Regia MSS EP preparation process demonstrated a strong commitment to the Conservation of Biological Diversity and Ecological Integrity Principle. It proactively addressed potential impacts on marine biodiversity, incorporated protective measures, and relied on scientific expertise to ensure that the seismic survey is conducted with minimal harm to ecosystems, species, and overall ecological health.

5.11.4 Valuation, Pricing, and Incentives Principle

The Valuation, Pricing, and Incentives Principle has reduced relevance within the context of the Regia MSS EP preparation process. However, it is important to emphasise that the process remains consistent with this principle, albeit to a lesser degree because of the nature of the activity. Several factors contribute to this alignment:

- The primary goal of the Regia MSS project is to identify gas reserves beneath the seabed. While the immediate emphasis is on scientific exploration rather than commercial exploitation, the project's success in locating potential gas reserves is inherently linked to the future valuation and pricing of these resources. Thus, the EP preparation process indirectly contributes to the long-term considerations associated with this principle.
- The Regia MSS project acknowledges the importance of inter-generational equity, recognising that present actions must consider the well-being of future generations. By responsibly exploring and identifying potential gas reserves, the EP preparation process ensures that future generations can make informed decisions regarding the utilisation of these resources. This aligns with the principle's objective of protecting natural and human capital for the benefit of future generations.
- The project's commitment to ecological sustainability and environmental protection indirectly addresses the Valuation, Pricing, and Incentives Principle. By safeguarding the marine environment and adhering to precautionary measures, the EP preparation process contributes to maintaining the natural capital that underpins any future valuation or pricing of ecosystem services.
- In cases where the Regia MSS project may unavoidably interfere with commercial fishing activities, it incorporates a compensation protocol. This protocol ensures that any potential financial impacts on fishing communities are addressed through calculated and negotiated agreements. While not directly related to traditional pricing mechanisms, it reflects a commitment to fair compensation and social considerations.

In summary, while the Valuation, Pricing, and Incentives Principle may hold reduced relevance in the specific context of the Regia MSS EP preparation process, the approach taken is consistent with the principle to the extent possible. The focus on responsible exploration, inter-generational equity, environmental stewardship, and fair compensation aligns with the broader goals of ensuring that ecological and social values are adequately considered, even though immediate valuation and pricing mechanisms are not central to the project's current phase.

5.11.5 Integration Principle

The Regia MSS EP preparation process demonstrates consistency with the Integration Principle of ESD as described below:

1. The Regia MSS EP preparation process included a thorough impact assessment considering economic, environmental, and social impacts. It identified and assessed potential positive and negative consequences of the seismic survey on these dimensions, ensuring that decision-makers had a comprehensive understanding of the project's implications.
2. The EP preparation process actively engaged with relevant persons, including indigenous communities, environmental organizations, and local communities. It sought their input and considered diverse perspectives, ensuring that relevant persons were given the opportunity to have their say in the decision-making process, and their concerns were considered.
3. In cases where uncertainties or risks were identified regarding potential environmental harm, the Regia MSS EP preparation process adopted a precautionary approach. It took proactive measures to prevent harm, even in the absence of full scientific certainty, aligning with the precautionary principle.
4. The process assessed how the seismic survey impacted future generations. It ensured that the decisions made did not compromise the ability of future generations to meet their needs and enjoy a healthy marine environment.

5. The EP preparation process integrated the conservation of biological diversity and ecological integrity into decision-making. It involved detailed environmental assessments and implemented measures to protect biodiversity within the operational area.
6. Environmental and social factors were incorporated into economic analyses. The process considered the costs and benefits of the seismic survey, considering its impact on the environment and society, thus fulfilling economic integration (Appendix F2).
7. The EP preparation process maintained clear documentation of the decision-making process. It transparently outlined how economic, environmental, social, and equitable considerations were integrated into the planning and execution of the Regia MSS, ensuring transparency and accountability. This was primarily achieved by using the Environmental Assessment Method (Appendix B9) and the Decision-Making Criteria (Appendix B1).
8. Mechanisms for ongoing review and monitoring of the seismic survey decisions were established in the Implementation Strategy (Appendix B3). This ensures the project will continue to align with ESD principles, with adjustments made as new information becomes available or circumstances change.
9. The process provided transparent and comprehensive reporting on how economic, environmental, social, and equitable considerations were integrated into the decision-making process. This information was shared with relevant persons through the Regia MSS website to uphold transparency and foster trust.

By addressing these aspects, the Regia MSS EP preparation process has demonstrated its commitment to and consistency with the Integration Principle of ESD. This approach ensured that the seismic survey will be conducted in a manner that balances economic, environmental, and social factors, ultimately contributing to ecologically sustainable development.

6 Conclusion

In conclusion, the assessment of the Regia MSS EP preparation process against the principles of ESD demonstrates a strong commitment to responsible and sustainable offshore petroleum activities in Australian waters. The adherence to ESD principles, as enshrined in the Regulations, underscores the importance of integrating economic, social, and environmental considerations into the decision-making processes surrounding petroleum operations.

Throughout this assessment, it becomes evident that the Regia MSS EP preparation process aligns with these principles. From the precautionary approach to intergenerational equity and the conservation of biological diversity, the EP process consistently reflects a commitment to safeguarding the marine environment, reducing environmental impacts and risks, and preserving the interests of future generations. While the valuation, pricing, and incentives principle may have reduced relevance within this context, the focus remains on ensuring that the cost of protecting natural and human capital is adequately considered.

This document has provided a comprehensive assessment of the Regia MSS EP preparation process, incorporating iterative updates based on evolving information, feedback, and regulatory requirements. Through the application of multiple assessment methods, it has been demonstrated that the activity can be undertaken in a way that manages environmental impacts and risks to an acceptable level, and ensures that the EP is robust, responsive, and fit for purpose across all stages of its implementation.

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8 Document Control

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	2 October 2023	MS	Assessment completed.
0.1	20 December 2023	RH/CT	Reviewed and updated.
0.2	29 December	MS	Reviewed and updated.
1	4 January 2024	MS	Accepted changes and formatted ready for public comment.
2	15 May 2024	MS/AH	Updated following public comment.
3	21 October 2024	MS/AH	Updated to broaden the scope from the ESD assessment to be the demonstration that acceptable levels of impact and risk have been met. Content taken from other parts of the EP to remove duplication and improve clarity of message.
4	16 April 2025	MS	Updated following NOPSEMA OMR 1 Letter
5	December 2025	MS/CT	Updated following NOPSEMA OMR 2 Letter

Annex 1

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table F4-6 If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table F4-6 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4078	Concerns about seismic testing and drilling rigs impacting marine life and fishing activities.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	917
4254	The precautionary principal needs to apply, due to lack of evidence of damage.	A full assessment of the precautionary principle will be undertaken outside of the aspect-by-aspect approach currently taken. Noted that the preconditions for the precautionary principles are two-fold and there need to be evidence of a serious or irreversible threat to the environment which is not present once control measures have been applied to the Regia MSS. However, precaution has been routinely used in the activity design.	3415
4254	The precautionary principal needs to apply, due to lack of evidence of damage.	A full assessment of the precautionary principle will be undertaken outside of the aspect-by-aspect approach currently taken. Noted that the preconditions for the precautionary principles are two-fold and there need to be evidence of a serious or irreversible threat to the environment which is not present once control measures have been applied to the Regia MSS. However, precaution has been routinely used in the activity design.	3415
4439	Concerned about impacts to squid, octopus and scallops.	Event ID 6875 - The Regia team responded in-meeting with a discussion about the assessment work undertaken on impacts to squid, octopus and scallops.	6875
4381	Even though the months April/May/June have the least ecological impact, it does not mean the impact is acceptable.	Event ID 6882 (Doc ID 9096)- CGG has always acknowledged that this is not a 'no impact' activity, and this is not what the environmental assessment is intended to achieve. Rather ensuring impacts are of an acceptable level (meaning that overall ecosystem integrity and resilience is not irreparably damaged) while also reducing impacts to as low as reasonably practicable. Timing has been selected in an effort to avoid the time of year when the ecosystem is most active and the majority of animals are breeding, which is the summer months. It is not appropriate to cease the activity, which occurs at a minimum 20km offshore, for animals laying eggs onshore.	6412

4489	Claims that CGG cannot determine what constitutes an "acceptable" level of impact or risk to Gunditjmara cultural values in Nyamat Mirring. States the April 2025 Environment Plan contains flawed cumulative impact assessments due to this lack of consultation. GMTOAC identifies several shortcomings: CGG's interpretation of potential impacts to Gunditjmara and other First Nations cultural heritage is too narrow; CGG wrongly assumes that acceptable ecological impacts equate to acceptable cultural impacts; and CGG's cumulative impact assessment for Karntubul (Southern Right Whale), previously criticised by NOPSEMA in its February OMR, remains unchanged.	CGG rejects GMTOAC's claim that inadequate consultation prevents CGG from determining "acceptable" levels of cultural impact, asserting that it fully met its consultation obligations. CGG argues that the legal test is whether the Environment Plan demonstrates impacts and risks are reduced to ALARP and to an acceptable level. It maintains that GMTOAC's critiques conflate subjective opinion with the regulatory standard under Regulation 34 and emphasises that the law does not grant stakeholders a veto over design decisions. In response to the assertion that its interpretation of cultural heritage is too narrow, CGG maintains that GMTOAC has already articulated its cultural values clearly and extensively through published materials and received during consultation. These values, encompassing ceremony, obligations, kinship systems, spiritual relationships, and ecological connections are thoroughly integrated across the EP. The EP references the Nyamat Mirring Plan 2023–2033, incorporates cultural values and sensitivities into Appendix F3, and identifies culturally significant species and places as sensitive receptors with tailored management measures, for example, timing restrictions to avoid birthing seasons. CGG states that it has incorporated analysis of cumulative effects on Sea Country, including those arising from the survey in combination with other activities. It confirms that Karntubul is included in cumulative risk assessments with corresponding mitigation commitments.	EVT352

Desktop Study: An Assessment of Available Whale Detection Technologies as Additional Management Procedures for the Regia 3D Marine Seismic Survey

Paul Miller

Millodon Consulting

Revision A

The views and opinions expressed in this document are those of the author and do not necessarily reflect the views of the Regia 3D MSS survey proponents or its sponsors.

Contents

CONTENTS 2

ACKNOWLEDGEMENTS 4

INTRODUCTION 5

ASSESSMENT SUMMARY 6

DETECTION TECHNOLOGIES CONSIDERED 6
ASSESSMENT CRITERIA 6
ASSESSMENT RESULTS 6

BACKGROUND 10

AUSTRALIAN REGULATORY FRAMEWORK FOR MARINE SEISMIC SURVEYS 10
National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) 10
EPBC Act Policy Statement 2.1 - Interaction between offshore seismic exploration and whales 11
About the policy statement 11
Scope of the Policy Statement 12
Applicable Species 12
Legislative Responsibilities 12
Part A Management Procedures 12
Part B Additional Management Procedures 13

DETECTION TECHNOLOGIES OVERVIEW 15

INTRODUCTION 15
PASSIVE ACOUSTIC MONITORING 15
PAM History 15
PAM During Marine Seismic Surveys 16
Towed Streamer PAM 17
Supplementary Vessel Towed PAM 18
Tethered Buoy PAM 18
Unmanned Surface Vessel PAM 20
Unmanned Underwater Vessel PAM 21
Fibre Optic Distributed Acoustic Sensors 21
SATELLITE IMAGERY 23
CAMERA-BASED DETECTION 24
Infrared Cameras 24
Dual Camera Systems 25
AERIAL SURVEYS 26
Manned Aircraft 26
Drones 27

VENDOR EQUIPMENT REVIEWS 30

TOWED PAM 30
Sercel QuietSea 30
Seiche Towed PAM 31
TETHERED PAM 32
Sercel Buoy Solution 32

Seiche Modular Buoy Systems 33
JASCO Ocean Observer Buoy 34
PAM Smart Buoy 35
UNMANNED VESSEL PAM 37
Autonaut USV 37
OceanObserver on the Slocum Autonomous Underwater Glider 39
CAMERA-BASED SYSTEMS 41
Seiche Smart Visual Detection System (SVDS) 41
WhalePOD 44
AERIAL DRONES 46
DJI Matrice 30T (thermal) 46
Autel EVO II Dual 640T Enterprise 49
REFERENCES 52

Acknowledgements

The author gratefully acknowledges the assistance of each of the equipment vendors that provided detailed information relating to their individual equipment offerings. This report has been compiled directly from many web-based sources, including government, research organisations, private enterprise, equipment manufacturers and vendors plus AI-based search research results. The views and opinions expressed in this document, based on the research conducted, are those of the author and do not necessarily reflect the views of the Regia 3D MSS survey proponents or its sponsors.

A list of most (but not all) of the sources of data used can be found in the References section at the end of this document.

Introduction

Klarite Pty Ltd (Klarite), on behalf of CGG Australia (CGG), has commissioned Millodon Consulting (Millodon) to conduct a desktop study on the available technologies, both current and in development stages, of systems designed to detect and alert the presence of marine mammals to aid in mitigation measures during seismic surveys.

CGG is planning a 3-Dimensional Marine Seismic Survey (3D MSS) offshore Victoria, to be conducted sometime during 2024. As part of the environmental management planning for the survey CGG is seeking to identify, procure and eventually deploy, suitable systems to mitigate interactions with Species of National Environmental Significance (SNES), with a particular focus on the Blue and Southern Right Whales, known to frequent the survey operational area at certain times of the year, or potentially even all year round.

The systems included within this study are being reviewed for suitability and practicality for consideration as Additional Management Procedures, in addition to those already defined and mandated in the Environment Protection and Biodiversity Conservation (EPBC) Act Policy Statement 2.1 - Interaction between offshore seismic exploration and whales. Additional Management Procedures are required in Australian waters where there is a moderate to high likelihood of encountering whales.

This study is not intended to be a full and thorough description of each system's operational or technical intricacies. Where available, URL links will be included to manufacturer's own web-based literature to better cover those subjects. The study is designed to help inform CGG on the most practical system, or combination of systems, to best reduce the risk of marine mammal interactions to as low as reasonably practicable (ALARP), based on information available in the public domain.

Assessment Summary

Millodon Consulting reviewed a range of different technologies for marine mammal detection that are either currently available or in advanced stages of development. Where there are multiple vendors for similar technologies each vendor's equipment was assessed independently.

Detection Technologies Considered

The range of technologies considered for review consisted of the following: -

1. Passive Acoustic Monitoring (PAM)
    a. Towed streamer PAM
    b. Supplementary vessel towed PAM
    c. Fixed/tethered PAM buoys
    d. Unmanned/Uncrewed Surface Vessels (USV)
    e. Unmanned/Autonomous Underwater Vessels (UUV/AUV)
    f. Distributed Acoustic Sensors (fibre optic)
2. Satellite imagery
3. Aerial surveys
    a. Manned Aircraft
    b. Drones
4. Camera-based monitoring systems

Assessment Criteria

Assessment of each system was based on five simple criteria: -

- Availability
- Prior deployment histories and reported effectiveness.
- Practicality of implementation
- Safety & environmental concerns
- Cost versus benefit

Assessment Results

The following list includes assessment summaries of each detection technology or methodology, as reviewed by the author. Systems have been either deemed worthy of implementation or further investigation/consideration, or rejected based on safety and environmental concerns or failing the cost versus benefit criteria.

1. Towed streamer PAM using Sercel's QuietSea in-streamer PAM hydrophones and QuietSea monitoring and automatic detection software is a proven and tested solution that will already be installed and operational on the survey vessel prior to mobilisation. It is recommended the QuietSea system be fully deployed and operational throughout the survey activity. Dedicated PAM Operator personnel, either CGG or contracted, would be considered necessary, with a minimum requirement for full-time PAM monitoring during the hours of darkness.

2. If using supplementary PAM vessel(s) the use of the Seiche towed PAM hydrophone arrays and onboard recording/analysis equipment is considered both practical and cost effective. However, the cost and associated risks of additional vessels and crew need to be considered against the potential benefits gained.

3. Tethered buoy PAM to provide real-time remote monitoring using data telemetry to an onshore or offshore monitoring hub is considered a feasible option. It would appear that the bandwidth requirements for real-time audio frequency spectral signal data via satellite is prohibitive for onshore monitoring at any significant distance offshore, but the use of VHF radio, 2.4GHz Wifi or GSM cellular phone are common options for local telemetry back to a monitoring vessel.

   All buoy-based PAM systems reviewed have the ability to operate autonomously, with real, or near real-time monitoring possible remotely from the buoy. The Sercel manufacture PAM buoy is, at time of writing, still in its late development stage but could be deployed pre-survey for sea trials and performance testing.

   Seiche Ltd has a long history of PAM equipment development and their Modular Buoy Detection System has proven offshore performance for whale detections, though their effective use during seismic surveys has yet to be confirmed by Seiche. The Jasco Ocean Observer Buoy, like the Seiche offering, is a smaller, more light weight option (45Kg) than the large and relatively heavy (220Kg) Sercel Buoys, so would be more easily deployed and recovered. The Jasco Ocean Observer Buoy is also the only unit reviewed that can perform onboard, in-situ processing of detections, with the spectrograms converted to frequency contours for transmission via satellite to the survey vessel or to a shore-based monitoring station for confirmation of detections and relaying of detection information to the survey vessel.

   If a tethered buoy PAM system is to be considered as an option for the Regia 3D survey further investigation into the telemetry ranges involved and the number of buoys needed to provide a ringfence around the active survey area to detect whales entering. The Jasco Ocean Observer Buoy would appear to have the best options available for either onshore or offshore monitoring of detections.

   It is important to note that whilst the majority of the Regia 3D active survey area, as currently mapped, is in water depths of less than 200 metres, the south western survey margin does extend beyond the continental shelf and into water depths exceeding 1300 metres, including the West Tasmania Canyons Key Ecological Feature. Whilst not impossible, the use of tethered buoys in such depths does create additional logistics problems for deployment and recovery. It may, therefore, be worthwhile considering the use of a hybrid PAM array using a combination of tethered buoys in the shallower waters and unmanned surface vessels or underwater gliders in the deeper waters, in order to provide adequate detection coverage from all directions of approach.

4. If considering a hybrid deployed remote PAM array, in order to maintain consistency in monitoring and detection software and associated systems, it would be logical to look at unmanned vessels provided by the same manufacturer/vendor as the selected tethered PAM equipment. Seiche's Autonaut USV can carry the same PAM and telemetry payload as its Modular Buoy Detection System, whilst JASCO's use of the Slocum Autonomous Underwater Glider, integrated with the OceanObserver intelligent acoustic monitoring system is another viable option.

Both vessels can maintain station, within a given radius, by circling (or traversing straight line routes) around a target location. The Autonaut, being a surface vessel, can continually transmit its current location and accept new instructions via an Iridium satellite link. Real-time detection data can be transmitted continually through RF or Wifi link, with a resultant limitation in reception range from the survey vessel monitoring equipment based on the PAM system radio transmitter's effective range.

The Slocum Glider, being an underwater vessel, can only transmit positioning and detection data during preset surfacing periods. However, the Jasco OceanObserver system installed on the glider can, in contrast to the Seiche system, transmit in-situ processed detections to any location via Iridium satellite. However, there would be a variable delay between the vocalisation detection, processing and transmission of detection data to the monitoring station, either onshore or offshore. This may affect the usefulness of any detection if the transmission delay proved to be longer than the transit time of a whale into the active survey area. In any case, the use of a hybrid remote PAM platform array can be considered a feasible option for consideration during the Regia 3D MSS.

5. For manned aerial whale detection survey flights there are several air charter services located in Warrnambool, the closest commercial airport to the Regia 3D MSS survey area. Aircraft available include small, single engine propellor planes, like the Piper Cherokee 150, turboprops like the Pilatus PC-12, up to small private jets. There are currently no designated landing points for helicopters, although the Helicopter Emergency Medical Service (HEMS 4) is based at the airport. Although manned flights for whale detections have been assessed as an option for the Regia 3D MSS, it is felt that the operational limitations, such as bad weather groundings, added safety risks and significant costs of regular sighting flights during survey operations, does not warrant further consideration.

6. Aerial surveying for visual detection of whales using suitably equipped drones is considered a more practical, safe, and cost-effective method than manned aircraft visual detection. A suitably qualified drone pilot may need to be engaged for this option, or additional pre-survey training provided to MMO personnel for the chosen drone equipment. The use of a thermal image capable drones could also provide the option for low-visibility/night flights for visual detection.

   One drone reviewed for this study, the DJI Matrice 30T, is considered a very viable option due to its advanced features, including thermal imaging, extreme optical zoom capacities (200x), laser ranging, dual control capable, weather resistance and more. With the addition of the "DJI Dock" system the drone can operate semi-autonomously, returning to the weatherproof dock to recharge batteries. The author feels this drone warrants further investigation by the Regia survey proponents as an additional whale mitigation management procedure.

7. Survey vessel mounted dual camera-based systems are also considered a viable option to be used to supplement MMO visual detections, especially during poor/night visibility periods. Again, additional MMO personnel may be required for this option to be implemented.

   Of the two systems reviewed, the Seiche Smart Visual Detection System is the more commercially developed system than Thaum's WhalePOD, but both are similar in function and features. The WhalePOD system is an Australian designed and developed unit that, at time of writing, was in the initial stages of its commercialisation phase. Initial field-testing results were positive and industry interest was reported as being high. If the WhalePOD system is a

commercially available system in time for deployment on the Regia 3D MSS it would be a valuable platform for early adoption and feasibility testing for use during marine seismic surveys. Based on initial contact with Thaum's WhalePOD team, early adoption could also result in more beneficial commercial terms, making the cost versus benefit assessment a simple task.

8. The use of DAS fibre optic detection systems as a mitigation tool has been investigated and is considered impractical for use during the Regia 3D MSS. Limitations include the need to connect to existing telecommunications infrastructure, or to deploy dedicated cables on the seafloor and physically interface them to the monitoring equipment. Interfacing to existing commercial fibre optic cables is only feasible when the cable is located within proximity to the survey area and has an uninterrupted light path (no electronic repeater nodes) between the DAS control/record unit and the distributed acoustic sensors setup along the cable's length.

Background

Australian Regulatory Framework for Marine Seismic Surveys

Marine seismic surveys involve the use of sound waves to gather information about the seafloor and subsurface geology. These surveys are often conducted in offshore areas for various purposes, including oil and gas exploration, scientific research, and environmental studies. Given the potential environmental impacts of such activities, regulatory frameworks are in place to ensure that they are conducted responsibly and in compliance with relevant laws.

National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA)

In Australia, the regulation of marine seismic surveys falls primarily under the regime of the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). NOPSEMA is Australia's independent expert regulator for health and safety, structural (well) integrity and environmental management for all offshore energy operations and greenhouse gas storage activities in Commonwealth waters, and in coastal waters where regulatory powers and functions have been conferred. NOPSEMA operates and regulates under the Australian Governments legislation and regulations.

a. **List of legislation**
   i. Public Governance, Performance and Accountability Act 2013
   ii. Offshore Petroleum and Greenhouse Gas Storage Act 2006
   iii. Offshore Petroleum and Greenhouse Gas Storage (Regulatory Levies) Act 2003
   iv. Environment Protection and Biodiversity Conservation Act 1999
b. **List of regulations**
   i. Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011
   ii. Offshore Petroleum and Greenhouse Gas (Safety) Regulations 2009
   iii. Offshore Petroleum and Greenhouse Gas (Environment) Regulations 2023
   iv. Offshore Petroleum and Greenhouse Gas (Regulatory Levies) Regulations 2022

As with any other human activity, marine seismic surveys have the potential for some level of impact on the environment. The type and degree of environmental impact from a seismic survey is influenced by:

- the nature of the biological, social, economic, and cultural features of the marine environment where the survey is proposed to take place,
- the level of spatial and temporal overlap with environmentally sensitive areas and times and
- the individual survey design (e.g. the nature of the sound source and acquisition line spacing).

The Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS Environment Regulations) require companies who wish to conduct a marine seismic survey to address these factors through an environmental impact assessment (EIA) for their specific proposed activity circumstances.

The key requirements that apply in Australia are:

- the Environment Protection and Biodiversity Conservation (EPBC) Act Policy Statement 2.1, which sets out procedures for managing interactions with whales
- recovery plans for listed threatened species (particularly where noise is identified as a threat), which define objectives and actions to ensure effective threat mitigation and species recovery
- Australian marine park management plans, which prescribe rules for where seismic surveys can and can't occur, as well as objectives for environmental protection.

There are also a range of international requirements that should be considered, such as:

- the Convention on the Conservation of Migratory Species (CMS) Family Guidelines on Environmental Impact Assessment for Marine Noise-generating Activities (CMS Guidelines)
- various technical guidelines on applying thresholds for the impact of received sound levels, e.g. marine mammal acoustic technical guidance
- various guidelines and codes of conduct for effectively managing environmental impacts from marine seismic surveys, e.g. IUCN guidance on effective planning of geophysical surveys.

NOPSEMA's environmental assessment processes consider all project and activity-specific environmental impacts and risks, including but not limited to those relevant to matters protected under Part 3 of the EPBC Act. Decision-making ensures that environmental impacts and risks, including to matters protected under Part 3 of the EPBC Act, will be of an acceptable level and reduced to as low as reasonably practicable (ALARP).

The object of the Environment Regulations is also to ensure that any petroleum activity or greenhouse gas storage activity is carried out in a manner consistent with the principles of ecologically sustainable development as set out in section 3A of the EPBC Act.

Of direct relevance to the subject of this report is NOPSEMA's. role as compliance regulator of the EPBC Act, with particular a focus on *Policy Statement 2.1 - Interaction between offshore seismic exploration and whales*, as described in the following section.

EPBC Act Policy Statement 2.1 - Interaction between offshore seismic exploration and whales

About the policy statement

The aim of the policy is to:

1. provide practical standards to minimise the risk of acoustic injury to whales in the vicinity of seismic survey operations,
2. provide a framework that minimises the risk of biological consequences from acoustic disturbance from seismic survey sources to whales in biologically important habitat areas or during critical behaviours, and

3. provide guidance to both proponents of seismic surveys and operators conducting seismic surveys about their legal responsibilities under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Scope of the Policy Statement

Under the EPBC Act, a number of whale species are listed as threatened and/or migratory species and are, subsequently, protected under the Act as matters of national environmental significance (NES). Whale species are also part of the Commonwealth marine environment, another matter of NES.

Whales and other cetaceans also have additional protections in the *Australian Whale Sanctuary*. The EPBC Act provides for offences for certain actions that adversely affect whales in the Australian Whale Sanctuary. The Act also provides for permits to be obtained in relation to actions affecting whales in the Australian Whale Sanctuary.

Applicable Species

Not all whales hear the same acoustic frequencies. Seismic survey sound sources are generally focussed at frequencies below 200Hz. Based on the best available scientific information, it is generally understood that baleen whales and some toothed whales are likely to be sensitive to sounds in this lower frequency range.

Due to the difficulties in identifying whales to the species level, particularly at distance, appropriate management procedures (as recommended in Part A Standard Management Procedures and Part B Additional Management Procedures) should be applied whenever **whales** are, or might be, encountered. **'Whales'** includes baleen whales and larger toothed whales, such as, sperm whales, killer whales, false killer whales, pilot whales and beaked whales.

Smaller dolphins and porpoises that have peak sensitivities in the higher frequency ranges are likely to be less disturbed by these lower frequency sounds and less vulnerable to acoustic trauma. Accordingly, this Policy Statement does not apply to encounters with the smaller dolphins and porpoises.

Legislative Responsibilities

If the likelihood of encountering whales is low, the chance of a seismic survey having a significant impact on a whale species should be minimal, provided that the proponent and the operator of the seismic survey adopt the measures outlined in Part A Standard Management Procedures.

While Part A Standard Management Procedures may be sufficient in locations where the likelihood of encounters with whales is low, the proponent may need to consider additional avoidance and mitigation measures for areas and/or seasons where the likelihood of encountering whales is moderate to high. In these circumstances, the proponent should not only apply Part A Standard Management Procedures, but should also consider measures like those outlined in Part B Additional Management Procedures.

Part A Management Procedures

Part A Management Procedures are to be implemented as a minimum requirement for all marine seismic survey activities conducted in Australia where the likelihood of whale interactions is considered low. Part A Management Procedures include: -

1. **Pre-Survey Planning:** to avoid scheduling seismic surveys in areas where and when whales are likely to be breeding, calving, resting or feeding.
2. **Trained Crew:** The survey proponent should ensure that there is sufficient trained crew to fulfil the basic requirements of whale observation, distance estimation and reporting.
3. **During Surveys:** All seismic survey vessels operating in Australian waters must undertake the following basic procedures during surveys irrespective of location and time of year of survey:

    - Pre-start-up visual observation
    - Soft start
    - Start-up delay
    - Operations
    - Power- down and Stop work
4. **Compliance and Sighting Reports:** It is the responsibility of the proponent to maintain a record of procedures employed during operations. Such records should be auditable and account for aspects of the operation that relate to legislative approvals and regulations.

Detailed specifics of the requirements for Part A Standard Management Procedures, such as soft-start durations and mitigation zone distances, can be found in the policy statement document that can be found online at the DCCEEW web site.

Part B Additional Management Procedures

For seismic surveys operating in areas where the likelihood of encountering whales is **moderate to high**, the application of additional measures, to ensure that impacts and interference are avoided and/or minimised, are necessary. The following measures are recommended, however, application of all these measures may not be necessary, applicable or possible for all seismic survey operations.:-

1. **Marine Mammal Observers (MMO):** Whilst listed as an additional management procedure in the policy statement it is now considered standard practice for marine seismic surveys to employ at least one MMO during any seismic survey activity. MMOs should be trained and experienced in whale identification and behaviour, distance estimation, and be capable of making accurate identifications and observations of whales in Australian waters. The MMOs should assist other observers (e.g. trained crew) and be available to provide advice, should whales be encountered.
2. **Night-time/Poor visibility:** For surveys in areas where whales are expected to be encountered, the proponent should include appropriate management measures to detect (or predict) whale presence and apply measures to reduce the likelihood of encounters. Depending on the situation a range of measures may be appropriate, possible measures include:

    - Limiting initiation of soft start procedures to conditions that allow visual inspection of the precaution zone;
    - Daylight spotter vessel or aircraft searches of the night-time survey area to determine if whales are present; and
    - Pre survey research (including surveys) to detect and identify likely whale concentration areas, such as: peak migration paths and times, key feeding sites (e.g. shelf breaks, sea mounts and trenches), or other aggregation areas.
3. **Spotter Vessel(s) and Aircraft:** Where the likelihood of encountering whales is high, spotter vessels/aircraft could be used to assist in detecting the presence of whales. Spotter vessels and aircraft may be usefully employed to determine the presence and likelihood of encountering whales during day and night-time operations; information that can then be used to re-design

the survey or tracks to be run to avoid whales that are in the vicinity. Spotter vessels/aircraft should maintain continuous contact with the seismic survey vessel. An MMO should be employed on board both the survey vessel and the spotter vessel/aircraft.

4. **Increased Precaution zones and Buffer zones:** In some locations and circumstances it may be advisable to apply increased distances for the instigation of power-down procedures from those outlined in Part A Standard Management Procedures.
5. **Passive Acoustic Monitoring:** Deployment of PAM with appropriate technologies and programs to detect whales in real time may provide an additional method of detecting and avoiding whales during surveys and may be particularly useful during night-time and low visibility operations.
6. **Adaptive Management:** Where a survey is proposed in an area that is spatially and temporally on the edge of areas considered to provide biologically important habitat, the proponent may consider implementing adaptive management procedures to manage the potential increased likelihood of encountering whales. Adaptive management could include implementation of daytime only operations if there are three consecutive days on which operators experience three or more whale-instigated shut down/power down situations. Adaptive management may also be used in conjunction with other measures described in Part B. For example, if aerial surveys identify whales in the region, increased buffer zones are implemented.

One of the core objectives of this report is to provide details of whale detection and mitigation systems that could be implemented as part of the Additional Management Procedures that will be implemented during the Regia 3D MSS due to the known presence of both Blue and Southern Right Whales in the vicinity of the Survey Planning Area. The most practical and effective additional management procedures/equipment will, where adopted by the survey proponents, be included as mitigation measure commitments within the Regia Seismic Survey Environment Plan.

Detection Technologies Overview

Introduction

The following section provides a broad overview of the technologies and implementation procedures that have been considered for adoption as Additional Management Procedures during the Regia 3DMSS. Advantages and disadvantages have been provided where an assessed technology is regarded as having both.

Passive Acoustic Monitoring

PAM History

Passive Acoustic Monitoring (PAM) for marine mammal detection has a history that spans several decades. The technique relies on the use of underwater microphones, known as hydrophones, to listen to and record the sounds produced by marine mammals. Here's a brief overview of the key milestones in the history of PAM:

1. **Early Observations (1950s-1960s):** The use of hydrophones to study marine life, including marine mammals, dates back to the 1950s and 1960s. Researchers began recording underwater sounds, but the technology was limited and the focus was primarily on general oceanography rather than specific marine mammal studies.
2. **Navy's Interest (1960s-1970s):** The United States Navy became interested in the use of passive acoustic techniques for detecting submarines. While conducting these naval operations, they unintentionally recorded marine mammal sounds, which led to increased awareness of their vocalisations.
3. **Whalesong Discoveries (1960s-1970s):** Researchers studying humpback whales made significant discoveries in the 1960s and 1970s. They found that humpback whales produced complex and repetitive songs, which piqued scientific interest in using passive acoustics for studying marine mammal behaviour.
4. **The Development of PAM Tools (1980s):** During the 1980s, advancements in hydrophone technology and signal processing capabilities made it easier to detect and analyse marine mammal sounds. This led to the development of dedicated PAM tools and software, making the process more efficient and accurate.
5. **International Whaling Commission's Involvement (1980s):** The International Whaling Commission (IWC) recognised the importance of passive acoustics in studying and conserving marine mammals. They initiated efforts to standardise PAM methodologies and data analysis techniques.
6. **Wide Application (1990s-2000s):** In the 1990s and 2000s, PAM gained broader recognition and became an essential tool for marine mammal researchers worldwide. It was used to study various species, including cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals and sea lions), and assess their distribution, abundance, and behaviour.
7. **Integration with Autonomous Systems (2000s-2010s):** With advancements in underwater autonomous systems, such as autonomous underwater vehicles (AUVs) and gliders, PAM techniques were integrated with these platforms to expand coverage and improve data collection.

8. **Industry Applications (2010s):** PAM found applications beyond scientific research. Industries like offshore oil and gas exploration, renewable energy, and shipping began using PAM as part of their environmental monitoring efforts to reduce the impact of their activities on marine mammals.
9. **Real-time PAM (2010s-2020s):** Real-time PAM systems evolved, allowing researchers and operators to monitor marine mammal activity continuously. These systems could detect vocalisations and other sounds, provide alerts for specific species detections, and help mitigate potential risks for marine life.

Overall, passive acoustic monitoring has become an essential tool in marine mammal research and mitigation, offering a non-invasive and effective means of detecting vocalising marine mammals. Ongoing advancements in technology continue to improve the accuracy, efficiency, and scope of PAM use in a broad range of applications.

PAM During Marine Seismic Surveys

PAM is a valuable tool used during marine seismic surveys to monitor and mitigate the impact of seismic operations on marine life, especially marine mammals. Seismic surveys involve the use of airguns to generate powerful acoustic signals, which may be harmful to marine organisms if not properly managed. PAM helps in minimising the potential negative effects by providing real-time monitoring and detection of marine mammal presence within the detectable range of the acoustic energy source.

Here's how PAM is utilised during marine seismic surveys:

1. **Marine Mamal Detection:** PAM systems are installed on seismic survey or energy source vessels and/or in the vicinity of the seismic survey area to continuously monitor for the presence of marine mammals. These systems consist of hydrophones (underwater microphones) or an array of hydrophones that can detect and record the vocalisations and other acoustic signals produced by marine mammals.
2. **Real-time Monitoring:** The hydrophones are connected to onboard or shore-based monitoring stations, where specialised software analyses the recorded acoustic data in real-time. Some PAM software is capable of automatic identification of individual species of marine mammals based on their vocalisation signatures. If marine mammal sounds are detected during survey, operations can be adjusted or halted temporarily to prevent potential harm to the animals.
3. **Mitigation Measures:** PAM allows for the implementation of mitigation measures when marine mammals are detected. These measures can include shutting down the airguns or altering the survey activity to minimise potential impacts on marine life. The mitigation measures are often guided by the likely species present and environmental regulations and guidelines specific to the area of operation.
4. **Data Collection and Analysis:** The data collected through PAM systems during seismic surveys are also essential for assessing the effectiveness of mitigation measures and studying the behaviour of marine mammals in response to seismic activities. This information helps researchers and regulatory authorities make informed decisions about future seismic operations.
5. **Compliance with Regulations:** Many countries and international organisations have strict regulations and guidelines to protect marine life during seismic surveys. In some countries PAM has been mandated as a required mitigation tool during all seismic survey activities. In Australia PAM use is not yet mandated. However, it is considered best practice as an "Additional

Management Procedure" beyond the "Standard Management Procedure" requirements of the EPBC Act, Policy Statement 2.1.

It's important to note that the use of PAM is just one aspect of a comprehensive environmental monitoring and management plan that operators implement during seismic surveys. Other measures, such as visual monitoring, pre-survey assessments, and adherence to mitigation zones, also play significant roles in safeguarding marine life during seismic operations.

Regardless of the platform on which a PAM system is deployed during a seismic survey activity there is one common disadvantage, or limitation, being the ability to detect marine life acoustic signals in amongst the large impulse noise of seismic airgun arrays being discharged, as well as the engine and propellor noises generated by the survey vessel(s) themselves. During survey data acquisition a typical airgun array discharge repetition rate is between 7 to 10 seconds. This high amplitude noise is received directly by PAM hydrophones through the water column, overpowering lower amplitude sounds.

Dependent on the water depth and subsurface geology, the subsurface acoustic reflections from each seismic source impulse can still be returning to the sea surface whilst the next airgun array impulse is generated. This means that the actual "quiet" period where lower amplitude marine fauna noise source levels can be monitored, without background seismic signal data present, is either minimal or non-existent during active survey periods. Therefore, PAM systems need to be able to filter out, or differentiate between seismic energy returns. The best times for detection of marine mammal vocalisations are the short periods of lower noise levels between seismic airgun pulses and during transits between seismic survey transect lines (line changes).

Towed Streamer PAM

Towed streamer PAM has been utilised for many years and is the most common form of passive acoustic monitoring used during seismic surveys to date. This detection method involves using a dedicated array of underwater microphones, or "hydrophones", which are incorporated in a long cable or "streamer" that is towed behind a seismic survey or associated support vessel.

The hydrophones pick up sounds in the underwater environment, including the vocalisations and other noises made by marine animals, such as whales. The PAM hydrophone arrays are interfaced to bespoke electronic equipment that can filter, digitise, and condition the acoustic signals for analysis by specialist software, such as the Open Source "PamGuard" system.

More recently manufacturers of in-water seismic survey equipment, such as Sercel's "QuietSea", system has incorporated cetacean detection hydrophones within the same streamers used to receive subsurface acoustic reflection data from the seismic energy source. The PAM hydrophone data is fed back to the survey vessel independently of the seismic data and is interfaced to equipment designed to analyse received acoustic signatures and automatically detect and identify cetaceans, alerting survey operators of their presence within the vicinity so that suitable mitigation measures can be instigated.

By incorporating PAM sensors in the seismic streamers, the need for additional dedicated PAM hydrophone arrays is eliminated, removing the risk of entanglement of the PAM streamer with the seismic vessel's towed equipment. It also reduces exposure of personnel to risks associated with the deployment and recovery of third-party PAM streamers from the stern of seismic survey vessels.

The integration of PAM data within the seismic streamers also provides for far greater numbers of hydrophones listening for cetacean vocalisations over a much broader area of the ocean. Dependent on the geophysical objectives, a typical modern seismic streamer deployment configuration during a marine 3D survey is between ten and fourteen individual seismic streamers of up to ten or twelve kilometres in length, spaced between fifty and one hundred and fifty metres apart. This provides a PAM hydrophone array of up to two square kilometres or more. Such large, two-dimensional arrays provide the ability to better compute geographic locations of received vocalisations by comparing the arrival times of individual acoustic signatures across the array to determine bearing and distances to the sound source.

Supplementary Vessel Towed PAM

The use of one or more vessels, in addition to the seismic survey vessel, to deploy towed PAM systems during a seismic survey can add considerably to cetacean mitigation efforts by enabling marine mammal detections at greater distances from the seismic energy source.

Dependent on the species of concern and the regulatory requirements for mitigation buffer zone distances from the active energy source(s) it may be impossible for seismic vessel-based towed PAM to detect cetacean vocalisations out to the required mitigation zone radius. Survey vessel towed PAM receivers are positioned astern of the vessel and therefore offset from the centre of the acoustic energy source. Positioning another vessel with its own towed PAM system ahead of the survey vessel could increase the potential to detect cetaceans ahead of the survey vessel, in the direction of travel along pre-plotted seismic lines.

Advantages of one or more supplementary vessels equipped with towed PAM are:-

- Increased range for detection of cetacean vocalisations from the seismic vessel, potentially providing more advanced warning of whale presence ahead of the energy source.
- Additional platform(s) for visual detections, including using more MMOs and possibly extra automated camera-based detection systems.
- Increased distance from the energy source means a lower level of direct arrival impulse noise as the amplitude decays with distance.
- A secondary vessel can potentially offer verification of received vocalisations and may assist in determining the location of the sound source.

Some disadvantages include: -

- The need for additional people to install, deploy, recover, and operate the PAM equipment, leading to additional safety risks for personnel at sea.
- The costs of an additional vessel and its crew capable of accommodating the extra PAM/MMO personnel and being able to work alongside the survey vessel in all weather conditions is not insignificant.

Tethered Buoy PAM

A tethered buoy PAM system is a tool used in marine research and mitigation efforts to monitor and protect marine animals, particularly cetaceans like whales and dolphins.

Here's how a tethered buoy PAM system works:

1. **Buoy**: The system typically consists of a buoy that floats on the water surface. The buoy is designed to stay afloat and stable in various sea conditions.
2. **Tethered Design**: The buoy is tethered to an anchor or weight on the seafloor. The tether keeps the buoy in place, preventing it from drifting away with ocean currents.
3. **Underwater Hydrophones:** The buoy is equipped with underwater hydrophones. These hydrophones are sensitive to underwater sounds and can pick up a wide range of frequencies.
4. **Data Recorder:** The buoy is connected to a data recorder or logger, which stores the acoustic data captured by the hydrophones. Depending on the system, the data can be stored locally on the buoy or transmitted in real-time, via either radio frequency (including Wifi)or satellite-based data telemetry, to a shore-based monitoring station or onboard the seismic survey vessel.
5. **Acoustic Monitoring:** The tethered buoy PAM system operates continuously, listening for underwater sounds in the surrounding environment. It can detect various marine animal sounds, such as whale calls, dolphin clicks, and other vocalisations.
6. **Research:** Tethered buoy PAM systems are particularly useful for long-term monitoring in specific areas, such as migration routes or important feeding grounds.
7. **Non-Intrusive:** Since the PAM system does not emit any sounds, it is considered non-intrusive and does not disturb marine life during the monitoring process.

Tethered buoy PAM systems have been deployed in the field during marine seismic surveys to supplement the towed array PAM systems typically deployed from the seismic survey vessel and/or the energy source vessel. Buoys can be placed around the perimeter of the active seismic operations area in order to alert survey operations of the arrival of cetaceans within the area.

Dependent on the size of specified mitigation zones, when compared to the distances between the detected animals and the seismic energy source, actions can be taken to either heighten the level of alertness, such as increasing visual or acoustic monitoring efforts, or suspend survey operations until no further detections have been received within a pre-defined period, equivalent to the likely movement of detected whales outside the mitigation zone.

Tethered buoy PAM has the following advantages: -

- Buoys can be deployed around the perimeter of the seismic survey operations area to virtually ringfence the active source area, enabling detections of vocalising cetaceans prior to them entering the mitigation zone.
- Monitoring of real-time buoy PAM can be performed remotely at any location, either onshore or offshore, using satellite-based acoustic data telemetry. No additional personnel need to be assigned to a survey vessel, reducing risk and costs of travel as well as reducing pressure on survey vessel bunk space. Onshore monitoring provides more flexibility in shift timing and manning levels.
- Buoys can be used to compare received energy source sound levels at distances from the centres of sources with the modelled levels used to define the mitigation zones. Mitigation zone distances could be amended based on real-world sound level measurements.

Tethered buoy PAM disadvantages include: -

- Cost of buoy deployment and recovery is not insignificant.

- Corrective maintenance in the event of equipment failure is logistically difficult and costly due to the potential need for third party vessel charter to repair or replace buoys.
- Poor weather can affect buoy operational effectiveness. Buoy surface movement can affect hydrophone data quality through additional noise. Constant cloud cover can reduce solar panel effectiveness to charge system onboard batteries.
- Tethered buoys can become a navigation risk to other vessels. Buoy locations are required to be registered with government and military authorities and released in official Notices to Mariners.

Unmanned Surface Vessel PAM

USVs (Unmanned/Uncrewed Surface Vehicles) can be utilised for various purposes, including Passive Acoustic Monitoring (PAM). USVs can enhance PAM operations by serving as a platform to deploy and maintain the acoustic sensors, collect data, and transmit it to the operators or data centres. Here's how USVs can be beneficial for PAM:

1. **Autonomous operations:** USVs can be programmed to follow specific paths or patrol areas or keep station autonomously, reducing the need for constant human intervention. This autonomy enables extended monitoring periods and increased coverage of marine environments.
2. **Reduced cost and risk:** Using USVs for PAM reduces the need for manned vessels, thereby cutting down operational costs and minimizing risks to human personnel in challenging or dangerous marine conditions.
3. **Extended endurance:** Many USVs can operate for extended periods, even in remote locations, allowing for continuous monitoring of underwater sounds over long durations.
4. **Precise positioning:** USVs equipped with GPS technology can maintain accurate positions, ensuring that acoustic sensors are deployed at specific locations for precise data collection.
5. **Low acoustic interference:** USVs are generally quieter than traditional manned vessels, reducing the potential for acoustic interference with marine life and improving the quality of PAM data.
6. **Remote control and data transmission:** Operators can remotely control USVs and receive real-time data from the acoustic sensors, enabling quick analysis and decision-making.
7. **Flexibility:** USVs can be equipped with different types of sensors, allowing them to perform a variety of tasks beyond PAM, such as meteorological or oceanographic data collection.

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- Configurable payloads and sensors
- Real-time data transfer via satellite telemetry.
- Potential alternatives to tethered buoys, especially in very deep water.

Some USV PAM disadvantages are: -

- Potential navigation risk to other marine users.
- Potential for entanglement of the towed hydrophone array with in-sea debris or fishing gear.
- Unmanned, so potential targets for theft or vandalism in certain deployment scenarios.

Unmanned Underwater Vessel PAM

Unmanned underwater vessels, often referred to as underwater drones or autonomous underwater vehicles (AUVs), can play a crucial role in conducting PAM efficiently. Here's how they could be used for this purpose:

1. **Data Collection:** Unmanned underwater vehicles equipped with hydrophones (underwater microphones) can collect audio data from different depths and locations in the ocean. These vehicles can travel to specific areas of interest and record underwater sounds without disturbing marine life.
2. **Extended Operation:** AUVs can operate for extended periods, covering large areas of the ocean. This allows for continuous or scheduled monitoring, which is especially useful for tracking the migration patterns and behaviours of marine species.
3. **Precise Localisation:** AUVs can be programmed to move to specific coordinates, enabling targeted acoustic data collection near underwater sources of interest, such as breeding or feeding grounds of marine animals.
4. **Real-time Data Transmission:** Some AUVs can transmit data in real-time to a monitoring station on the surface. This feature is advantageous for immediate analysis and decision-making based on the collected acoustic data.
5. **Adaptability:** AUVs can be programmed to follow predefined paths, adapt to changing environmental conditions, and navigate complex underwater terrain, ensuring optimal coverage of the monitored area.
6. **Reduced Human Interaction:** Using AUVs for PAM reduces the need for constant human presence at sea, minimizing the associated risks and costs.
7. **Integration with Other Sensors:** AUVs can carry additional sensors, such as environmental sensors or cameras, to gather more comprehensive data about the underwater environment and the marine life within it.
8. **Data Processing and Analysis:** The collected acoustic data can be processed to identify specific species based on their characteristic sounds. Machine learning algorithms can be employed to automate the analysis process and identify patterns in the recorded sounds.
9. **Reduced Environmental Impact:** Compared to traditional survey methods that involve larger vessels and potentially disruptive activities, AUVs produce minimal noise pollution and disturbance to marine life.

The advantages of autonomous underwater vessel use for PAM are similar to those of autonomous surface vessels, with the addition of the ability to submerge the hydrophone arrays to water depths where sea surface noise in greatly lessened. This provides a quieter environment for detecting distant whale vocalisations. However, this advantage comes at the cost of real-time data telemetry to the PAM monitoring station during periods of submersion, making it impractical as a mitigation option.

Fibre Optic Distributed Acoustic Sensors

Fibre optic distributed acoustic sensors (DAS) are a type of technology that utilises optical fibres to detect acoustic signals along the length of the fibre. These sensors are capable of converting the fibre optic cable into an array of virtual microphones, making them ideal for various applications in monitoring and surveillance.

Here's how fibre optic DAS generally works:

1. **Principle**: The basic principle behind fibre optic DAS is the interaction between light and sound. When an acoustic wave (sound) interacts with the fibre optic cable, it causes minute changes in the properties of the light traveling through the fibre.
2. **Optical Fibre:** The fibre optic cable used in DAS is typically a single-mode optical fibre, which allows only one mode of light to propagate along the fibre core. This is crucial for maintaining the integrity of the signal.
3. **Laser Interrogation:** A laser source is used to generate a continuous wave of light that travels through the optical fibre.
4. **Scattering:** When an acoustic wave interacts with the fibre, it causes minute changes in the refractive index of the fibre due to phenomena like Brillouin scattering or Rayleigh scattering. These changes result in the scattering of light along the fibre.
5. **Interference Measurement:** The backscattered light returns to the DAS unit, where it is analysed to detect changes in the phase and intensity of the light. By analysing these changes, the DAS system can pinpoint the location and characteristics of the acoustic disturbance.
6. **Data Processing:** The collected data from the DAS system is then processed using advanced signal processing algorithms to interpret the acoustic information accurately. This allows the system to distinguish between different types of acoustic events.

Fibre optic DAS has several advantages over traditional point sensors:

- **Continuous Monitoring:** Since the fibre optic cable acts as an array of virtual microphones, DAS provides continuous monitoring along its entire length, enabling the detection of acoustic events over long distances.
- **Sensitivity and Resolution:** DAS systems have excellent sensitivity and high spatial resolution, allowing for precise localization of acoustic events.
- **Versatility:** Fibre optic DAS can be used in various applications, such as pipeline monitoring, perimeter security, seismic monitoring, and structural health monitoring.
- **Immune to Electromagnetic Interference**: Fibre optic cables are not affected by electromagnetic interference, making DAS systems suitable for harsh environments.

Due to these advantages, fibre optic distributed acoustic sensors have gained popularity and are being employed in diverse industries for efficient and reliable acoustic monitoring applications.

An article published in Frontiers in Marine Science in July 2022 titled "Eavesdropping at the Speed of Light: Distributed Acoustic Sensing of Baleen Whales in the Arctic" *(Bouffaut et al)* detailed the successful use of a 120km long sub-sea telecommunications fibre optic cable, with sensing points every 4 metres, to identify and estimate the 3D positions of vocalising baleen whales. It also demonstrated the use of frequency modulated whale vocalisations recorded on the DAS to generate correlated subsurface seismic profiles down to a depth of around 2 seconds.

Disadvantages of DAS include:

- DAS can only operate over uninterrupted lengths of fibre optic cable. It cannot pass through repeater modules or other electronic nodes.
- Use of DAS with existing cables requires the assistance and cooperation of the telecommunications company that owns and/or operates the cables.
- DAS can only be used on dedicated fibres and therefore needs to utilise spare or unused fibres within any existing cable infrastructure.

- Deployment of dedicated DAS fibre optic cables on the seafloor may need some forms of regulatory approval prior to deployment.
- Deployed seafloor cables may be at risk of damage through external sources, such as trawling operations.
- Dedicated DAS cables needs to be physically connected to the recording equipment. In most cases this means the need to run the cable to a shore-based facility or possibly an offshore installation, such as an oil rig/platform. The logistics of this requirement are prohibitive.
- As at 2021, there is only one submarine telecommunications cable, Indigo Central, that passes through the Regia 3D survey area. This cable runs between Sydney and Perth, making the likelihood of potential utilisation due to the distances involved extremely slim.

Satellite Imagery

Satellite imagery has been utilised for various purposes, including environmental monitoring and wildlife conservation. However, using satellite imagery specifically for whale detection presents some challenges.

Whales are massive marine creatures that typically spend most of their time submerged underwater. While some whale species exhibit behaviours such as breaching (jumping out of the water) or spouting (blowing air and water from their blowholes), these activities can be relatively infrequent and challenging to capture from space.

Nevertheless, advancements in satellite technology and image processing algorithms have made it possible to detect large marine mammals, including whales, under certain circumstances. Here are some ways satellite imagery can be used for whale detection:

1. **Large Whale Detection:** Satellites equipped with very high resolution (VHR) optical sensors can detect large whales when they surface for air. These sensors can capture images of large whales like humpback whales, blue whales, and Southern Right whales when they breach or spout. While not continuous monitoring, these images can provide valuable data on whale distribution and migration patterns.
2. **Whale Migration Tracking:** Satellite-tagged whales can transmit signals when they surface, allowing researchers to track their movements and migration routes. This information can be used to understand whale behaviour and identify critical habitats.
3. **Whale Population Estimation:** Researchers can analyse satellite images to estimate whale populations in specific regions, such as areas where seismic survey activities are planned. This approach involves identifying and counting whales in the images, which can provide valuable insights into population trends and mitigation efforts.
4. **Detection of Human Activities Impacting Whales:** Satellite imagery can also be used to monitor human activities that may negatively impact whales, such as ship traffic, coastal development, and oil spills. By identifying potential threats, regulators can take appropriate measures to protect whale habitats.

However, it's important to note that satellite-based whale detection has its limitations. Cloud cover and weather conditions can obstruct the view from satellites, making consistent monitoring challenging. Moreover, smaller marine mammal species, or those that spend more time underwater, might be difficult to detect using current satellite technology.

The field of satellite imagery and marine mammal monitoring is continuously evolving, and there may be more advanced techniques and systems developed in the future. A German company, Space Whale, has developed a cetacean survey method, employing a convolutional neural network (CNN) to automate much of the VHR satellite imagery interpretation. Space Whale offers VHR satellite-based whale detection and monitoring as a service, with end users merely needing to provide corner coordinates for a rectangular area of interest, start and end dates for monitoring and the whale species of interest in order to obtain a quote for services.

At present though, real-time satellite imagery for use in whale detection as a real-time mitigation measure is not considered a practical option. It can certainly be considered as a means to establish whale population presence in a survey operational area over time in order to determine the best time to conduct a seismic survey.

Camera-Based Detection

Infrared Cameras

Infrared, or Night Vision cameras can be used for various purposes, including whale detection. Infrared cameras have been used to monitor and study marine mammal populations, including whales, in both research and mitigation efforts. Here's how infrared cameras are employed for whale detection:

1. **Thermal Imaging:** Infrared cameras are also known as thermal imaging cameras because they detect and capture infrared radiation (heat) emitted by objects, including living beings. Whales, like all warm-blooded animals, generate heat, and this thermal signature can be detected by infrared cameras even when the whales are underwater.
2. **Day and Night Vision:** Infrared cameras can operate in low-light conditions and even in complete darkness, making them valuable tools for marine research, especially in remote locations or during nighttime studies.
3. **Identification and Monitoring:** By using infrared cameras, researchers can identify and track whales without disturbing them or altering their natural behaviour. This helps in studying their movement patterns, behaviour, and population dynamics.
4. **Aerial Surveys:** Infrared cameras mounted on drones or aircraft can conduct aerial surveys of whale populations over large areas, making it easier to assess their numbers and distribution.
5. **Remote Monitoring:** Infrared cameras can be set up at specific locations, such as coastal areas or key migration routes, to continuously monitor whale activity. This allows researchers to collect data over extended periods without the need for direct human presence.
6. **Mitigation Applications:** Infrared cameras can play a role in marine mitigation efforts by providing valuable data on whale populations, migration patterns, and interactions with their environment. This information can be used to develop better mitigation strategies to protect these species.

It's important to note that while infrared cameras are a useful tool for whale detection, they are often used in conjunction with other monitoring techniques, such as acoustic monitoring (PAM) and visual observations (MMOs), for additional mitigation measures during marine seismic surveys.

Advantages of infrared cameras include: -

- Ability to identify whales in low light or dark conditions.

- Up to 360-degree, 24-hour remote scanning of the ocean around the monitoring platform out to the horizon.
- Systems are relatively inexpensive and are lightweight, easily transported, and relatively simple to install.
- Some camera systems incorporate Artificial Intelligence (AI) software to automatically identify whales through thermal imaging and blow detections.

Some disadvantages of infrared camera systems are: -

- Reduced effectiveness during periods of poor weather, including sea state and precipitation and during high sun glare situations. Fog and humidity can also adversely affect camera performance.
- If being used as an additional night time visual mitigation procedure, alongside the use of PAM detection systems, it may be necessary to engage additional MMO personnel to provide full 24 hour visual monitoring coverage onboard the survey or support vessel(s).

Dual Camera Systems

A Dual HD Image and Infrared Whale Detection Camera System is a specialised technology designed to monitor and detect the presence of whales using both high-definition visual imagery and infrared (IR) technology. This type of system is commonly used in marine research, conservation efforts, and environmental monitoring.

Here's how dual camera systems work:

1. **Dual Camera Setup:** The system consists of two types of cameras: high-definition (HD) visual cameras and infrared (IR) cameras. These cameras are typically positioned on a platform, such as a survey vessel or a fixed installation like an oil rig or platform.
2. **HD Image Cameras:** The HD cameras capture visible light imagery of the surrounding ocean. These images provide clear visual information about the appearance, behaviour, and location of whales. HD cameras are particularly useful for identifying specific species, observing behaviour patterns (breaching, swimming, etc.
3. **Distance Measurement:** Some dual camera systems can integrate automatic distance estimation analysis software, such as the Seisch Real Time Automated Distance Estimate at Sea (RADES) software.
4. **Infrared (IR) Cameras:** As detailed previously, IR cameras capture heat signatures emitted by living organisms, including whales, in the form of thermal radiation. Whales generate heat due to their metabolism, and this heat signature can be detected by IR cameras even when visibility is poor, such as in low light or adverse weather conditions. IR cameras are advantageous for night-time observations and in areas with reduced visibility.
5. **Image Processing and Analysis:** The system typically includes image processing software that can analyse the captured images and videos in real-time or post-capture. Machine learning algorithms can be employed to identify and classify whale species based on their visual features and heat signatures.
6. **Whale Detection Algorithms:** The core functionality of these systems lies in their ability to automatically detect the presence of whales within the captured images and videos. Detection algorithms are trained to recognise specific shapes, patterns, and characteristics of whales, both in visible light and in IR images. When a potential whale is detected, or an anomaly in the incoming images flagged, the system can trigger alerts for further observation or examination.

7. **Data Storage and Transmission:** The systems can store the captured images and videos for further analysis and research. Additionally, if a system is connected to a network, it can transmit real-time data to MMOs or a central database for instant analysis and response.
8. **Research and Conservation Applications**: A Dual HD Image and Infrared Whale Detection Camera System has numerous applications. It can aid in understanding whale migration patterns, assessing population sizes, monitoring the health of individual whales, and studying their behaviour. Furthermore, it can be used to support additional mitigation procedures, such as during marine seismic surveys, where they can be used as an additional source of real-time whale monitoring and detection to trigger required mitigation control measures.

This technology combines the advantages of high-definition visual imagery and infrared technology to provide a comprehensive and accurate method for monitoring and detecting whales. The advantages of a dual camera system include all of those previously listed for infrared cameras, plus the ability to better identify whale species and distances during daytime operations. The inclusion of automated distance estimation software further adds to the list of advantages.

The disadvantages of dual camera system use are also similar to those of a straight infrared camera option, being the limited effectiveness during poor sea state and weather conditions. Both systems are also limited by the location of the platform on which they are mounted, with a 360 degree uninterrupted view being almost impossible to achieve on most vessels due to the presence of the ship's mast(s) and any other upper deck superstructures, such as cranes, stacks and the like. Mast-top mounting, where the view is less obstructed, is impractical in most situations due to the height and the increased motion experienced at that height.

Aerial Surveys

Manned Aircraft

Manned aircraft aerial surveys for whale detections are a valuable method used by researchers to study and monitor whale populations in their natural habitats. These surveys involve using aircraft, such as airplanes or helicopters, equipped with specialised equipment and cameras to observe and document the presence of whales in a given area. Here's an overview of how aerial surveys for whale detections typically work:

1. **Survey Planning:** Researchers plan the aerial survey by defining the study area and identifying the target species of whales they want to observe. The study area can be a specific region, a migration route, or a known feeding or calving ground for the whales. For seismic survey planning purposes this would be the survey's Operational Area plus any prescribed mitigation zone buffers.
2. **Aircraft and Equipment:** A suitable aircraft is selected for the survey, considering factors such as range, speed, and altitude capabilities. The aircraft is often equipped with high-quality cameras and, in some cases, specialised sensors like infrared or thermal cameras that can aid in detecting whales more effectively.
3. **Flight Patterns:** Project planners determine the flight patterns based on the study objectives and the characteristics of the whales they are monitoring. The aircraft may fly along predetermined transects, circular patterns, or adaptive flight paths to cover the designated study area systematically.

4. **Detection and Documentation:** During the flight, trained observers/spotters scan the ocean surface for signs of whales, such as blows (exhalations), breaches, or fluke dives. When a whale is sighted, its location, behaviour, and species are recorded. Photographs and videos may also be taken for later analysis and identification.
5. **Data Analysis:** After the aerial survey, observers analyse the collected data to estimate whale abundance, distribution, and behaviour. They use statistical methods to extrapolate the observations to estimate the total whale population in the study area.
6. **Mitigation and Management:** The data gathered from aerial surveys help inform mitigation measures and management decisions related to whale populations. It aids in understanding population trends, identifying critical habitats, and assessing the impact of human activities on whale populations.

Advantages of Aerial Surveys:

- Aerial surveys allow spotters to cover large areas efficiently and rapidly.
- They provide a non-invasive method to study whales without disturbing their natural behaviours.
- Aerial observations can be used to complement data obtained from other survey methods, such as shipboard surveys, shore-based observations, or acoustic monitoring.
- Pre-activity aerial surveys can be used to help plan seismic survey timing to minimise exposure to periods of peak presence of whale species of concern.

Limitations of Manned Aerial Surveys:

- Weather conditions and sea state can affect survey flight operations and the ability to detect whales accurately.
- The altitude of the aircraft may limit the ability to identify smaller whale species or individuals.
- Aerial surveys can be expensive, especially if frequent or ongoing coverage is required.
- Aerial surveys are limited in duration and highly dependent on aircraft fuel endurance and distances from suitable air strips based within practical range of survey locations.

Overall, aerial surveys for whale detections can be a useful addition to marine seismic survey mitigation methods. However, the additional risks associated with personnel spending significant periods of time in low flying aircraft, plus the significant additional costs of this method, combined with the restrictions to flights in poor weather conditions, makes this option less desirable as a real-time mitigation method for a seismic survey, especially when located in areas of frequent bad weather.

Drones

Using drones for whale research and detection has become an increasingly popular and effective method in recent years. Drones offer numerous advantages for studying and monitoring whales in their natural habitats. Here are some ways in which drones are utilised for whale monitoring:

1. **Aerial Surveys:** Drones equipped with high-resolution cameras can conduct aerial surveys over large ocean areas, making it easier to spot whales and other marine mammals from above. This approach is especially valuable for species that spend a lot of time at the surface, like humpback whales and southern right whales.

2. **Behaviour Observation:** Drones allow researchers to observe the behaviour of whales without disturbing them. They can document social interactions, feeding behaviours, breaching, and other activities, providing valuable insights into the lives of these animals.
3. **Population Monitoring:** By flying over known habitats or migration routes, drones can help researchers estimate whale populations more accurately. Traditional survey methods may miss some individuals, but drones can cover larger areas and improve counting accuracy.
4. **Identification:** Drones equipped with specialised cameras, such as thermal or multispectral sensors, can aid in identifying whale species based on unique markings, colour patterns, or heat signatures.
5. **Tagging and Tracking:** Some drones are equipped with specialised dart guns or tagging devices that can safely attach tracking tags to individual whales. These tags allow researchers to monitor the movements and behaviours of specific whales over time.
6. **Acoustic Monitoring:** Drones can also carry hydrophones or other acoustic sensors to record whale vocalisations, helping scientists study their communication patterns and track their presence in areas with low visibility.
7. **Environmental Research:** Drones can be utilised to collect water samples, measure sea surface temperatures, and study other environmental factors that may influence whale behaviour and distribution.

When using drones for whale detections, it is essential to follow ethical guidelines and regulations to minimise disturbance to the animals and their environment. Observers must maintain a safe distance from the whales and ensure that the drone's presence does not cause stress or disruption to the animals. Additionally, adherence to local laws and permits related to drone operations and wildlife observation is crucial.

Advantages of drones:

- Drones are a cost effective and safe means of visual detection of whales. One or more drones can be deployed from either the survey or a support vessel at any time to scan a large area of ocean from heights capable of spotting whales at considerable distances.
- Modern consumer drones have flight times in excess 40 minutes and ranges up to 20km, with real-time, high-definition video streamed back to the drone pilot's video monitor or First Person View (FPV) goggles. Individual drones can be rotated as batteries are recharged, providing almost continual aerial monitoring, as long as flight conditions are suitable.
- Drones can be fitted with an additional infrared camera for use on low light or night detection flights. Some drones also include a laser range finder for accurate measurement of the geographic coordinates of a visual target.
- Drones can be quickly launched in response to acoustic whale detections to provide visual confirmation of presence and location of detected whales.
- Some drones can use dual controllers, with one controlling the flight while the other controls the cameras, allowing for MMOs to concentrate on species location and identification while the drone pilot focusses on the flight controls.
- Drones can be programmed to autonomously fly preset patterns around moving seismic vessels, such as circular flight paths at fixed offsets, or by using fixed routes around programmed geographic waypoints. They can also be used to scout well ahead of a seismic vessel along survey line transects, providing significant advanced notice of the presence of whales beyond the immediate mitigation zone.

- Drones can be used to electronically tag whales using drop tags to potentially add a valuable whale research data source during a seismic survey activity, in association with a third-party research organisation. This could result in improved PR for the survey operator.

Disadvantages of drones:

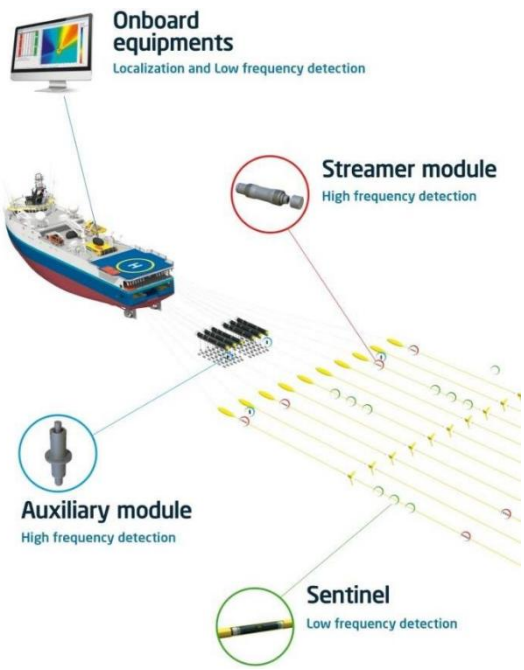
- Most drones cannot operate during periods of very poor weather, such as in strong winds or heavy rain although some high-end commercial drones, such as the DJI Matrice 30 and Autel Robotics EVO II Dual 640T Thermal drones, are weather resistant, including the controllers.
- Drones require trained pilots to get the best operational and safety performance from the aircraft. Pilots may also need to be trained as Marine Mammal Observers (MMOs) to aid in species identification and regulatory regimes. Alternately, MMOs may need to be trained as competent drone pilots.
- Drones can be subjected to attacks from bird species, causing loss of flight control and possible crash landings at sea.
- Drone flight limes are limited by battery life and regular landings are needed to replace batteries.

Vendor Equipment Reviews

Towed PAM

Sercel QuietSea

Conventional PAM (Passive Acoustic Monitoring) systems are composed of a separate PAM antenna at sea with a limited number of sensors. The Sercel system is an innovative PAM system integrated in the seismic acquisition system: for low-frequency detection, it is using up to 384 seismic hydrophones of the streamer sections and for high-frequency detection, up to 120 dedicated broadband hydrophones also integrated in the streamers (QuietSea Streamer Modules) and below impulsive source array (QuietSea Auxiliary Modules, intended to improve detection in the vicinity of the source).



This integrated system offers numerous advantages: good coverage of the exclusion zone (centered on the source) by many sensors, high precision of the marine mammal localization (by the mean of sensors positioning in real-time), reduction of the risk of accidents during deployment, easy retrieval and operation (no separate antenna at sea) and thus, significant reduction of operational downtime and possible equipment replacement costs.

Assessment Criteria	Comment
Availability	Immediate. Will be pre-installed on the survey vessel prior to mobilisation for the survey
Prior deployment histories and reported effectiveness.	Has been used worldwide since 2016 with demonstrated success.
Practicality of implementation	Easily implemented based on historical use
Safety & environmental concerns	No concerns raised
Cost versus benefit	Will be incorporated in survey activity budget. Benefits outweigh costs.

References

- https://www.sercel.com/products/pages/quietsea.aspx
- https://www.sercel.com/products/Lists/ProductSpecification/QuietSea_brochure_Sercel_EN.pdf

Seiche Towed PAM

The base system comprises a towed array cable, deck cable, electronic processing unit including data acquisition devices, computer and headphones. The physical spacing of hydrophones and the frequency response of the system provides optimal performance and the acoustic detection of species of interest. PAMGuard software is integrated as standard. Equipment is provided with 100% back-up.

The system can be readily configured to suit the project requirements. The array section includes either four or six hydrophones arranged in pairs of calibrated hydrophone channels with low noise preamplifiers, identical sensitivity and frequency response. An array depth sensor is integrated at the rear of the array. A 230 m heavy tow cable with a detachable 20-25 m array section may be preferred for harsh environments. A networked PAM station is available to enable the PAM system to be monitored and controlled from the most convenient location onboard.

Assessment Criteria	Comment
Availability	Systems available with advanced shipping notice ex-UK and USA
Prior deployment histories and reported effectiveness.	Many years of prior use on seismic surveys worldwide
Practicality of implementation	Practical for use on support or supplementary PAM vessels. Survey vessel will have Sercel QuietSea fitted.
Safety & environmental concerns	No significant concerns other than the need for additional in-water equipment deployment and recovery, with the potential for entanglement and personnel exposure to deck equipment.
Cost versus benefit	Cost of equipment and additional PAM operator personnel is not prohibitive

References

- https://www.seiche.com/underwater-acoustic-products/acoustic-sensors/towed-pam/
- https://www.seiche.com/wp-content/uploads/2022/10/Seiche-Data-Sheet-Towed-PAM.pdf

Tethered PAM

Sercel Buoy Solution

Automated & Real-time detections via QuietSea algorithms

- Connected via IRIDIUM or 4G
- Harbour porpoise detector available
- Other species under development
- Raw data available for post-processing 〉 High level integration
- Detections are visible on the seismic vessel

Specifications

- Diameter: 1200mm
- Height: 2182 mm
- Weight: 210 kg (without the anchoring)
- Navigational Aid: LED Lantern, AIS Transponder, Real Time GPS tracker
- Telemetry: AIS, Iridium, 4G and Wi-Fi as needed and relevant.

Assessment Criteria	Comment
Availability	Sercel are currently building 4 x buoys for potential deployment as a trail in the Regia 3D survey area.
Prior deployment histories and reported effectiveness.	No history of use during seismic surveys. One prototype buoy in use in the UK for Harbour Porpoise detection trials.
Practicality of implementation	Potentially expensive to ship from Europe and deploy/recover in Victorian waters due to size and weights..
Safety & environmental concerns	None
Cost versus benefit	Unknown cost element but potentially advantageous pricing due to the CGG/Sercel business association and beta test status of the units.

Seiche Modular Buoy Systems

The Modular Buoy Detection System uses Passive Acoustic Monitoring (PAM) to provide a flexible approach to monitoring vocalising marine mammals and underwater noise.

The system consists of a remote moored buoy with a multi-element detachable hydrophone array suitable for mitigation and anthropological noise capture. Signals can be captured up to a sampling rate of 500 ks/s at 16 bit depth. The system can be configured to record the data locally within the buoy or remotely at the receiving station, whichever is required.

Further options include:

- Remote on/off via Radio Frequency (RF) link (868 Mhz)
- Real-time remote monitoring of audio via RF link (2.4 Ghz)
- Truly global remote control via Iridium
- Truly global GPS via Iridium

Telemetry

The buoy has the necessary components to transmit signals received at the hydrophone (PAM data) to the survey vessel, as well as transmitting position information (from an Iridium GPS receiver on board the buoy).

- The telemetry system for the PAM data operates in the 2.4 GHz band
- The position telemetry system operates in the 1–2 GHz band
- The remote power control system operates in the 868 MHz band

Hydrophone

Due to the modularity of the array sections, Seiche can provide custom-made array sections to suit specific needs. However, we also offer an off-the-shelf option with the following specification:

- • Hydrophone element H1
- • Super Broadband 10 Hz to 200 kHz (3 dB points)

Assessment Criteria	Comment
Availability	Unknown availability. No response received from Seiche at time of writing.
Prior deployment histories and reported effectiveness.	Unknown for seismic surveys but many commercial deployments quoted.
Practicality of implementation	Use of RF audio data telemetry, rather than satellite-based, may prove problematic due to distances involved between deployed locations and survey line lengths. However, if the effective operating range is beyond the required detection range it may be possible to deploy an array of buoys to provide continuous coverage around the survey area.
Safety & environmental concerns	None
Cost versus benefit	Unknown cost but likely not prohibitive for the project.

References

- https://www.seiche.com/wp-content/uploads/2022/10/Seiche_Modular-Buoy-Detection-System-Data-Sheet.pdf
- https://www.seiche.com/modular-buoy-systems/
- https://www.seiche.com/underwater-acoustic-products/specialist-systems/satellite-remote-pam/
- https://www.seiche.com/wp-content/uploads/2020/01/Eco-2015-Remote-PAM-new.pdf

JASCO Ocean Observer Buoy

A compact and powerful system for real-time passive acoustic monitoring (PAM), acoustic data collection, and non-acoustic measurements. Based on JASCO's OceanObserver electronics suite, it records data to removable memory with two classes of real-time telemetry options:

- Stream full bandwidth data via Wi-Fi, cellular, or VHF (short range, lifetime of days or weeks)
- Transmit processed information products via Iridium (long range, lifetime of weeks or months)

Collects data from acoustic and non-acoustic sensors and supports a variety of sensor and array options. Transmits full bandwidth data to nearby vessels or shore stations or performs in situ processing to transmit results via satellite, including marine mammal calls and clicks, pitch tracks for validation, vessel noise quantification, and ambient noise statistics. Typically fitted with up to three hydrophones, GPS, AIS, and Wi-Fi. Can be moored or free drifting.

Specifications

Mass:	45 kg , 99.3 lbs
Dimensions:	(D × H*)24 × 77 in [610 × 1956 mm]
Main platform:	JASCO Ocean Observer electronics suite
Local telemetry:	Wi-Fi, cellular, VHF
Global telemetry:	Iridium
Acoustic sensors:	Omnidirectional hydrophones
	Directional sensors
	Small linear or spatial arrays

Hydrophone suspension:	Straight cable or inverse catenary
Battery pack:	96 alkaline D-cells (internal)

Assessment Criteria	Comment
Availability	Unknown
Prior deployment histories and reported effectiveness.	Unknown
Practicality of implementation	Similar in size and functionality to the Seiche buoys, the Jasco units would be no less practical to deploy and operate. The use of satellite telemetry to transmit "in-situ processing" needs to be clarified as far as time lag between detection and receipt of notification at the monitoring station. Otherwise the use of VHF telemetry to the survey (or ancillary) vessel limits the real-time detection range to around 30km.
Safety & environmental concerns	None
Cost versus benefit	Costing has yet to be confirmed but it is unlikely to be prohibitive for the project.

References

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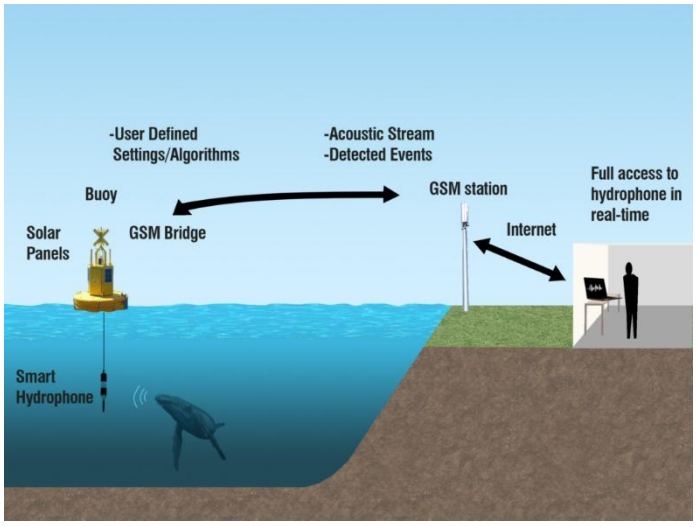
- https://www.jasco.com/observerbuoy-06m
- https://static1.squarespace.com/static/52aa2773e4b0f29916f46675/t/5df143c8bfd22d29920ce88e/1576092617380/Datasheet_OCEANOBS-0.6M.pdf

PAM Smart Buoy

A Passive Acoustic Monitoring (PAM) Buoy offers real-time acoustic monitoring with a smart hydrophone, environmental data buoy and global system for mobile (GSM) communications bridge. When deployed in the ocean, the PAM Smart Buoy captures sounds from the surrounding environment and facilitates real-time acoustic data transmission.



Ocean Sonics' icListen Kayak new architecture is compact, energy efficient and scalable. This Smart Hydrophone has a wide dynamic range for high quality data & long term stability. This all-in-one instrument processes data while streaming HD acoustic data in real time. It is configured to keep all raw data or keep only data of specific frequency set by the user.

Key Features of Ocean Sonics icListen Kayak Hydrophone

- Passive Acoustic Monitoring (PAM)

- Bandwidth 10 Hz to 200 kHz
- 24-bit Resolution
- Very High Sensitivity
- Ultra Low Noise Sensing Element
- Extra Low Power, 0.2W
- Scalable – can be used in arrays of up to 100 hydrophones

Assessment Criteria	Comment
Availability	Unknown. No response received from vendor enquiry. Vendor based in Cyprus, so potentially an issue.
Prior deployment histories and reported effectiveness.	As above, no response received.
Practicality of implementation	This system utilises GSM data telemetry, so not practical outside GSM coverage areas.
Safety & environmental concerns	None
Cost versus benefit	Unknown cost of equipment of shipping.

Unmanned Vessel PAM

Autonaut USV

The AutoNaut is an uncrewed surface vessel (USV) propelled forward by the motion of the waves. Patented Wave Foil Technology enables long-term mission duration. Powered entirely by renewable energy and with no requirement for offshore personnel the AutoNaut significantly reduces costs and safety risks at sea. Solar energy powers an extensive range of sensors and equipment for 24/7 operation.

- Uncrewed operation: no offshore personnel at risk
- Powered by renewable energy: no fuel costs, no emissions
- Mission duration of several months
- Station keeping within 25 metres
- Storm-proven robustness
- Simple deployment/recovery from vessel or slipway
- Flexible payload and sensor capacity
- Data transfer

SENSORS

Seiche analogue array

The Seiche analogue array incorporates two hydrophone sensors and a depth gauge. It is 30m in length and has been designed for minimal flow noise and simple deployment.

Seiche digital thin line array

This high-sensitivity acoustic array is fully configurable in real-time. Eight digital hydrophone sensors are incorporated within the 25metre array.

Additional sensors

Additional sensors can also be incorporated for supplementary meteorological and oceanographic data as well as visual imaging.

Assessment Criteria	Comment
Availability	Unknown
Prior deployment histories and reported effectiveness.	Unknown
Practicality of implementation	Unknown

Safety & environmental concerns	None
Cost versus benefit	Unknown

OceanObserver on the Slocum Autonomous Underwater Glider

JASCO Applied Sciences has teamed with Teledyne Webb Research to integrate JASCO's OceanObserver™ intelligent acoustic monitoring system into the Slocum underwater glider. The buoyancy driven Slocum glider gathers data as it rises and dives in the water to propel itself forward. The Ocean- Observer system onboard records the underwater sounds while running automated cetacean detectors that flag possible marine mammal calls or other events of interest. The glider surfaces at specified intervals to send the flagged events to shore, where analysts can review and confirm the detections. All data are recorded on 6 TB of removable SD memory cards for full analysis upon retrieval.

Customized Detections and Processing

JASCO's experienced bioacousticians tailor the detection algorithms to the species and call types of your choice. Concurrent detections are associated to provide con-textual information for onshore analysts. During times of high glider self noise, the processing algorithms can be disabled to minimize false alarms, reducing personnel workload and maximizing satellite bandwidth use.

Intelligent Communications

The processed events are prioritized so that important events, like detections of species at risk, are sent first, making best use of the communication window. The event information is then distributed by email. The durations of the event time windows vary, and events are aggregated as ensembles, to maximize the contextual information available to analysts.

Detailed Detection Contours

The acoustic data, and even spectrogram images, are too large to be sent by satellite. So the Observer converts the detection spectrograms into frequency contours that are small enough to be relayed via satellite. Superior to pitch tracks, the contours give a richer representation of the data for easier, more accurate species detection and identification.

Customized Onboard Processing

- Marine mammal call detectors for baleen whales, toothed whales, and pinnipeds
- Various call types, including moans, whistles, and clicks
- Seismic pulse detection and quantification
- Ambient sound level calculations

Communication

- Telemetry via Iridium (RUDICS) satellite
- Detection information distributed via email to end users

Technical Specifications

Acoustics
Sample rate: 8–512 ksps
Resolution: 24 bits
Hydrophone: Customizable options from various manufacturers.
Sensitivities and frequencies tailored to your needs.

Physical
Mass: 55–70 kg 122–155 lbs
Length: 1.5 m 59.1 in
Hull diameter: 220 mm 8.7 in
Maximum depth: 1000 m
Horizontal speed: 0.35 m/s (0.68 knots) average
Up to 0.5 m/s (1 knots) with full drive

Assessment Criteria	Comment
Availability	Slocum Gliders are in use worldwide for various applications and availability is not expected to be an issue.
Prior deployment histories and reported effectiveness.	Has been used for whale detections previously. Unknown for use during a seismic survey.
Practicality of implementation	System can be deployed from the survey or a support vessel by one or two persons.
Safety & environmental concerns	None
Cost versus benefit	Unknown cost of implementation.

Camera-Based Systems

Seiche Smart Visual Detection System (SVDS)

The SVDS camera system consists of: High-Definition Video (HDV) and Long-Wave Infrared (LWIR) & thermal imaging camera pair, with on-board processing and storage. Each unit is housed robustly for maritime use. Various configuration options are available to ensure optimal visual coverage and ranges up to 360 degrees.

The new generation camera system builds on decades of experience of visual and underwater acoustic maritime monitoring combined with technologies originally found in self-driving vehicles. The cameras are more robust, compact, and lighter, making them easier to ship, and install, thereby reducing operational costs. Boasting lower power consumption and 1000x more powerful computing than the previous generation systems, the new cameras are capable of real-time on-board automated detection. For improved data security our cameras have built-in encrypted SSD storage to allow continuous data capture even during network interruption or observer workstation down time. The improved pan and tilt system allows for user configurable automatic scanning of an area up to 360 degrees.

General

- Modular customisable configurations
- Optional mounting systems
- Portable system deployed in hard case
- Fully marinised waterproof housing IP68 (pending certification)
- Hydrophobic glass
- Operating Temperature Range: -30°C to 70°C (pending certification)
- Shock: 1,500 g @ 0.4 msec (pending certification)
- Operating Voltage 19-30 VDC / supply voltage AC 110-240V
- Power consumption: Low power mode 20W Nominal 35W, Max Peak 135W
- On board GPU image processing 32GB on system storage
- On board Dual 4TB storage, main and encryption backup
- Networked removable storage up to 100TB
- Wi-Fi & satellite connectivity available on request
- GigE connectivity

- External triggers available 3.3V, 5V, 12V, serial optional protocol upon request
- Optional Workstations
- Built in 48 Channel GPS
- IMU orientation +/- 0.1°
- 360-visual scan with PTU

Software

- Mysticetus software compatibility
- Fast logging
- Auto detection (customised training dependant)
- Radar map visualisation with built in antenna for target location
- Automatic ranging – accurate target range estimation

RGB Camera: Standard RGB camera

(Optional upgrades):

- Sensor: 1/2.3 CMOS SONY IMX392
- Resolution: 2.4MP
- Array Size: 1920x1080
- Pixel Size: 3.45µm x 3.45µm
- Dynamic Range: 48dB
- Shutter Type: Global Shutter

Thermal camera:

- Thermal sensitivity: <40mK
- Pixel Pitch: 12 µm
- Full Frame Rate: 60 Hz
- Array size: 640 x 512
- f-number: 1.0
- Continuous Electronic Zoom: 1X to 8X zoom
- Spectral Range: Long-wave Infrared; 7.5 µm – 13.5 µm
- Scene Dynamic Range: to 140 °C (high) to 500 °C (low)

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Assessment Criteria	Comment
Availability	TBA

Prior deployment histories and reported effectiveness.	TBA
Practicality of implementation	The only limitation could be the ability to mount the camera in a position of unobstructed 360 degree visibility due to ship or USV masts.
Safety & environmental concerns	None
Cost versus benefit	TBA

WhalePOD

Introduction

WhalePOD is a bespoke thermal and colour camera system integrated with artificial intelligence, designed for automatic detections, ranging, and an intuitive software interface tailored for marine mammal detection and compliance reporting. What sets WhalePOD apart from other visual detection systems is our distinct camera platform design and approach. As we developed WhalePOD's camera platform to be deployed on vessels, our emphasis has been on achieving both long-range and high-speed panoramic coverage, day and night.24/7 automated detection of whale surfacing at sea.

Last month, we concluded a shore field trial of WhalePOD during the northern migration at North Stradbroke Island. The preliminary results are outstanding. To illustrate, during a night shift on 11 July, between 1 am and 4 am, I observed 40 whale surfacing events using our thermal camera, at distances ranging from 2 km to 4 km. In daylight, whale blows were visible from well over 10 km away. The system's ability to comprehensively cover an area without compromising detail was crucial in capturing these brief surfacing events. (*pers comms - Aqeel Akbar, Founder & Director, Thaum*)

Description

WhalePOD is an AI-centric product co-designed with regulators, industry, and researchers.

WhalePOD seeks to define a new gold-standard for ESG monitoring. We are aligning business outcomes with responsible stewardship and sustainability.

Feasibility Study: Awarded AUD $100k grant from NOPSEMA and AAD via BRII Priority Sectors, January 2020

ON Accelerate 7: WhalePOD completes Australia's premier deep-tech accelerator run by CSIRO, Feb-May 2023

Thaum, a startup team from the ANU Research School of Physics deep-tech incubator Momentum, is commercialising WhalePOD – a technology to enable a new age of industrialisation where environmental conservation and scientific contribution is an outcome of business, not a burden.

WhalePOD's disruptive vision capabilities help offshore industries implement harm mitigation strategies to protect marine mammals.

The core platform technology is a high-performance, panoramic, thermal and colour camera that uses artificial intelligence for 24/7, all-weather, and long-range detection of objects of interest in harsh marine environments.

Assessment Criteria	Comment
Availability	Thaum has indicated likely commercial availability in early 2024
Prior deployment histories and reported effectiveness.	Currently under testing for commercial deployment
Practicality of implementation	Unknown due to early stages of commercialisation
Safety & environmental concerns	None
Cost versus benefit	Unknown but unlikely to be cost prohibitive for the potential benefits of system deployment.

Aerial Drones

DJI Matrice 30T (thermal)

The new DJI Matrice 30 Series is DJI Enterprise's flagship drone that fits in a backpack. It integrates multiple high-performance sensors into one single camera payload, controlled with an ingenious redesigned remote control and runs on upgraded Pilot 2 software, which significantly improves the flight experience.

The M30 model offers much more power, endurance and capability for rugged professional uses, while its size makes it ideal for easy transportation and fast setup.

The DJI Matrice 30 series enterprise drone is a weather-proof, relatively portable UAV that offers a 48 MP stabilized camera with up to 200x hybrid zoom, thermal imaging camera, laser rangefinder, and a low-light optimized FPV camera. It comes with a new rugged DJI RC Plus controller. On top of that, an optional DJI Dock is able to automatically operate up to 7km away and charge the drone quickly when needed.

The M30 series comes in two versions, the M30 and the M30T. (Both versions are using a fixed payload system) The only difference is that the M30T also includes a thermal imaging camera. The use cases for this drone range from equipment inspection to seek-and-rescue types of missions.

The M30 model integrates a 48 megapixel 1/2" CMOS sensor zoom camera with 5×~16× optical and 200× digital zoom, a 12-megapixel wide-angle camera, 8k photo 4K/30 fps video resolution, and a laser rangefinder that can give the precise coordinates of objects up to 1,200 meters away.

Despite having integrated payloads, the Matrice 30 Series will continue to support PSDK integration for third-party payload development, including spotlights, loudspeakers, gas detectors, parachutes, and more.

It's clear DJI wants to revolutionize drone operations by extending flight time and use, regardless of the environment. When equipped with two TB30 intelligent batteries the new Matrice 30 Series drones offers up to 41 minutes of flight time. The self-heating feature of the TB30 batteries helps the M30 stay functional in extremely cold environments.

As part of the M30 Series kit, DJI launched the BS30 intelligent battery station, which can charge 4 pairs of the TB30, at three different levels: standard, storage, and ready to fly. Each level maintains differing charge capacities:

- **Standard:** Charges batteries to 90% in 30 minutes.
- **Storage:** Maintains batteries at 50% for a longer lifespan and overall health.
- **Ready to Fly:** Maintains full charge for immediate hot-swap during operation.

Key Features:

Wide Camera

- Equivalent Focal Length: 24 mm, DFOV: 84°
- 12 MP 1/2" CMOS Sensor
- Video Resolution: 4K/30fps
- Zoom Camera
- 48 MP 1/2" CMOS Sensor
- 5×-16× Optical Zoom
- 200× Max. Hybrid Zoom
- Photo Resolution: 8K
- Video Resolution: 4K/30fps

Thermal Imaging Camera

- Equivalent Focal Length: 40 mm
- Resolution: 640×512
- Frame Rate: 30fps
- Measurement Accuracy: ±2°C or ±2%
-
- Laser Rangefinder
- Range: 3 m - 1200 m
- Accuracy: ±(0.2m+D×0.15%)

Powerful Flight Performance

- A balance of power and portability delivers higher operational efficiency. Max Flight Time: 41-min
- Wind Resistance: 15 m/s
- Service Ceiling: 7000 m
- Max Speed: 23 m/s

Environmental Adaptability

- With IP55 protection, the M30 can easily handle adverse weather and temperatures ranging from -20° C～50° C.

FLAGSHIP PERFORMANCE

HYBRID VISUAL, THERMAL, LRF PAYLOAD CAMERA

Assessment Criteria	Comment
Availability	Available from several Australian vendors or direct from DJI
Prior deployment histories and reported effectiveness.	No available data on use for whale sighting missions but demonstration video footage of night search and rescue of people in the ocean would suggest whales would also be sighted using the thermal image camera when at the sea surface.
Practicality of implementation	Should be easily implemented with flights based to and from the survey vessel helideck. Need to check the potential for registering moving platform automated Return To Base (RTB) in the event of communications failure.
Safety & environmental concerns	None identified
Cost versus benefit	Relatively inexpensive drone purchase price at ~AUD18K. Cost of an additional contract drone pilot, if required, including bunk space & meals, may prove more costly and logistically restrictive.

Autel EVO II Dual 640T Enterprise

The Autel Robotics EVO 2 Dual 640T V3 is one of the most compact and advanced thermal drones on the market. Featuring a 640x512 radiometric thermal sensor and 50MP RGB lens with 16x digital zoom - it is easy to observe distant targets in amazing detail. The system uses a new image processing algorithm making thermal imaging details clearer and more discernible than competition with the similar resolution and hardware. With a 38-minute flight time and 9.3-mile transmission range - the EVO 2 Dual 640T V3 is a powerful tool professionals can use to get the job done right!

Thermal Camera

The thermal camera is equipped with a 13mm focal length lens and the ability to record at 640 x 512 resolution at 30 Hz. In dangerous situations, you can keep the drone back as you use 16x digital zoom with 4x lossless zoom to find what you're looking for. The V3 thermal image is designed to better display discernible differences and detail. Keep reading to view the array of thermal modes and features the EVO II Dual 640T offers, in addition to its thermal detection, recognition, and identification ranges:

- Central temperature measurement: View real-time temperatures in the center of the remote's display.
- Spot temperature measurement: Tap the remote's display and view an object's temperature in real time.
- Regional temperature measurement: A dynamic view of average, minimum, and maximum temperatures.
- Ten thermal color palettes: White Hot, Cold and Hot, Rainbow, Enhanced Rainbow, Ironbow, Lava, Arctic, Searing, Gradation, and Heat Detection.

- Picture-in-picture display mode: View visual and thermal imaging at the same time.
- Temperature alarm: This will monitor a set temperature in real time and set off an alarm if reached.
- Isotherm: Set a temperature range and the system will detect any object in view that's within that range.
- Image enhancement: Real-time adjustment of the thermal image brightness, contrast, and details; the system will highlight any object within the target temperature.
- Infrared thermal analysis tool: The IRPC tool quickly imports images, edits and analyzes temperature measurements, and generates detailed reports for sharing and collaboration.
- Detection range: Detects a person up to 0.34 miles away, an SUV from up to 1.03 miles away, and a truck from up to 1.8 miles away.
- Recognition range: Recognize if an object is a person from up to 443' away, an SUV from 0.26 miles away, and a truck from up to 0.45 miles away.
- Identification: Identify a person from up to 223' away, an SUV from up to 682' away, and a truck from up to 0.22 miles away.

Visual Camera

Inspections and rescues are not the only things you can do with your EVO II Dual 640T. The 50MP visual camera is capable of capturing stunning professional footage at 4K HDR resolution. With its 0.8" RYYB CMOS sensor instead of a traditional RGB sensor, the larger surface area delivers a high level of detail in high-contrast lighting conditions. Dynamic tracking shots are possible with the quick focusing of the PDAF+CDAF system, and low-light scenes will be clearer thanks to the moonlight algorithm 2.0's increased noise suppression.

Smart Controller V3 with SkyLink 2.0

Utilizing SkyLink 2.0, the Smart Controller V3's built-in 7.9" display can receive HD video transmission in flight from up to 9.32 miles away (or QHD quality from up to 0.62 miles away). Reception is engineered to be stable and interference-free, thanks to triple-band (900 MHz, 2.4 GHz, and 5.8 GHz) frequency hopping. Thanks to the display's 2000 cd/m² brightness, you can easily view the drone's footage, even in direct sunlight. You're not restricted to flying on sunny days, though. The Smart Controller V3 can withstand -4 to 104°F temperatures and is IP43-rated for all-weather performance.

360-Degree Obstacle Avoidance

While in flight, an array of 19 sensors, including 12 visual sensors, the main camera, ultrasound IMUs, and more, can build a 3D map of the drone's surroundings and plan a clear path to its destination in real time.

Additional Features

- Foldable design
- Can deploy and take off in under a minute
- Up to 38 minutes of flight time
- Up to 39 mph of maximum wind resistance
- Maximum flight speed up to 45 mph

- Maximum payload up to 2 lb
- Can be flown even if the firmware and app are not fully updated
- Without built-in fly zones, nothing prevents you from taking off when needed
- The EVO II Dual 640T is not under the United States ITAR (International Traffic in Arms Regulations)
- Compatible with optional Live Deck 2 for broadcasting live mission intel

Assessment Criteria	Comment
Availability	Available from at least one Australian vendor or from Autel based in Honk Kong or Shenzen.
Prior deployment histories and reported effectiveness.	No available data on use for whale sighting missions but demonstration video footage of night search and rescue of people in the ocean would suggest whales would also be sighted using the thermal image camera when at the sea surface.
Practicality of implementation	Should be easily implemented with flights based to and from the survey vessel helideck. Need to check the potential for registering moving platform automated Return To Base (RTB) in the event of communications failure.
Safety & environmental concerns	None identified
Cost versus benefit	At ~ AUD$10K the Autel 640T is less costly than the DJI M30T but lacks some of the DJI technology, like laser ranging and 200X image zoom. Cost of an additional contract drone pilot, if required, including bunk space & meals, may prove more costly and logistically restrictive.

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REGIA
Marine Seismic Survey

Environmental Performance Tables

Appendix G1: REG-EP-035-G1

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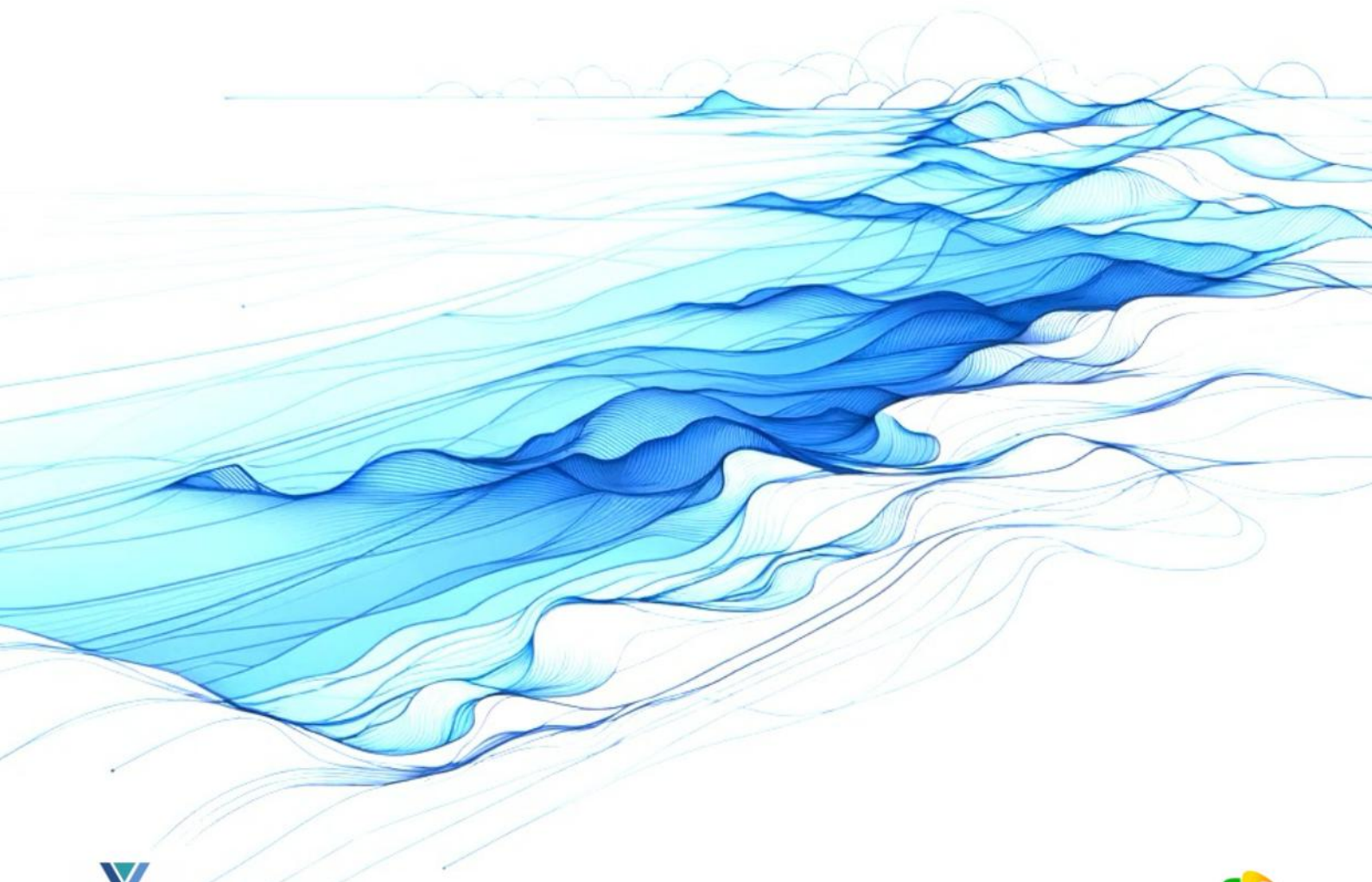

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Table of Contents

1 Environmental Performance Tables 3
1.1 Management of the Activity (All Aspects) 3
1.2 Accidental Release of Materials or Waste Overboard 6
1.3 Collisions with Marine Fauna 7
1.4 Introduction of Marine Pest Species 8
1.5 Accidental Release of Fuel 9
1.6 Planned Discharges and Atmospheric Emissions 12
1.7 Physical Presence 13
1.8 Underwater Sound 15
1.9 Light Emissions 28
2 Document Control 29
Annex 1: Public Comment 30
Annex 2: Objections and Claims Raised from Consultation 31

1 Environmental Performance Tables

1.1 Management of the Activity (All Aspects)

Environmental Performance	
Environmental Performance Outcomes	**Measurement Criteria**
The activity will have constraints and limitations in place such that all environmental aspects are not created for more than 90 days.	Operational logs and activity reports confirm that all activities were completed within a 90-day period, with records verifying that the activity was conducted within the activity limitations. Audits and inspections conducted throughout the activity show measures in place to manage impacts and risks performed as expected and deviations were corrected within procedural timeframes.
The activity is managed to ensure environmental impacts and risks remain within temporary, reversible, small-scale, and low-intensity impacts.	
The effectiveness of impact and risk management measures is continuously monitored and adapted as necessary to maintain compliance with the implementation strategy.	
The activity is conducted in a way that prevents unmitigated financial loss to affected persons and ensures social and cultural values are protected.	
The community and relevant persons are informed about the operational details of the activity and relevant persons objections and claims are promptly assessed.	Consultation records confirm that operational details were shared with the community and relevant persons, with documented assessments and responses for any objections and claims received within specified timeframes.
Social, cultural, and economic features are protected, sustaining their value for people and communities.	Behavioural observation reports, audits, verified incident reports, monitoring records and independent evaluations confirm no disruption to critical life-cycle behaviours of identified species, supported by documented mitigation measures. Compensation for verified income losses, such as reduced catch volume or displacement, is validated via claims assessments, economic desktop study, fish stock data, and spatial access mapping.
The activity is conducted such that environmental impacts and risks remain within the range assessed as medium or lower, with mitigation measures in place and functioning as intended.	All mitigation measures identified are implemented and function as intended, with no incidents indicating that residual impact exceeds the “medium” level assessed in the risk register.

Control Measures	**Environmental Performance Standards**	**Measurement Criteria**
CGG Technical Operations Manager	Maintains oversight of the activity and implementation of EPOs and EPSs within the EP through daily reports.	Operational logs, daily HSE checklists, and meeting records confirm that the CGG Technical Operations Manager maintained oversight of vessel performance per the Sail Line Plan, conducted daily HSE checks, and attended daily operational meetings and toolbox talks,
	Ensure that seismic acquisition practices during the survey reflect the planning and alignment outcomes of the ‘Acquire	

Control Measures	Environmental Performance Standards	Measurement Criteria
	Seismic on Paper' exercise, including any corrective actions identified during the simulation.	with environmental matters documented and tracked for compliance.
	Verifies that the project vessels are performing as per the agreed contract and executing the seismic in accordance with the agreed (and varied) Sail Line Plan.	
	Continually monitor vessel HSE performance to ensure that the EP commitments are implemented.	
Quality Control and Reporting Representative	Ensure contracted vessels operate within the Sail Line Plan boundaries and sequences throughout acquisition.	GPS tracking data and activity logs confirm vessel movements complied with Sail Line Plan boundaries and sequences, with deviations identified, justified, and rectified in accordance with the operational procedure.
Environment Officer	Environmental incidents are documented, assessed, and responded to within required timeframes, with corrective actions implemented to prevent recurrence and minimise environmental harm in accordance with the Implementation Strategy.	Incident logs confirm all environmental incidents were recorded within 24 hours, with associated assessment outcomes and records of corrective actions implemented to minimise or prevent environmental harm.
	Continually monitor daily reports, weekly audit results, and incident reports, for ongoing compliance of the activity with the environmental performance outcomes and standards in this document.	
	Immediately initiate an inspection and/or corrective action upon identification of a non-compliance with any environmental performance outcome or standard.	
	Assessment of merit of an objection or claim is completed within 48 hours and any environmental protection requirements are implemented as soon as practical.	
Consultation Management System	Ensure relevant persons are provided with timely, accessible information that enables meaningful consideration of the activity	Communication logs, email records, and copies of notifications sent.
	All relevant person-related information, engagement plans, consultation activities, and complaints/feedback are accurately and completely documented and recorded.	Audit reports demonstrating the completeness and accuracy of documentation and records.
	Maintain comprehensive and up-to-date documentation of all processes, procedures, and records.	An audit shows compliance with documentation requirements and timely updates.

Control Measures	Environmental Performance Standards	Measurement Criteria
Environment Management System	Ensure all employees receive an activity specific induction on the environmental performance required for the activity and their environmental responsibilities.	Training records indicating that of employees and contractors have completed required induction.
	Establish clear communication channels for reporting environmental performance and incidents.	Daily and monthly reports demonstrate timely and accurate dissemination of information.
	Emergency response procedures are tested and shown to be capable of containing and mitigating potential environmental impacts in accordance with OPEP/OSMP requirements.	Pre-survey deployment exercises confirm that response resources can be deployed within response timeframes specified in the OPEP, with records showing containment of a simulated release scenario within acceptable limits.
	Conduct weekly audits to assess the effectiveness of the environmental performance outcomes and standards, the activity limitations, the implementation strategy and identify areas for improvement.	Audit reports showing completion of scheduled audits and implementation of corrective actions.
	Perform annual management reviews to evaluate the environmental performance outcomes and standards and make necessary improvements.	Meeting minutes and action plans from management reviews demonstrating continuous improvement.
	Ensure that suppliers and contractors comply with the organization's HSE requirements.	Supplier audits and compliance reports showing adherence to EMS standards.
Sound Source Verification Buoy Location Procedure	Anchored sound source verification buoys will only be deployed in locations where no mapped features of ecological significance (e.g. sensitive benthic habitats or protected seabed features) are present, as determined by available spatial data prior to deployment.	A record of spatial screening (e.g. GIS layer overlay or pre-deployment checklist) is maintained and available for audit.
	All components of the SSV buoys, including anchors, clump weights, chains, and associated equipment, will be fully recovered following deployment. No equipment will be intentionally left on the seabed.	Deployment and recovery logs document the quantity and type of equipment retrieved.

1.2 Accidental Release of Materials or Waste Overboard

Environmental Performance	
Environmental Performance Outcomes	**Measurement Criteria**
No loss of materials or wastes overboard.	Operational logs, waste management records, and environmental audits confirm secure containment of all materials and wastes, with no recorded incidents or observations of overboard loss throughout the activity.
No death or injury to fauna, including listed threatened or migratory species, from the activity.	Verified incident reports, monitoring records, and environmental audits confirm zero observed or reported instances of fauna injury or mortality directly linked to the activity, with specific attention to listed threatened or migratory species.

Control Measures	**Environmental Performance Standards**	**Measurement Criteria**
Streamer Recovery Units	The streamers will have recovery units fitted to prevent benthic disturbance in the event of loss.	Inspection and equipment logs confirm that recovery units are securely fitted to all streamers, with documentation showing pre-deployment checks and maintenance records for functionality.
	Streamer tail buoys will be of a design that does not represent an entrapment risk to turtles or turtle guards will be used.	Design specifications and inspection records verify that tail buoys are either designed to avoid turtle entrapment or fitted with turtle guards, confirmed through pre-deployment inspections.
Consultation Management System	If a loss of equipment poses a risk to other marine users, they will be notified via VHF Channel 16 and the event will be reported to AMSA, within 2 hrs.	Communication logs and incident reports verify that VHF Channel 16 was used to notify marine users of equipment loss, with timestamped records of notification to AMSA within the specified 2-hour window.
Garbage Management System	All containers for waste that has the potential to be blown overboard will have covers.	Inspection records confirm that all waste containers are equipped with secure covers to prevent overboard loss, documented in pre-survey audits and verified by ongoing inspections.
	All waste gathered during the survey is transferred to shore for disposal and this is recorded in the Garbage Management Book.	Waste transfer records and entries in the Garbage Management Book confirm that all collected waste was disposed of onshore, with records detailing each transfer and disposal event.
Support Vessel	When safe, assist in the recovery of lost equipment or unintentional garbage discharges.	Support vessel logs and incident response records document all recovery actions for lost equipment or garbage, with details of timing, location, and conditions confirming safe recovery practices.

1.3 Collisions with Marine Fauna

Environmental Performance	
Environmental Performance Outcomes	**Measurement Criteria**
No death or injury to fauna, including listed threatened or migratory species, from the activity.	Verified incident reports, monitoring records, and environmental audits confirm zero observed or reported instances of fauna injury or mortality directly linked to the activity, with specific attention to listed threatened or migratory species.

Control Measures	**Environmental Performance Standards**	**Measurement Criteria**
Turtle Guards	Tail buoys designed so they do not represent an entrapment risk to turtles or turtle guards will be used.	Design specifications and inspection records confirm that tail buoys meet entrapment risk mitigation standards or are fitted with turtle guards, with photographic verification from pre-deployment checks to ensure compliance.
Marine Fauna Observers	Two MFO's will always be resident on the survey vessel and will maintain a watch during daylight hours.	POB logs and daily records confirm that two MFOs were continuously present on both the survey and spotter vessels during daylight hours, maintaining active watch and providing immediate notifications of any fauna observations to the Survey Environment Advisor and Officer of the Watch, as required by monitoring protocols.
	Two MFO's will always be resident on the spotter vessel and will maintain a watch during daylight hours (except during port calls, crew transfers, and bunkering activities).	
	Provide immediate notification of an observation to the Survey Environment Advisor and the Officer of the Watch.	
Operational Procedure	All vessels as part of the Regia MSS will comply with of EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with Cetaceans to reduce the risk of collision with marine fauna during the activity.	MFO records will confirm that vessels adhered to EPBC Regulations (Part 8)

1.4 Introduction of Marine Pest Species

Environmental Performance	
Environmental Performance Outcomes	**Measurement Criteria**
No introduction of a known or potential invasive marine species.	Ballast water management records, biofouling inspection logs, and environmental audits confirm adherence to marine pest prevention protocols, with no observed introduction or establishment of invasive marine species in the area, validated through post-activity desktop assessments.

Control Measures	**Environmental Performance Standards**	**Measurement Criteria**
IMS Risk Assessment Procedure	Vessels/immersible equipment must be assessed as 'low risk' prior to mobilisation to the operational area by a qualified IMS inspector.	Inspection records confirm that all vessels and immersible equipment received a 'low risk' rating from a qualified IMS inspector before mobilization, with assessments documented and verified by audit reports.
	If any project vessels, including the seismic vessel and spill response vessels, have an overseas 'last port of call,' a Pre-Arrival Report must confirm that the vessel meets ballast and quarantine requirements.	Pre-Arrival Reports document compliance with ballast and quarantine standards for vessels arriving from overseas ports, with supporting inspection records confirming adherence to invasive species protocols.
Anti-Fouling System	The vessel's fuel consumption should not be increasing overtime more than 5% above the baseline established after last hull inspection.	Fuel consumption logs confirm that usage remains within 5% of baseline levels set post-inspection, with any increases promptly reviewed to ensure anti-fouling system efficacy.
	The interval between hull cleanings should be at least twelve months, as recorded in the maintenance logs. Any deviation from this schedule will be investigated to assess the anti-fouling system's performance.	Maintenance logs verify that hull cleaning occurs on a minimum 12-month schedule, with documented investigations into any deviations, including assessment of the anti-fouling system's condition.

1.5 Accidental Release of Fuel

Environmental Performance	
Environmental Performance Outcomes	**Measurement Criteria**
No accidental release of fuel to the marine environment.	Incident logs and environmental audits confirm no recorded fuel releases into the marine environment during the activity, with secure fuel management practices documented throughout operations.
Maintain arrangements to respond to an unplanned release of fuel in accordance with the OPEP.	Response resources, mobilisation logs, exercise records, personnel competencies, and incident reports demonstrate that spill response arrangements remained in place and were capable of being activated and executed in accordance with the OPEP for the duration of the activity.
Maintain arrangements to monitor the effects of a release of fuel to the marine environment in accordance with the OSMP.	Monitoring equipment, deployment logs, sampling results, and reporting records demonstrate that environmental monitoring arrangements were maintained and capable of being implemented in accordance with the OSMP for the duration of the activity.
Respond to and clean-up any accidental release of fuel until termination criteria are met.	Clean-up efforts continue until no visible surface sheen remains, hydrocarbon concentrations in water and sediment meet regulatory thresholds, and an incident report confirming termination criteria are met is submitted.
Monitor any accidental release of fuel until termination criteria are met.	Monitoring continues until no visible surface sheen remains, hydrocarbon concentrations in water meet defined thresholds, and an incident report confirming termination criteria are met is submitted.

Control Measures	**Environmental Performance Standards**	**Measurement Criteria**
Consultation Management System	Pre-start notifications and ongoing communications will be made over Channel 16 to ensure collision avoidance.	Communication logs and radio transmission records on Channel 16 confirm that pre-start notifications and ongoing updates were consistently broadcast at designated intervals, with records demonstrating alignment with collision avoidance protocols as outlined in the Consultation Management System.
CGG Marine Assurance System	Ensures vessels have a documented Preventative Maintenance System (PMS) that provides a status on the maintenance of equipment as per the manufacturer's specification for maintenance procedures for navigation equipment.	Maintenance records and PMS documentation confirm that navigation and bunkering equipment have been maintained per manufacturer specifications, verified by periodic audits and pre-survey inspections.

Control Measures	Environmental Performance Standards	Measurement Criteria
	Pre-survey inspection confirms: Navigation and bunkering equipment maintenance is up to date. Each vessel has an up-to-date SOPEP in place. Vessel materials or equipment that have the potential for spill overboard are within contained/bunded areas. Vessel contractor has an HSE management plan, and that plan will be approved by CGG prior to survey commencement.	Inspection and audit reports confirm that all vessels pass pre-survey checks, including current SOPEP documentation, maintenance status, bunding of spill-prone equipment, and CGG-approved HSE management plans.
Vessel Bunkering Procedure	Pre-bunkering inspection confirms: Dry break couplings and bunkering hoses are in serviceable condition and certified for use. Tank inventories are taken prior to, during, and after transfer.	Inspection logs confirm dry break couplings and bunkering hoses are certified and operational; inventory records document volumes before, during, and after bunkering to verify containment integrity.
	No one fuel tank inventory will exceed 250 m^3.	
	Only commence bunkering operations in sea states less than 5m and wind speeds less than 35 knots.	Bunkering operation logs, including sea state and wind speed data, confirm adherence to environmental limits, with operations conducted only within safe parameters.
Support Vessel	Support vessel to communicate future vessel movements with other marine users.	Communication logs show documented notifications of vessel movements to nearby marine users, with confirmation of receipt where applicable to facilitate collision avoidance.
	Support vessels will accompany the seismic vessel during surveying operations to patrol and maintain a clear zone ahead of the vessel.	Patrol records and vessel positioning data confirm that support vessels maintained a clear zone ahead of the seismic vessel throughout surveying, as documented in patrol logs and GPS tracking.
CGG Technical Operations Manager	CGG will notify any incidents in accordance with the procedures in the OPEP and OSMP.	Incident logs and notification records confirm that all incidents were reported per OPEP and OSMP protocols, with time-stamped evidence of compliance.
	CGG will execute a comprehensive monitoring and evaluation strategy aimed at assessing the environmental fate and ecological consequences of any potential spill incident in strict accordance with the OPEP and OSMP.	Monitoring reports and evaluation summaries document environmental fate assessments and ecological impact analysis for any spill incident, consistent with OPEP and OSMP strategies.

Control Measures	Environmental Performance Standards	Measurement Criteria
	CGG will establish an oiled wildlife response strategy in collaboration with the relevant State government to safeguard listed and migratory species in the event of an oil spill, ensuring prompt and effective protection measures are in place.	Response planning documents and collaborative agreements with State authorities confirm a standby oiled wildlife response strategy, with records of readiness measures and personnel training to protect listed and migratory species effectively.

1.6 Planned Discharges and Atmospheric Emissions

Environmental Performance	
Environmental Performance Outcomes	**Measurement Criteria**
Planned discharges and atmospheric emissions comply with maritime law.	Discharge and emissions logs, along with compliance audits, confirm that all planned discharges and atmospheric emissions meet maritime law standards, with documented evidence of adherence to permitted levels and discharge protocols.

Control Measures	**Environmental Performance Standards**	**Measurement Criteria**
CGG Marine Assurance System	Pre-survey audits of the contracted vessels show compliance with MARPOL, COLREGS, and Marine Orders 21, 30, 31, 59, 70, 71, 72, 91, 95, 96,97, and 98.	Pre-survey audit reports confirm that all contracted vessels comply with MARPOL, COLREGS, and specified Marine Orders, with documented evidence of inspections and compliance for each standard.
	Ensure that bilge discharges from all vessels remain below 15 ppm during all discharge events.	Oil content meters and discharge logs confirm bilge water discharges did not exceed 15 ppm, with real-time alarms triggered and reviewed for any anomalies, as recorded in the Oil Record Book.

1.7 Physical Presence

Environmental Performance	
Environmental Performance Outcomes	**Measurement Criteria**
The activity is scheduled and located to avoid exclusion of commercial fishing from known, high-effort fishing areas for more than 90 consecutive days, with no resulting adverse effects on fish stock status.	Documented evidence of compliance with marine traffic management protocols, including the absence of reported or observed incidents of collision with other marine users, verified through regular logbook entries, GPS tracking records, and radar monitoring data.
As a result of the activity limitations and the adoption of the Otway Adjustment Protocol, no commercial marine user will be worse off because of the activity.	Reasonable claims assessments confirm compensation has been paid for any evidence-based decline in income (e.g. catch volume or displacement) attributable to the activity, validated through pre- and post-activity economic desktop study, fish stock data, and spatial access mapping.

Control Measures	**Environmental Performance Standards**	**Measurement Criteria**
Consultation Management System (CMS)	Marine users are informed in a timely manner such that conflicts or incidents with the survey vessels are avoided, as verified by absence of marine user complaints or navigation incidents.	Communication logs confirm that marine users were identified and informed in compliance with maritime law, with documentation showing consistent outreach to stakeholders.
	The forward plan for the survey is communicated to fishers through the agreed on-water communications plan.	Notification records verify that the survey plan was communicated to fishers as per the agreed communications plan, with evidence of timing and content of messages shown in full text copies of the correspondence.
	The status of the claims process and how to make a claim for compensation are clearly communicated to all commercial fishers in the region before the survey starts.	Documentation of notifications, emails, and/or meetings confirms that all commercial fishers were informed of the claims process and compensation procedures prior to the survey.
Otway Adjustment Protocol (OAP)	Appropriately documented claims will be assessed, in accordance with the processes outlined in the OAP, and completed within 30 days of receipt of the required data.	Documentation of notifications, emails, and/ claims confirm that all commercial fishers commercially worse off because of the survey have made claims. Confidentiality agreements and payment receipts were appropriate.
	A claim can be lodged up to 180 days after the completion of the activity.	
	Adjustment can be claimed for up to 30 days after the completion of each activity.	

Control Measures	Environmental Performance Standards	Measurement Criteria
	Successful claims will receive compensation within 30 days of the Outcome Notification being executed.	
Streamer tail buoys	Each streamer will be fitted with a tail buoy to mark the end of the streamers so that they can be detected by other vessels.	Pre-deployment photographs confirm that tail buoys were fitted to all streamers prior to deployment, with audit records verifying visibility compliance.
Quality Control and Reporting Representative	Always monitor the location and planned activities of the contracted vessels in accordance with the Sail Line Plan.	GPS tracking data and activity logs confirm continuous monitoring of vessel locations and adherence to the Sail Line Plan, with records documenting compliance.
CGG Technical Operations Manager	Reasonable, evidence-based claims are promptly assessed and paid in accordance with the Otway Adjustment Protocol.	Claims assessment records show that compensation claims were reviewed and paid promptly, with supporting evidence based on the Otway Adjustment Protocol.
Fisheries Liaison Officer (FLO)	Individual located in the region to be able to meet fishers in person to discuss the operational outlook and support fishers with claims under the Otway Adjustment Protocol.	Meeting logs and consultation records verify that the FLO was present in the region, with documented interactions with fishers to discuss the survey outlook and claims process.
CGG Marine Assurance System	Navigation and communication equipment is part of the maintenance system and is functioning continually throughout the survey.	Maintenance records and inspection logs confirm that navigation and communication equipment was operational and maintained throughout the survey, with downtime incidents documented.
Support Vessel	Throughout the seismic survey, at least one support vessel will be in constant attendance to communicate with other marine users.	Support vessel logs confirm continuous presence and communication with marine users during the seismic survey, with documented records of interactions.

1.8 Underwater Sound

Environmental Performance		
Receptor	**Environmental Performance Outcomes**	**Measurement Criteria**
Plankton, Zooplankton and Krill	**As a result of complying with the sound source volume and activity limitations, sound emissions will not disrupt the ecological integrity of plankton communities.**	Operational logs and sound source tracking data confirm continuous movement during full-power operation, validated by GPS coordinates and real-time monitoring records showing no stationary positioning.
	As a result of complying with the sound source volume and activity limitations, no impacts to plankton communities beyond 740 metres from the sound source.	
Fish & Invertebrates	No change in the assessed stock status of commercial and aquaculture species during and following the activity.	Analysis of VFA or AFMA annual Stock Assessment Reports indicating no statistically significant change in biomass within the area of activity, validated by pre- and post-activity comparisons of biomass data over multiple years to account for natural variability.
	Fish will not be exposed to cumulative sound levels exceeding 186 dB SEL $_{cum24hr}$ for more than 24 hrs.	Operational logs and sound source tracking data confirm continuous movement during full-power operation, validated by GPS coordinates and real-time monitoring records showing no stationary positioning.
Birds, Marine Mammals & Reptiles	No death or injury to fauna, including listed threatened or migratory species, from the activity.	Verified incident reports, monitoring records, and environmental audits confirm zero observed or reported instances of fauna injury or mortality directly linked to the activity, with specific attention to listed threatened or migratory species.
Cetaceans	As a result of shutting down or relocating the sound source when whales enter shutdown zones, no physical injury or sustained interference with marine mammal life-cycle behaviours occurs during the activity.	Verified observation logs, real-time visual and acoustic monitoring records, and incident reports confirm adherence to sound source shutdown protocols when cetaceans (including low-frequency cetaceans, BWs, and SRWs, including cow-calf pairs) are observed within specified distances and durations from the sound source, with documentation showing compliance for each proximity and residency condition.
	As a result of complying with the activity limitations and environmental performance standards in place to protect threatened whales, environmental impacts and risks associated with the activity are managed in a manner that is demonstrably consistent with ecologically sustainable development principles.	
	As a result of shutting down or relocating the sound source when a blue whale is observed within 5 km, blue whales will not be behaviourally disturbed within this range, leading to the protection of important foraging areas and avoidance of displacement.	

Environmental Performance		
Receptor	**Environmental Performance Outcomes**	**Measurement Criteria**
	As a result of implementation of the suite of mitigation measures, SRW are not exposed to sound levels that result in auditory impairment or displacement from BIAs or HCTS.	
	As a result of shutting down the sound source when: - any pinniped or dolphin is observed within 500 metres, - any whale is detected within 2 km of the sound source, and - any low frequency cetacean observed within 9 km of the sound source Cetaceans will not be exposed to sound levels associated with auditory injury.	
	As a result of the implementation of real-time monitoring and activity limitations, SRW are not exposed to sound levels that cause substantial behavioural disturbance within or adjacent to BIAs or HCTS.	
	As a result of implementing shutdown or relocation procedures if a blue whale is detected within the 5 km ensonified area. blue whales will not be exposed to physical injury from sound exposure.	
	As a result of implementing shutdown or relocation procedures when a SRW enters the 13 km ensonified area.	
	Underwater sound emissions from the Regia MSS are empirically measured and validated through the sound source verification procedure to ensure they remain within levels that do not cause injury or unacceptable disturbance to Southern Right Whale.	
	As a result of the implementing the suite of mitigation measures, marine mammals will not experience auditory injury or sustained behavioural disturbance affecting survival, reproduction, or population distribution.	
Divers, Swimmer, and Surfers	Received sound levels at coastal areas accessible by coastal users will not exceed the human health safety criterion relating to amenity value.	Operational records and discharge logs confirm that sound levels at the source did not exceed the modelled parameters established to meet human health and safety criteria for coastal amenity value, with compliance documented through sound source output monitoring during activity.

Environmental Performance		
Receptor	**Environmental Performance Outcomes**	**Measurement Criteria**
Identified Cultural, Social and Economic Features	Social, cultural, and economic features are protected, sustaining their value for people and communities.	Behavioural observation reports, audits, verified incident reports, monitoring records and independent evaluations confirm no disruption to critical life-cycle behaviours of identified species, supported by documented mitigation measures. Compensation for verified income losses, such as reduced catch volume or displacement, is validated via claims assessments, economic desktop study, fish stock data, and spatial access mapping.

Control Measures	Environmental Performance Standards	Measurement Criteria
Survey Environment Advisor	Maintain communication with the Environment Officer, the Officer of the Watch, the Marine Fauna Observers, and PAM Operators, and the Coastal Whale Monitoring Teams (WMT) to implement shut down procedures as per the Fauna Management Plan.	Communication and detection logs confirm that the Survey Environment Advisor maintained continuous coordination with all observers/detectors with timely detection information provided to the Environment Officer and documented adherence to shutdown procedures as outlined in the Fauna Management Plan.
	Provide detection information to the Environment Officer.	
Environmental Officer	Convene the Whale Expert Panel to seek guidance on the detection circumstances and procedural responses to detections.	Records of meeting logs, communication reports, and shift documentation confirm that the Environmental Officer maintained 24/7 support, convened the Whale Expert Panel as needed, and promptly communicated all whale detections from external sources to the Survey Environment Advisor, ensuring timely procedural responses to detections as per established protocols.
	Communication of whale detections from other sources to the Survey Environment Advisor throughout the duration of the activity.	
	Maintain a 24/7 onshore presence to support the procedural responses to detections.	
	Issue tasks to marine fauna detectors and maintain a record of all taskings.	
	Review and approved the daily assignments of the Whale Monitoring Teams for the Coastal SRW Monitoring Plan.	
	Coordinate completion of the Sound Source Verification Procedure (Appendix G6) and ensure functionality of SSV buoys prior to survey commencement.	
Marine Fauna Observers	Two MFO's will always be resident on the survey vessel and will maintain a watch during daylight hours.	POB logs and daily records confirm that two MFO's were continuously present on both the survey and spotter vessels during daylight hours,

Control Measures	Environmental Performance Standards	Measurement Criteria
	Two MFO's will always be resident on the spotter vessel and will maintain a watch during daylight hours.	maintaining active watch and providing immediate notifications of any fauna observations to the Survey Environment Advisor and Officer of the Watch, as required by monitoring protocols.
	Fauna detections result in timely implementation of required mitigation responses in accordance with the Fauna Management Plan, including shutdowns or relocation if thresholds are exceeded.	
Passive Acoustic Monitoring Operators	One PAM Operator will always be resident on the survey vessel and will maintain a watch during nighttime hours.	POB logs confirm that a PAM Operator was continuously present on the survey vessel during nighttime hours, conducting active acoustic monitoring and providing immediate notifications of any detections to the Survey Environment Advisor and Officer of the Watch in accordance with procedural requirements.
	Fauna detections result in timely implementation of required mitigation responses in accordance with the Fauna Management Plan, including shutdowns or relocation if thresholds are exceeded.	
Relief PAM/MFO Observer	One additional MFO and PAM Operator will always be resident on the survey vessel to provide relief as needed.	Detection records verify immediate reporting of any acoustic detections to the Survey Environment Advisor and Officer of the Watch, with timestamps confirming prompt communication.
Whale Expert Panel	The whale expert panel will comprise at least four people with an expert in each of the following areas: Southern Right Whales Blue Whales Fauna Detections CGG Seismic Operations In addition, a First Nations knowledge holder participation can be facilitated through the Sea Country Protection Plan (Event ID EVT352).	Pre-survey meeting minutes confirm panel attendance and approval of the Fauna Management Plan, including recommendations for implementation resources.
	Recommendations from the Whale Expert Panel are incorporated into the activity's operational and mitigation plans to ensure cetaceans interactions remain of an acceptable level.	Meeting logs verify that the Whale Expert Panel convened as requested by the Environmental Officer and every two weeks, with minutes documenting any recommendations made.
	The whale expert panel will meet on request of the Environment Officer and at least fortnightly during the activity.	

Control Measures	Environmental Performance Standards	Measurement Criteria
Spotter Vessel	The spotter vessel will position itself at the most likely point of interaction with Southern Right Whales or Blue Whales, as directed by the Environment Officer, based on the recommendations of the Whale Expert Panel.	Positioning logs and communication records confirm that the spotter vessel was strategically placed at locations based on the standards, or as improved by written recommendations from the Whale Expert Panel.
	BW Mode: The spotter vessel will maintain position 20 km to the west of the survey vessel.	
	SRW Mode: The spotter vessel will travel parallel to the seismic vessel, 20km away and on the northerly side, while the seismic vessel is acquiring lines 31-67.	
	The spotter vessel will have PAM and position itself to maximise the probability of detecting low-frequency cetaceans at distances well beyond defined behavioural-effect thresholds (shutdown distances), enabling timely implementation of required mitigation responses.	PAM records, vessel-tracking data, and spotter logs verify PAM operation and positioning that enabled early detection of low-frequency cetaceans beyond shutdown distances, with detections communicated and responses implemented as required.
Spotter Vessel Procedures	BW and SRW Scouting Mode: The spotter vessel conducts pre-start and pre-turn scouting 10 km ahead of the survey vessel	Tasking records, daily reports, and vessel tracking data show the movement, mode, and observations of the spotter vessel and demonstrates that routes were adjusted in response to fauna sightings or environmental changes.
	SRW Sentry Mode: The spotter vessel will travel parallel to the seismic vessel, 20km away and on the northerly shoreside of the seismic vessel, while it is acquiring lines 31-67	
	Blue Whale Sentry Mode: The spotter vessel maintains a position 20 km to the west of the survey vessel	
Sound Source Verification (SSV) Buoys	Three SSV buoys must be deployed 4–6 weeks before seismic acquisition, subject to safe weather conditions, at locations proximate to Cape Nelson, Logan's Beach, and Cape Otway and be functional throughout the survey.	Deployment records and AHS notification confirm that the SSV buoys were installed. GPS records show the location and daily function tests confirm operability.
	If one SSV buoy becomes non-functional, remaining buoy data streams and drift-recording deployments will be used to maintain near real time verification of ambient and seismic sound levels until the buoy is restored.	Deployment records and AHS notification confirm that the SSV buoys were installed. GPS records show the location and daily function tests confirm operability. Daily reports show alternative measures deployed if buoys non-functional.
	If two or more SSV buoys become non-functional, contingency drift-recording and available fixed loggers will be deployed and prioritised to maintain sufficient spatial coverage for real-time sound-field verification until systems are restored.	

Control Measures	Environmental Performance Standards	Measurement Criteria
	Each SSV buoy must be fitted with a multi-channel broadband hydrophone capable of detecting ambient underwater sound and with communication systems capable of near real-time relay of pre-programmed exceedances.	Equipment specifications show hydrophone and communication capability. Data received shows time, date, and sound levels recorded.
	Each SSV buoy must record continuous broadband (10 Hz–25 kHz) ambient sound with complete 1-second RMS data streams suitable for generating valid 3-minute L75, L90 and L95 distributions ≥95% of the time, verified through automated integrity checks and post-download analysis.	Sound spectrograms from each buoy show compliance with data requirements for each buoy.
	All three SSV buoys must be cross-calibrated (both moored and unmoored) to establish each buoy's baseline ambient signature and quantify mooring-related noise.	Audio files of calibration tests show results and any adjustments made for calibration.
SSV Procedure (Appendix G6)	The IMOS Passive Acoustic Observatory dataset (2009–2017) must be downloaded, filtered to September–November, and analysed to produce a statistically valid mid-shelf ambient baseline distribution prior to SSV deployment.	Analysis report shows: (i) full download of the 2009–2017 IMOS dataset. (ii) extraction of all September–November acoustic data across all available years. (iii) generation of percentile distributions (L5, L25, L50, L75, L90, L95)
	At least six months of nearshore ambient sound recordings from multiple loggers in the SRW Reproduction BIA must be successfully collected, downloaded, and analysed to produce percentile distributions (L5–L95) suitable for validating baseline calculations.	Deployment logs and analysis outputs shows: (i) ≥8 months of continuous recordings from all nearshore loggers within the BIA (ii) successful download of all logger files with verified time synchronisation (iii) production of broadband percentile distributions (L5–L95) consistent with the methodology used for the IMOS mid-shelf baseline.
	All SSV buoys and bottom-mounted hydrophones will be deployed, positioned, and calibrated in accordance with the procedure to ensure accurate, comparable and reliable recording of ambient and survey-related underwater sound.	Deployment records, calibration logs, baseline ambient datasets, drift-measurement results at prescribed distances, and verified acoustic data packages (including metadata, diagnostics, and positional information) demonstrate that all monitoring equipment was correctly deployed and calibrated, that a minimum four-week ambient baseline

Control Measures	Environmental Performance Standards	Measurement Criteria
	Ambient sound levels will be continuously recorded at all designated sites for at least four weeks prior to acquisition to establish a robust, location-specific baseline for subsequent comparison.	was collected, that seismic sound levels were measured at 5–20 km during acquisition, and that all acoustic data were quality-checked, backed up, and transmitted in accordance with the procedure.
	During seismic acquisition, sound levels at 5 km, 10 km, 15 km and (if required) 20 km will be measured through drift deployments to provide real-time verification of the horizontal extent of the seismic sound field.	
	All acoustic datasets, metadata, logger diagnostics, and positional information will be verified, backed up, and transmitted in accordance with the procedure to ensure data quality and traceability.	
Pre-survey and aerial surveillance procedures	SRW: Monitor SRW presence/absence in the reproduction BIA from 1 May until 31 October in accordance with the Whale Coastal Monitoring Programme (Appendix G5).	Aerial survey logs confirm flights were conducted with sufficient coverage to detect presence of Southern Right Whales or Blue Whales within the monitoring zone. Flight results were used to inform the decision to commence or delay the activity.
	Data from all relevant published sources and social-media platforms is actively gathered, verified, and reviewed to support early prediction of Blue Whale migration speed and progression, enabling determination of the earliest likely arrival date in the Otway region and timely activation of 'Blue Whale Mode'.	Weekly records demonstrate that published reports and social-media sources were reviewed, with any Blue Whale sightings or migration indicators documented and assessed to update arrival predictions and inform startup of 'blue whale mode'.
	The seismic source will only be discharged in the Pygmy Blue Whale foraging BIA off Otway when the presence and distribution of Pygmy Blue Whales and other foraging whales have been assessed by CGG and confirmed to be compatible with the activity proceeding without causing unacceptable disturbance.	Whale monitoring data (visual and acoustic) confirm that the distribution and behaviour of Pygmy Blue Whales and other foraging whales were assessed prior to discharge of the seismic source, and that the activity was authorised to proceed only where the risk of disturbance was determined to be acceptable based on current detections and environmental conditions.
	Conduct daily weather-determined aerial surveillance from Cape Nelson starting two weeks after the first blue whale sighting at Augusta (WA) until the arrival of blue whales in the region is confirmed.	Aerial surveillance logs, flight reports, and meteorological records confirm that daily weather-permitting flights were conducted from Cape Nelson.
Pre-Start Up Procedure	Monitoring (visual and acoustic) must always be carried out, starting 24 hours prior to any start-up of the sound source during the day.	Detection logs confirm that monitoring for cetaceans began 24 hours prior to each planned sound source start-up, with continuous records indicating any sightings and procedural adherence.

Control Measures	Environmental Performance Standards	Measurement Criteria
	Soft start can only commence if there have been: • No confirmed detections of a SRW in the preceding 24 hours from any detection platform (including shore based MFOS): • No detections of a BW within 5km of the sound source. • No detections of any whale within 2 km in the preceding 60 minutes. ○ No detections of dolphins, pinnipeds, or turtles within 500m (except for bow riding dolphins). No start-up of the sound source if there have been three (3) or more shutdowns for any whale (including BWs) in the preceding 24 hr period.	Observation logs and procedural records verify that the soft start was initiated only after meeting all pre-start detection criteria, with documented checks showing compliance with SDZ and recent shutdown requirements.
Start-up Procedures	Soft start of the survey can only commence when there have been no confirmed detections of any BW from all the platforms for a period of one hour. Prior to start up, SEA to check with WMT's and the spotter vessel that no detection of SRW has occurred within the last 24 hours. When the sound source is first turned on soft starts will be undertaken by gradually ramping up the seismic source over a 30-minute period. When the sound source is in low power mode soft start will be undertaken by increasing the seismic source to full power mode (targeting 30 minutes duration subject to operational requirements).	Operational logs confirm that the soft start was conducted with pre-start observations and by gradually increasing the seismic source output over a 30-minute timeframe, with ramp-up intervals documented to ensure compliance. Log records verify that, following operation in low power mode, a soft start procedure was followed to increase the seismic source output to full power, with the procedure documented to meet compliance requirements.

Control Measures	Environmental Performance Standards	Measurement Criteria
	The SRW restart protocol: • 90 minutes prior to acquisition: the spotter vessel will start a pre-clearance detection survey of the line; the spotter vessel will be 20kmahead of the seismic vessel. • 60 minutes prior to acquisition: the MFO's and PAM operators on the vessel will start a pre-clearance detection survey • 30 minutes prior to acquisition : the soft start can commence, and the spotter vessel can resume its position, 20km away and on the northerly side, while it is acquiring lines 31-67.	
	Blue whale restart protocol: • 90 minutes prior to acquisition: spotter vessel starts pre-survey clearance observations at start of line 10km ahead of the survey vessel. • 60 minutes prior to acquisition start PAM and MFOs will start a pre-clearance detection survey • 30 minutes prior to acquisition commence soft-start, spotter vessel transitions to sentry mode (20 km due West of the survey vessel).	
Start-up delay procedures (if sighting)	If flocks of foraging birds are detected within 500 m of the sound source during the soft start procedure, the acoustic source will be shut down and will not be ramped up until all pre-acquisition criteria have been met again. [Paragraph added in response to Matter B15].	Observation logs and procedural records confirm that the acoustic source was set to low power mode upon detection of foraging bird flocks within 500 m, with subsequent ramp-up only occurring after all pre-acquisition criteria were met.
	If any whale is detected in relevant shut down zones (SDZs) during soft start procedures, the acoustic source will be shut down, and another soft start cannot commence until all pre-acquisition criteria have been met again.	Detection and shutdown records confirm that the acoustic source was promptly shut down upon whale detection within relevant SDZs, with records verifying that a new soft start was initiated only after meeting all pre-acquisition criteria.
Operating Procedure	The seismic vessel is not permitted to operate at speeds of more than 6 knots (speed over ground) during acquisition to reduce the risk of vessel collision to whales.	Acquisition vessel speed logs confirm compliance with the 5-knot speed limit during acquisition, with records verifying continuous adherence to speed restrictions.

Control Measures	Environmental Performance Standards	Measurement Criteria
	If a whale approaches within 300m of any vessel, the vessel must: – Reduce speed and maintain at least 300 m from the whale (subject to navigation and vessel safety). – Position vessel to not impede the path of the whale (subject to navigation and vessel safety). – Avoid sudden changes in speed or direction. – Communicate the sighting to the SEA and other vessels.	Daily reports and communication logs document vessel speed reduction, positioning, and communication with the SEA and other vessels upon whale sightings within 300 m, confirming adherence to procedural responses.
	If a dolphin, pinniped, or turtle approaches within 150m of any vessel, the vessel must: Reduce speed and maintain at least 150 m from the dolphin, pinniped or turtle. Position vessel to not impede the path of the dolphin, pinniped or turtle. Avoid sudden changes in speed or direction. Communicate the sighting to the SEA and other vessels.	Daily reports and communication logs verify that vessels reduced speed, maintained a 150 m distance, and followed proper positioning and communication procedures when a dolphin, pinniped, or turtle was observed within proximity.
Shutdown procedures	Shutdown the sound source if medium-large flocks of foraging birds are observed within 500 m of the source. Start-up procedures can commence when the seismic source is > 500 m from flocks of foraging birds.[1]	Observation logs, incident reports, and operational records confirm that the sound source was promptly shut down when required by procedural conditions within specified distances, with documentation showing compliance for each shutdown event.
	Shutdown the sound source if any pinniped, dolphin, or turtle is detected within 500 m of the source (except for bow riding dolphins).	
	Shutdown the sound source if any whale is observed within 2000 m of the sound source.[2]	

[1] This measure has been adopted to protect foraging penguins and other diving birds following consultation.

[2] Based on previous seismic surveys, CGG has chosen to only implement a shutdown zone and not a low power zone to provide another level of protection to all whale species. This is based on the low power zone for whales as detailed in the EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (Policy Statement 2.1).

Control Measures	Environmental Performance Standards	Measurement Criteria
	If there is an "unidentified baleen whale" within 5 km of the seismic source, this will trigger a shutdown for one hour, or until daylight if at night.	
	Shutdown the sound source upon confirmed detection of any BW within 5km for one hour.	
	Shutdown the sound source if a Southern Right Whale is detected at any time, from any platform, until 24 hours of no detections have occurred.	
	If there are exceedances (as defined in the procedure) of impulsive noise over 120 dB, detected by any SSV buoy the sound source will be shut down. In October, if there have been 14 consecutive days without a SRW detection, the shutdown trigger for repeated impulsive-noise exceedances increases to 140 dB SPL.	
Night-time and low visibility procedures	Start-up may be commenced as per the Soft-Start Procedure if there have not been 3 or more whale instigated shut-down situations during the preceding 24-hour period.	Daily reports confirm that sound source start-up was conducted per the Soft-Start Procedure, with adherence to additional requirements for night-time or low visibility conditions.
	Operations may proceed if there have not been 3 or more whale instigated shut-down situations during the preceding 24-hour period.	
	If there is a SRW detection at night the sound source will be shut down until daylight.	
	If there is a confirmed blue whale PAM detection within 5 km at night the sound source will be shut down until daylight.	
Helicopter Operation Procedure	Helicopters will not fly lower than 1650 ft when within 500 m horizontal distance of a cetacean, except when landing or taking off and will not approach a cetacean from head on.	Flight logs and operational records confirm that helicopter operations aligned with procedural requirements to minimize disturbance to marine fauna.
End-of-Survey Procedures	Shutdown and do not recommence the survey 90 days after the survey started.	Daily reports confirm the start date of the survey (i.e first day of acquisition) and MFO daily reports show records of observations that confirm if the end-of-survey criteria have been met.

Control Measures	Environmental Performance Standards	Measurement Criteria
Drones for coastal aerial surveillance	Each drone must be capable of detecting and visually identifying a Southern Right Whale at a minimum slant range of 25 km using the H30T telephoto camera under clear atmospheric conditions.	Documented pre-season and mid-season validation tests showing the H30T camera can resolve a 10–18 m whale body at ≥12 pixels across at 25 km slant range and that line-of-sight remains unobstructed out to the geometric horizon at ≤120 m AGL. Manufacturer specifications and test reports confirming stable imaging performance within the defined operational wind envelope. Archival of all SRW detection imagery with embedded time, date, and GPS metadata, as verified through periodic QA checks of flight logs and image EXIF data.
	The drone's camera system must provide a minimum of 12 pixels across the critical dimension of a whale at any distance where a detection is claimed, consistent with Johnson/NATO identification criteria.	
	The drone must maintain sufficient gimbal and sensor stability to collect usable detection imagery (optical or thermal) in all operational wind conditions up to the Sub-Optimal threshold of 20 kt sustained winds and 25 kt gusts.	
	All imagery used to verify SRW presence must include time-stamped and geolocatable metadata automatically embedded by the drone's onboard systems.	
Coastal Whale Monitoring Teams (WMT)	For the duration of the SRW season, at least one WMT (1 x MFO and 1 x drone pilot) will perform daily coastal monitoring of the region between Cape Bridgewater and Cape Otway according to the applicable weather-dependent deployment plan.	Daily records verify that coastal monitoring between Cape Bridgewater and Cape Otway was completed by a WMT (1 MFO and 1 drone pilot) in line with the applicable weather-dependent deployment plan.
	When the survey commences until 31 October, at least three (3) WMT's will perform daily monitoring in accordance with Appendix G5 – SRW Coastal Monitoring Programme Implementation Plan.	
	Each WMTs must complete full daily coverage of their assigned coastal zones according to the applicable weather-dependent deployment plan,	
SRW Reproduction BIA - Coastal Detection Shutdown and Restart Procedures	All confirmed SRW detections must be communicated to the SEA immediately, with shutdown initiated within five minutes when the survey is acquiring.	SRW detection log confirms presence in the reproduction BIA. Comparison between acquisition log confirms full power at time of detection. Shutdown log confirms the sound source was shut down in response.
	All unconfirmed SRW detections must be referred to the Whale Expert Panel within two hours, with WMT deployment to verify the sighting within 12 hours where conditions allow.	

Control Measures	Environmental Performance Standards	Measurement Criteria
	Only restart the survey in accordance with the start-up procedures after 24 hours of no detections of SRW from any platform.	
	Conduct aerial surveillance flights with drones at least once per week off Cape Nelson to confirm arrival of blue whales into the region.	
Consultation Management System	Consult with local commercial divers and dive schools to raise awareness for and institute a Diving SIMOPS Plan.	Consultation records show best endeavours to provide the opportunity for local divers to participate in the scoping and implementation of the Diving SIMOPS Plan.
Citizen Science Observations	Maintain open communications with the Arthur Rylah Institute to share information about SRW detections and monitoring.	Consultation records show CGG's efforts to share information on SRW presence and behaviours in the reproductive BIA.
Satellite Detection Technology	Before the survey commences, undertake trials of satellite detection technology for detecting the presence and movements of SRW in the reproductive BIA.	A report of the trial will be made with recommendations for CGG to consider how the detection technology might complement the existing detection methods.

1.9 Light Emissions

Environmental Performance	
Environmental Performance Outcomes	**Measurement Criteria**
Biologically important behaviours within a BIA or outside a BIA can continue while the activity is being undertaken.	Behavioural observation records, remote monitoring, or third-party assessments confirm no statistically significant reduction or alteration in the frequency, duration, or success of biologically important behaviours within or outside the Biologically Important Area (BIA), with documentation showing comparisons to baseline behaviour data.
Light emissions will be reduced to minimum levels for safe operations and navigation in accordance with the Vessel Management Plan	Operational lighting logs and environmental audits confirm adherence to the Vessel Lighting Management Plan, with records showing that lighting intensity and directional use were minimized to the lowest safe levels during the activity.
Light emissions are managed to avoid displacing turtles or disrupting nesting, foraging, or migratory behaviours within or near biologically important areas.	Behavioural observation reports, environmental audits, and independent assessments indicate no observable impact on critical life-cycle behaviours, validated by pre- and post-activity comparisons and supported by records of mitigation measures implemented during activity.

Control Measures	**Environmental Performance Standards**	**Measurement Criteria**
CGG Marine Assurance System	Ensure that all vessel lighting complies with the Vessel Lighting Management Plan to minimize light emissions to levels required for safe operations and navigation.	Operational lighting logs and environmental audits confirm that lighting intensity and direction align with the Vessel Lighting Management Plan.
Survey Environment Advisor	Monitor and advise on vessel light emission practices to ensure compliance with the Vessel Lighting Management Plan.	Daily reports verify that light emissions are managed according to the Vessel Lighting Management Plan, with documented adjustments made as necessary.

2 Document Control

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	29 March 2023	MS	Template created.
0.1	9 April 2023	MS	Community Liaison Program added.
0.2	5 May 2023	MS	Project vessels, IMS risk assessment procedure, marine assurance system, and bunkering procedure added.
0.3	7 May 2023	MS	Sail line procedure added. Reframed all measurement criteria to be more detailed.
0.4	28 August 2023	MS	Marine mammal adaptive management plan, and marine mammal observers added.
0.5	14 September 2023	MS	Acquire seismic on paper, and OPEP/OSMP added. Added column to EPSs to show whether the standard was adopted because of the consultations.
0.6	24 September 2023	MS	Moved into Regia MSS document template. Cultural heritage protection program, and Adjustment protocol added. Modified throughout to include all requirements from impact and risk assessments.
0.7	2 October 2023	PR/LT	CGG Review.
1	20 December	MS	Updated following CGG review and consultations with relevant persons.
2	15 May 2024	MS	Updates following public comment and the adoption of additonal environmental performance standards for spotter vessel, an additional MFO/PAM Operator.
3	28 October 2024	MS/CT/AH	Updated following NOPSEMA assessment.
4	16 April 2025	MS	Updated following NOPSEMA OMR 1 Letter
5	9 December	CT/RH/EO/MS	Updated following NOPSEMA OMR 2 letter and consequentail changes between submissions.

Annex 1: Public Comment

The following consultation feedback was received since the beginning of the public comment period starting 25 January 2024. As this feedback relates to a control measure, the Fauna Management Plan (FMP), details of how this feedback has been incorporated into the FMP are stated in this parent document, in Table G1-1 below.

Table G1-1 - Public comment input

Matter	Matter ID	Changes made arising from public comment
Matter: Impacts on fin and sei whales	M36	EP Appendix G2 (Fauna Management Plan) has been updated to include species exhibiting biologically important behaviours, being Fin and Sei Whales.
Matter: MFOs/MMO's do not have a 360-degree view, the use of one MFO/MMO is inadequate.	M45	CGG has considered these claims and has determined that additional MFO coverage is appropriate to further mitigate the potential for whales to go undetected within the 3 km observation zone. Consequently, CGG has has updated EP Appendix G2 (Fauna Management Plan), EP Appendix F3 (Acceptability Assessment) and EP Appendix G1 (Environmental Outcomes) to include an additional MFO/ PAM operator will be present on the vessel to support fatigue management. In addition to the two MFOs on the seismic vessel, two dedicated, trained and experienced MFOs will be onboard a dedicated spotter vessel at all times. In addition, officers of the watch on the attending support vessels will be trained to identify whales during daylight hours to support the visual detection of marine mammals.
Matter: Limitations of MFOs/MMOs when detecting marine mammals	M43	CGG has considered these claims and has updated EP Appendix G2 (Fauna Management Plan), G1 (Environmental Performance) and F3 (Acceptability Assessment) to include an additional MFO/ PAM operator to ensure fatigue management is appropriately addressed with allowance for 24/7 coverage.
Matter: The use of two PAM operators is inadequate.	M49	
Matter: Impacts on whales and whale songlines	FN05	CGG has considered these claims and the identified potential impacts and their measures concerning First Nations cultural values regarding whales has been added to Appendix G2, Fauna Management Plan, Annex 2.
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and M#01: Activity limitation, to reflect that the sound source will not be discharged at full power from areas which result in an exceedance of the safety criterion for recreational divers, surfers and swimmers along the coastline. CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F1 F3, G1 and G2.).
Matter: Mitigating sound exposure impacts to seabirds	B15	Clarification has been provided in EP Appendix E5 (Impact Assessment – Underwater Sound: Birds) and EP Appendix G2 that the acoustic source will be reduced to the low power setting if flocks of foraging birds are observed by the Marine Fauna Observer within 500 m of the source. Full power can commence when the seismic source is > 500 m from any flocks of foraging birds.

Annex 2: Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table G1-2. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table G1-2 - Objections and Claims raised from consultation

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4374	Claims that the Regia survey conflicts with the SRW National Recovery Plan, which stipulates that actions within or near southern right whale BIAs and HCTS must not prevent the whales from utilizing the area or cause auditory impairment. Additionally, the plan requires that such actions minimize the risk of behavioral disturbance.	Event ID 6529 - CGG has outlined several commitments to ensure compliance: • The proposed activity will occur before SRWs arrive or after they depart, with pre-survey monitoring in place to reasonably detect SRWs migrating to or from the reproductive BIA, and pre-start conditions if SRW'd are detected. • The Regia MSS EP includes extensive detection measures, covering multiple methods to detect SRWs within a 15 km radius, exceeding the requirements in the SRW National Recovery Plan's Policy Statement 2.1. • CGG will shut down the sound source if a SRW remains resident in the 15 km ensonified area for more than 12 hours or if a SRW cow and calf pair is observed within 10 km of the sound source. • SRWs within the reproductive BIA will not be exposed to underwater noise levels exceeding thresholds for permanent threshold shift (PTS), temporary threshold shift (TTS), or behavioral response thresholds. Further details on the control measures are available in Appendix G1 of the Regia MSS EP.	6410
4395	The project is adjacent to Warrnambool's Logans Beach Whale Nursery for Southern Right Whales and upstream of the Bonney Upwelling Key Ecological Feature, which could be affected.	The titleholder acknowledges this and has spent two years preparing a comprehensive Environmental Plan (EP). This process included ongoing consultations with communities and individuals, summarizing the EP into webinars, information sheets, and holding in-person meetings. The team recognizes the Otway region's marine environment as both spectacular and dynamic and believes environmental assessments must be thorough and detailed to respect its importance. Impacts are assessed in the Environmental Plan (EP) and can be found in Appendix E7 and F3. Measures to minimise adverse impacts to whales and ensures the Regia MSS does not prevent SRW and BW utilising their BIAs include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in Appendix E7 Section 9 and G1. The claim that some krill larvae from the proposed Regia MSS area may reach upwelling regions is acknowledged, but there is no evidence to support the idea that this area is a key source for krill in the Bonney Upwelling system. Krill larvae from across the broader region could also end up in the upwelling area. No cause-and-effect pathways have been identified that show the Regia MSS area as uniquely important for krill supply in the region. (Event ID 6815)	
4405	Objects to the assertion that ± 50% interannual variation in upwelling extent, mostly climate-driven, has not constrained whale population recovery.	Whales have evolved to handle significant fluctuations in their food source, with some years yielding more biomass and others less. The Regia EP provides references to support this argument. Upon closer examination of Wiedenmann et al. (2011), which the stakeholder cites, it becomes clear that while whales can adapt to decreases in krill abundance in a particular area, the net effect on their population vital rates is negligible. Wiedenmann et al. (2011) also suggest that blue whales may adjust their foraging behaviors in response to changes in local environmental conditions, mitigating the impacts of declines in krill abundance. They note that blue whales exploit different feeding areas based on large-scale prey abundance and can concentrate in productive areas when prey is scarce, such as during El Nino years (Benson et al. 2002, Bailey et al. 2010). Furthermore, Wiedenmann et al. (2011) propose that blue whales are better equipped to cope with environmental changes than species with more restricted foraging areas, thanks to their adaptive foraging behaviors and ability to travel long distances in a foraging season. (Event ID 6815)	6432
4454	Claims uncertainty due to reliance on fixed buoy, as this method is proposed as the sole strategy beyond visual and towed PAM detection ranges, means risks to threatened species have not been reduced to as low as reasonably practicable, and that CGG's environmental management system is not effectively implemented.	The EP acknowledges the limitation regarding guaranteed triangulation with the fixed buoy acoustic detection system. However, the system is one part of a multi-faceted detection and mitigation strategy that also includes towed PAM, visual observers, aerial surveys, and spatial/temporal activity restrictions. This combination of measures supports the	EVT132

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	Stakeholder argues that the system's effectiveness is undermined because triangulation of detections is not guaranteed and the testing protocol requires only a single successful unit test before deploying an array.	implementation of the defined shutdown zones and activity limitations, thereby managing risks to ALARP and achieving acceptable environmental outcomes for species like BW and SRW. To note, an incorrect reference was used by the stakeholder.	
4455	The objection argues that the Environmental Plan's reliance on "near real time" data transmission between Acoustic Detection Monitoring operators and seismic operators is flawed because the term is undefined, with no limits on latency or provisions for equipment and communication failures in offshore conditions. The objection states that given the speed of whale movement and the immediacy of sound exposure, the lack of clear parameters renders the measure unreliable. Without evidence that the system can function effectively, the objection maintains that the control cannot be shown to reduce impacts to ALARP, and the ambiguity means the plan fails to meet regulatory requirements for appropriate, measurable environmental performance standards.	In Appendix G1 the EP describes standards for the control measures, including: One ADM Operator to always listen for LF cetacean calls for the duration of the survey and immediately communicate positive detections of LF cetaceans to the Environmental Officer. Further information on the towed and tethered ADM is contained in Appendix C7. This has not been made publicly available due to being commercial in confidence. In addition, the system is one part of a multi-faceted detection and mitigation strategy that also includes towed PAM, visual observers, aerial surveys, and spatial/temporal activity restrictions. This combination of measures supports the implementation of the defined shutdown zones and activity limitations, thereby managing risks to ALARP and achieving acceptable environmental outcomes for species like BW and SRW. To note, an inncorrect reference was used by the stakeholder.	EVT132
4456	The objection contends that CGG's proposed tethered buoy Passive Acoustic Monitoring (PAM) system is an unproven and unreliable primary mitigation measure for detecting marine mammals beyond the range of visual observation and towed PAM. It highlights contradictions within Appendix F5, which claims such systems have been used in seismic surveys while also stating their application in this context is "unknown." Published research shows only limited use in very different settings, such as large-scale Arctic noise monitoring arrays, rather than real-time whale detection. The objection concludes that relying on this experimental technology as a primary safeguard does not meet the regulatory requirement to reduce environmental impacts to ALARP, given the absence of evidence demonstrating its effectiveness in comparable operational environments like the Otway Basin.	Regarding the alleged contradiction in F5: The EP describes both the potential and general use of PAM systems deployed near the survey area (which can include buoys) during seismic surveys for real-time monitoring, and then a detailed, vendor-specific assessment of the actual documented history of particular tethered buoy PAM products. As stated in the EP, the PAM system is one part of a multi-faceted detection and mitigation strategy that also includes towed PAM, visual observers, aerial surveys, and spatial/temporal activity restrictions. The tethered buoy is also undergoing real-world testing, prior to any activity. This combination of measures supports the implementation of the defined shutdown zones and activity limitations, thereby managing risks to ALARP and achieving acceptable environmental outcomes for species like BW and SRW.	EVT132

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4457	The objection references NOPSEMA's 2019 inspection report for the Otway Basin 2DMC Marine Seismic Survey, which concluded that published scientific evidence does not support passive acoustic monitoring (PAM) as an effective method for detecting Whales, including foraging Blue Whale and lactating females with calves, when the system is towed directly behind an active seismic or support vessel, stating that CGG has not addressed known limitations and therefore is inconsistent with the precautionary principle without providing peer-reviewed evidence that addresses the limitations previously identified.	The 2019 comments from NOPSEMA are related to a different proposal, with an alternative towed PAM system. The Sercel Quietsea PAM system has been accepted and used during Australian seismic surveys. In addition, as stated in the EP, the PAM system is one part of a multi-faceted detection and mitigation strategy that also includes towed PAM, visual observers, aerial surveys, and spatial/temporal activity restrictions.	EVT132
4499	GMTOAC notes that the April 2025 EP allows CGG a 90-day continuous window to complete the survey, with a maximum of 60 days of active seismic acquisition. GMTOAC claims that this limited timeframe will not allow CGG to meaningfully implement ongoing review and improvement measures intended to reduce harm to Karntubul.	Appendix G1 outlines that the Environment Officer is responsible for recording, assessing, and addressing environmental incidents within required timeframes, implementing corrective actions, and ensuring continuous compliance through daily reports, weekly audits, and incident reviews. Non-compliance triggers immediate inspection and corrective action, and objections or claims are assessed within 48 hours, with any necessary protections implemented promptly. This framework also illustrates how the proposed CVA project (Event ID EVT337), including the Sea Country Protection Plan, could involve Gunditjmara and supports CGG's position that the CVA should extend before, during, and after the activity.	EVT352
4503	GMTOAC claims inconsistencies and contradictions within CGG's April 2025 EP, particularly regarding the enforceable activity limitations intended to reduce risks to Southern Right Whales and Blue Whales. GMTOAC notes that NOPSEMA previously identified this issue in 2024, stating that duplication and inconsistencies left "no single source of truth" for assessing the EP. GMTOAC believes this fundamental flaw remains unresolved in the April 2025 version, undermining the reliability and enforceability of CGG's proposed control measures. GMTOAC provided the following examples: • Although the EP states that Appendix A2 contains the "final" list of enforceable activity limitations, it later states that Appendix G1 is "controlling" and overrides other lists. GMTOAC notes that many measures appear in one appendix but not the other, and others contain conflicting descriptions.	CGG rejects claims of inconsistency between Appendices A2, G1 and G2, however the stakeholder may have misunderstood the distinction between activity limitations and control measures. Appendix A2 sets enforceable activity limits, measures that restrict operations to avoid or reduce impacts—while Appendix G1 details the control measures, performance standards, and procedures used to implement those limits in line with NOPSEMA's definition of controls. A2 and G1 serve different but complementary purposes, with A2 defining mandatory constraints and G1 outlining the operational steps required to meet them, together ensuring SRWs are protected from behavioural disturbance. G1 and G2 are also complementary rather than conflicting: G2 defines roles and responsibilities, while G1 outlines the controls and measurement criteria used to verify them. CGG maintains that the Environmental Officer and Survey	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	For example, Appendix A2 and Appendix G1 both outline conditions for discharging the sound source in the Southern Right Whale reproduction BIA, but the conditions differ in scope and detail. GMTOAC warns that such internal discrepancies create confusion for vessel crews and contractors and could jeopardise the species the measures are intended to protect. • GMTOAC highlights conflicting and unclear role descriptions across appendices, particularly for key positions such as the Survey Environment Advisor and Environmental Officer. Responsibilities differ between Appendix G1 and G2, creating uncertainty about who is accountable for shutdowns, communication, monitoring, aerial surveys, technology trials, and 24/7 oversight. GMTOAC notes that the EP does not clarify whether multiple staff will be appointed to fulfil these demanding roles. • Several measures appear in one appendix but not another. For instance, Appendix G2 requires pre-survey aerial surveys, but this requirement is absent from the controlling Appendix G1. Similarly, Appendix G1 includes commitments to trial drone and satellite detection technologies, but these are not included in the Fauna Management Plan, leaving unclear whether they are required or how their effectiveness will be assessed. • GMTOAC claims that these inconsistencies make it difficult, if not impossible, for operators to understand or correctly implement the required measures, with potential serious consequences for Nyamat Mirring, its ecosystems, and culturally significant species such as Southern Right Whales and Pygmy Blue Whales. They also express concern that CGG's qualitative measures, such as determining whether disturbance is "acceptable", lack objective criteria and fail to involve the Whale Expert Panel or reference Recovery Plan standards.	Environment Advisor roles are clearly aligned across both appendices, collectively providing continuous oversight, shutdown authority, monitoring coordination, and expert engagement. CGG also notes that activity-level commitments, such as drone and satellite detection trials, rightly sit in G1, while position-specific duties like aerial surveys sit in G2. It states that the EP is intentionally structured so A2, G1 and G2 each fulfil distinct functions within an integrated management system, providing operators with clear instructions, objective decision-making criteria, and independent oversight from the Expert Panel. CGG concludes that this framework ensures transparent, robust management and effective protection of Southern Right Whales and Pygmy Blue Whales.	

REGIA
Marine Seismic Survey

Fauna Management Plan

Appendix G2: REG-EP-036-G2

Rev 5

December 2025

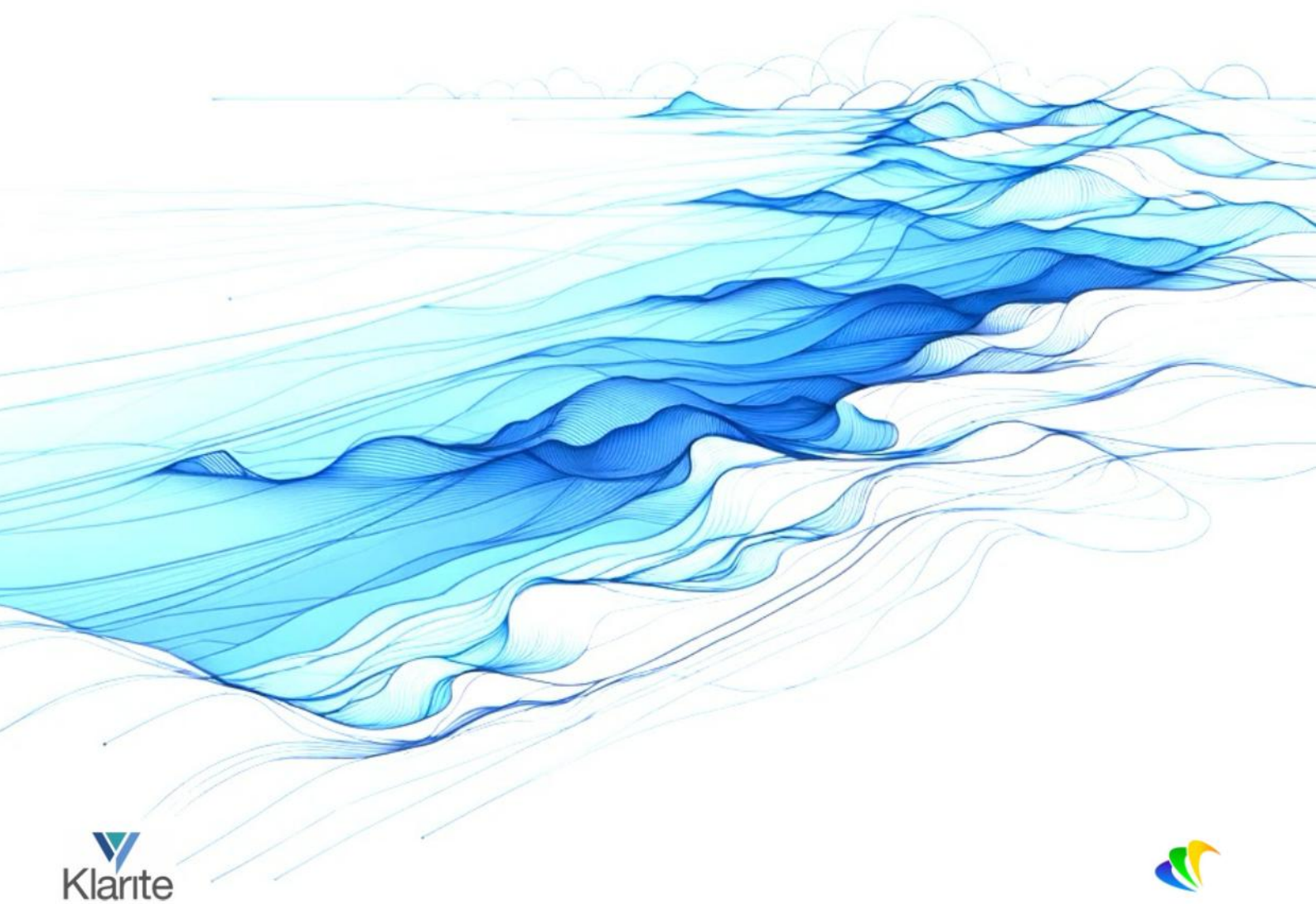

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Table of Contents

1 Introduction ***3***

1.1 Pre-Start Up Procedure **3**

1.2 Important Foundational Information **3**

2 Implementation ***5***

2.1 Roles and Responsibilities **5**

2.2 Records and Reporting Requirements **7**

2.3 Detection and Observations Methods **8**

3 Protection Procedures – At Sea ***9***

3.1 Start Up Procedures **9**

3.2 Start Up Delay Procedures **9**

3.3 Operating Procedures **9**

3.4 Shut Down Procedure **10**

3.5 Night-time and Low-Vis Procedures **11**

3.6 Helicopter Operation Procedure **11**

3.7 End-of-Survey Procedure **11**

4 Protection Procedures – SRW Reproduction BIA ***12***

4.1 September Procedures – Onshore MFOs, PIC, and Onshore PAM Operators **12**

4.2 October Procedures – Onshore MFOs, PICs, and Onshore PAM Operators **12**

4.3 SRW Spotter Vessel Procedure **13**

4.4 Night-time and Low-Vis Procedures **14**

4.5 Detection Shutdown and Restart Procedures **14**

5 Protection Procedures – BW Foraging BIA ***17***

5.1 Pre-BW Season Drone and Coastal Monitoring (End of October) **17**

5.2 1st November –31st December Detection Procedures **17**

5.3 BW Spotter Vessel Procedure **17**

5.4 Night-time and Low-Vis Procedures **18**

5.5 Shutdown and Restart Procedures **18**

6 Document Control ***20***

7 Glossary of Acronyms and Terms ***21***

8 References ***22***

Annex 1: Blue Whale Diving Summary ***23***

Annex 2: Objections and Claims Raised from Consultation ***24***

1 Introduction

The purpose of this Fauna Management Plan (**FMP**) is to provide details about how the Regia Marine Seismic Survey (Regia MSS) will be carried out in a manner by which the environmental impacts from underwater sound and the risk of a collision to fauna will be reduced to as low as reasonably practicable (**ALARP**) and will be of an acceptable level.

This FMP is a control measure to manage impacts to fauna from the following environmental aspects associated with the Regia MSS:

- Vessel collisions with fauna
- Underwater sound emissions

This FMP will ensure that the Environmental Performance Outcomes (**EPO**s) from the Regia MSS Environment Plan (**EP**) relevant to fauna will be achieved.

1.1 Pre-Start Up Procedure

The following criteria must be met for commencing soft starts.

- Monitoring must be carried out, starting 24 hours prior to any start-up of the sound source during the day.
- A Soft start can only commence if there have been:
  - No detections of any whale within 2 km in the preceding 60 minutes.[1]
  - No detections of dolphins, pinnipeds, or turtles within 500m (except for bow riding dolphins).

CGG acknowledges that there are less methods available for marine mammal detection during hours of darkness and low visibility. The precautionary design of the pre-acquisition criteria has addressed the inability to acquire visual observations by MFOs during these times by integrating observations and detections over a longer period for SRW and BW.

1.2 Important Foundational Information

Several informative statements have been made in the development of this FMP as detailed below, to assist users in interpretation and implementation of the FMP. If any aspect of this FMP is unclear, users should consider these statements in determining what action, if any, to take.

1) At all times and without exception, the safety of personnel, other marine users and vessel management takes priority over the requirements described in this FMP.

2) Vessel Masters, CGG Site Representative, Party Chief and Survey Environment Adviser (**SEA**) will work together to minimise impacts to fauna in the context of safety requirements.

3) Conservatism has been built into how the Activity Action Zone (**AAZ**) and Shut Down Zone (**SDZ**) distances have been determined to address management of underwater sound emission risks taking account of detection accuracy, weather conditions, uncertainty in the impact assessment, and whale behaviour.

4) Acoustic modelling was undertaken for several different survey line locations, and several different underwater sound effect criteria were used to interrogate model outputs. The SDZ distances are based on the furthest distance to the underwater sound effect criteria from the acoustic modelling utilising revised survey layouts for the Regia MSS and species-specific behavioural characteristics (Vallarta & Eickmeier 2025).

[1] This precautionary design addressed the inability to visually observe whales by extending the visual observation window in the daytime to beyond typical dive times (~30 min) of deep diving species such as blue whales. The design of pre-acquisition criteria has also been expanded to address concerns and insights raised through consultation.

5) Policy Statement 2.1 details if the likelihood of encountering whales is low, the chance of a seismic survey having a significant impact on a whale species should be minimal, provided that the proponent and the operator of the seismic survey adopt the measures outlined in Part A: Standard Management Procedures.

While every attempt has been made to limit ambiguity in the FMP, if there is a lack of clarity, or residual uncertainty, about the instructions in this FMP users are required to take actions in a manner that manages impacts to fauna, are precautionary, and will ensure impacts and risks are within the defined acceptable levels specified in the Regia MSS EP.

2 Implementation

2.1 Roles and Responsibilities

Figure G2-1 shows the Regia MSS organisation structure relevant to the FMP with responsibilities for each role detailed in Table G2-1.

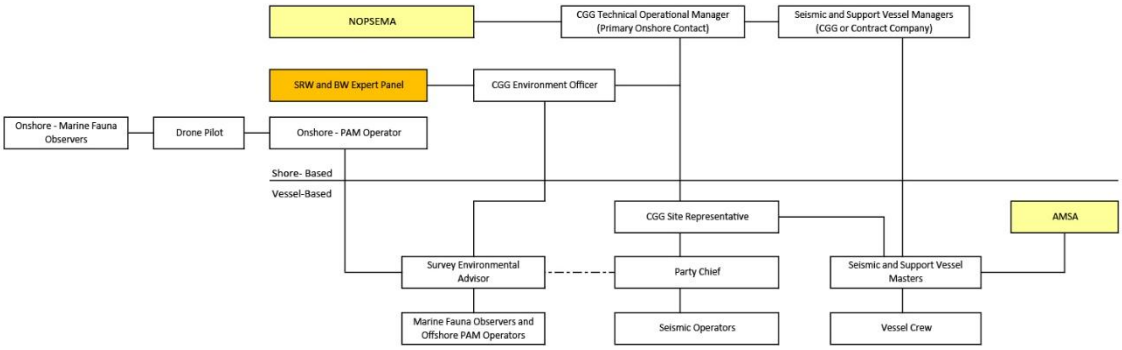


Figure G2-1: Regia MSS Organisation Structure Relevant to the FMP

Table G2-1 details the roles and responsibilities for the implementation of the FMP and details the records and reporting requirements.

Table G2-1 - Roles and Responsibilities for the FMP

Role	Responsibility
CGG Technical Operations Manager	Provide sufficient resources to implement the FMP.
CGG Environment Officer	Coordinate the SRW and BW Expert Panel and provide updates daily when SRW and BW detections and associated shutdowns occur.
	Develop the FMP Implementation Plan with input from SRW and BW Expert Panel, CGG Site Representative, SEA, Party Chief, MFOs, and PAM Operators.
	Collection and review of new relevant research, if any, will be completed within one month of the commencement of the Regia MSS. A risk assessment and management of change process will be instigated if outcomes of relevant research suggest that there has been a significant change to the context of the Regia MSS that may lead to an update to the FMP.
	Coordinate and document the review of effectiveness and compliance with the FMP.
	A review of the effectiveness and compliance with the FMP will be undertaken within one week of commencement of the Regia MSS and thereafter every four weeks while the Regia MSS is being undertaken.
	Ensure the Regia MSS induction provides an overview of the FMP.
	Review the FMP Daily Report to ensure detection and actions meet the requirements of the FMP.
	Provide support to the Survey Environment Adviser as required.
SRW and BW Expert Panel	Provide advice on the FMP Implementation Plan prior to commencement of the survey such that any recommendations can be adopted, as appropriate.

Role	Responsibility
	In considering the FMP Implementation Plan prior to commencement of the survey, the SRW and BW Expert panel will: Provide advice to optimise flight path and observer effort for detection of BW and SRW during aerial survey(s) to be instigated prior to commencement of the Regia MSS. Advise when aerial surveys are to be instigated during survey acquisition. Consider daily reports and monitoring of SRW and BW detections and associated shutdowns, if they occur, and recommend further management actions, as required. The panel will also help confirm the species of any 'unidentified whale' detections during the survey.
	Provide advice to CGG in relation to actions to take in connection with SRW and BW detections and associated shutdowns.
CGG Site Representative	Accountable for implementation of this plan.
	Provide records of FMP training and activity-specific environmental induction to SEA.
Survey Environment Adviser	Coordinate MFO, PAM and SSV observations/detections and provide advice to the Party Chief of required actions.
	Provide advice to the Party Chief and Vessel Masters (or delegate) on the requirements of the FMP.
	Develop daily FMP Report of MFO, PAM and SSV observations/detections and actions taken.
	Liaise with CGG Environment Officer to determine when aerial surveys are triggered and SRW and BW Expert Panel input required.
Party Chief	Maintain open communication with SEA.
	Communicate the status of the seismic activities (i.e. deployment, testing, soft start, shutdowns) to the SEA.
	Decide whether actions within the FMP can safely be implemented and act accordingly.
	Document reasons for not following the FMP Plan, if required.
	Provide input into the review of effectiveness and compliance with the FMP.
Drone Pilot in Command	Operate and manage all shore-based drone surveillance flights to detect, verify, and report Southern Right Whale presence in accordance with approved monitoring and safety protocols.
Vessel Masters	Maintain open communication with SEA.
	Decide whether actions within the FMP can safely be implemented and act accordingly.
	Document reasons for not following the FMP, if required.
	Provide input into the review of effectiveness and compliance with the FMP.
	Provide records of FMP training and activity-specific environmental induction for vessel crew to SEA.
Marine Fauna Observers (MFOs) **PAM Operators (Onshore and Offshore)**	Provide input into the development of the FMP Implementation Plan.
	Undertake observations/detections and immediately report whale and other fauna (MFO only) observations/detections to the SEA.
	Provide input into the review of effectiveness and compliance with the FMP.
	Submit daily reports to the SEA.
	Monitor data from SSV Buoys
Seismic Operators and Vessel Crew	Undertake Regia MSS induction that provides an overview of the FMP.
	Communicate whale sighting to SEA immediately, supported by relevant information where available (e.g. latitude and longitude, time of sighting, no. of whales).

2.2 Records and Reporting Requirements

Records and Reporting Requirement	Responsible	Description
Pre-Regia MSS FMP implementation review	CGG Environment Officer	Documentation and records of evidence of outcomes of engagement with the SRW and BW Expert Panel. Documentation and records of evidence to show that the FMP implementation requirements are in place prior to the commencement of the Regia MSS.
Regia MSS Induction records	CGG Site Representative Vessel Masters	Regia MSS induction records.
MFO and PAM operator qualifications	CGG Environment Officer	Resumes Training certificates
Communication of the FMP Plan to those who have responsibilities to implement the plan.	CGG Environment Officer	Signed record that roles responsible for implementation and actions in this plan have read and understand.
Daily observation/ detection report.	MFO PAM Operator	Report detailing marine fauna observations and whale detections taken as per the FMP, and reasons actions not taken.
Daily FMP Report	SEA	Report detailing marine fauna observations and whale detections and actions taken as per the FMP, and reasons actions not taken.
Review of effectiveness and compliance with the FMP	CGG Environment Officer	Documentation of efforts for collection and review of new relevant research. Documentation of risk assessment performed, and management of change process instigated, if any new research outcomes suggest that there has been a significant change to the context of the Regia MSS. Documentation of daily reports to the SRW and BW Expert Panel of SRW or BW observations and detections and associated shutdowns, if they occur. Documentation and any actions from the review of effectiveness and compliance with the FMP.
End of Survey Report	SEA	Report detailing marine fauna observations and whale detections, actions taken as per the FMP, and reasons actions not taken.
Compliance and Sighting Reports	SEA	Sightings and observations from all detection methods used as well as survey information are to be recorded within the DCCEEW Cetacean Sightings Application (CSA). Upon completion of the survey the information entered into the CSA is to be exported as a text file and provided to the CGG Environment Officer.
	CGG Environment Officer	Submit CSA text file to sightingsdata@aad.gov.au within two months of survey completion.

2.3 Detection and Observations Methods

Details of the detection and observation methods can be found in Section 9.3 of Appendix E7. In short, detections can occur from any of the following sources:

1. Seismic vessel
    a. Marine Fauna Observers
    b. PAM Detectors
    c. Officers of the Watch (verified by MFO/PAM Detector)
2. Aerial Drone Surveillance
3. Coastal Observers
4. Spotter vessel
    a. Marine Fauna Observers
    b. PAM Detectors
5. Other marine users
    a. Third parties with on-water activities (passing ships, petroleum titleholders, fishers)
    b. Offshore wind proponents with ADM technologies
6. State agencies/research institutions
    a. Arthur Rylah Institute – Citizen Science Program
    b. DEECA – Research programs
    c. Blue Whale Study
7. Local citizen science platforms

These multiple approaches provide extensive coverage for whale detections out to the required ranges.

3 Protection Procedures – At Sea

In the context of the Regia MSS, it is acknowledged that there are inherent challenges in detecting whales. Given the range of species, behaviours, and habitats, it requires a multifaceted approach.

These procedures apply to all marine mammals, however specific measures relating to sound and BWs and SRWs are discussed in Section 4 and Section 5.

Unless otherwise stated, all low frequency cetacean detections are assumed to be either a SRW or BW until confirmed otherwise, and the below procedures applied accordingly.

3.1 Start Up Procedures

A soft start will be implemented in the following circumstances:

1. When the sound source is turned on initially once all pre-start up criteria have been met.

   This type of soft start gradually increases the seismic source over a 30-minute period. It is anticipated that during this period mobile species including dolphins, seals, and turtles will move away from the sound source before it is at full power, providing them a level of protection. Once the source passes, animals will be free to move back into the habitat that they departed from.

2. When the sound source is in low power mode due to the presence of medium to large flocks[2] of foraging birds[3] within 500 m of the sound source.

3. When the sound source is in low power mode during line turns or otherwise transiting the Operational Area.

3.2 Start Up Delay Procedures

- If medium to large flocks of foraging birds is detected within 500 m of the sound source during the soft start procedure, the acoustic source will be set to low power mode and will not be ramped up until all pre-acquisition criteria have been met again. [Paragraph added in response to Matter B15].
- If any whale is detected in relevant SDZs during soft start procedures, the acoustic source will be shut down, and another soft start cannot commence until all pre-acquisition criteria have again been met.

3.3 Operating Procedures

- No vessel is permitted to operate at speeds of more than 6 knots during normal acquisition operations, to reduce the risk of vessel collision to whales.
- If a whale approaches within 300m of any vessel, the vessel must:
  - Reduce speed and maintain at least 300 m from the whale.
  - Position vessel to not impede the path of the whale.
  - Avoid sudden changes in speed or direction.
  - Communicate the sighting to the SEA and other vessels.
- If a dolphin, pinniped, or turtle approaches within 150m of any vessel, the vessel must:
  - Reduce speed and maintain at least 150 m from the dolphin, pinniped or turtle.
  - Position vessel to not impede the path of the dolphin, pinniped or turtle.

[2] There is no set number of birds that constitutes a flock. For the purposes of mitigating impacts/risks to all foraging birds, a small flock is considered a group of less than 20 birds, a medium flock a group of 20 to 100 birds and a large flock a group of over 100 birds. Mitigations should consider medium to large flocks of birds to minimise potential for negative impacts to occur. These impacts could include alterations to resting regime, alterations to foraging success, collision, alterations to group cohesion.

[3] Foraging, as it relates to birds, includes bird species participating in feeding behaviours such as plunging and diving.

- Avoid sudden changes in speed or direction.
- Communicate the sighting to the SEA and other vessels.

Figure G2-2 details the observation and detection distances for each observation and detection method. This approach ensures that information on the presence of whales and other species can be obtained at relevant distances. Figure G2-2 also illustrates deployment of aerial surveys that may provide additional information on the movement of SRW into and out of reproduction BIA and BW into and out of the Otway Region.

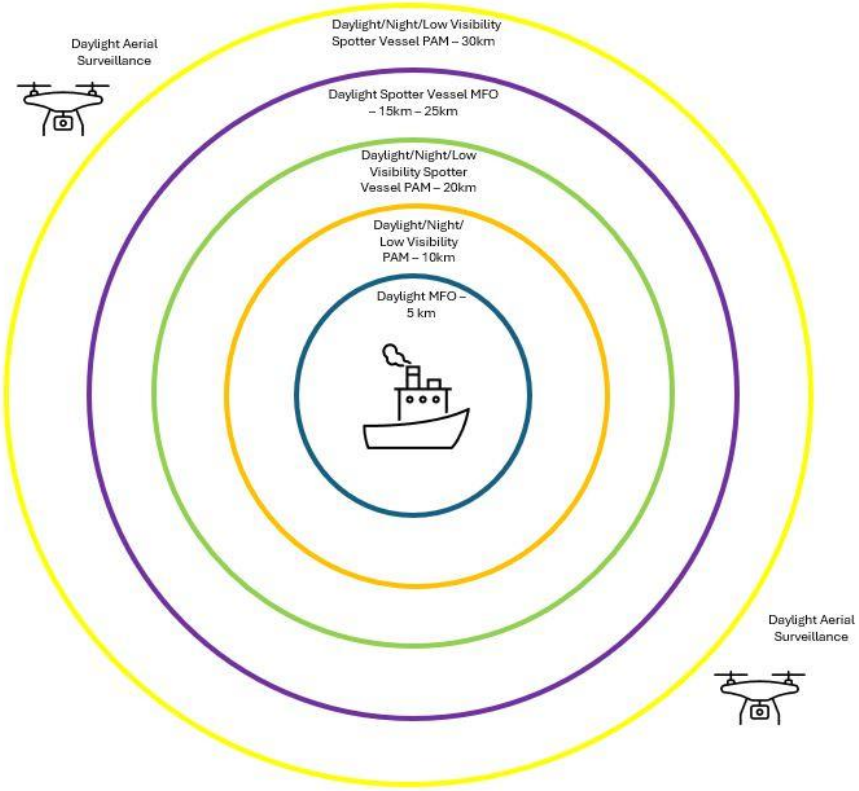


Figure G2-2 - Observation and Detection Zones

3.4 Shut Down Procedure

Once the seismic source is at full power, shut down of the sound source must occur if:

- Medium to large flocks of foraging birds are observed by the Marine Fauna Observer within 500 m of the source. Start-up procedures can commence when the seismic source is > 500 m from medium to large flocks of foraging birds.[4]
- Any pinniped, dolphin, or turtle is detected within 500 m of the source (except for bow riding dolphins).[5]

[1] Based on modelled PTS SEL24 distance for LF-cetaceans.

[4] This measure has been adopted to protect foraging penguins and other diving birds following consultation.

[5] Based on previous seismic surveys, CGG has chosen to only implement a shutdown zone and not a low power zone to provide another level of protection to all whale species. This is based on the low power zone for whales as detailed in the EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (Policy Statement 2.1).

- Any whale[6] is detected within 2 km of the sound source.
- Any LF cetacean is detected within 9 km of the sound source[1]

3.5 Night-time and Low-Vis Procedures

At night-time or at other times of low visibility, the following measures apply for start-up and operations:

- **Start-up** may commence as per the Soft-Start Procedure if there have not been 3 or more whale instigated shut-down situations during the preceding 24-hour period.
- **Operations** may proceed if there have not been 3 or more whale instigated shut-down situations during the preceding 24-hour period.

3.6 Helicopter Operation Procedure

Helicopters will not fly lower than 1650 ft when within 500 m horizontal distance of a cetacean except when landing or taking off and will not approach a cetacean from head on.

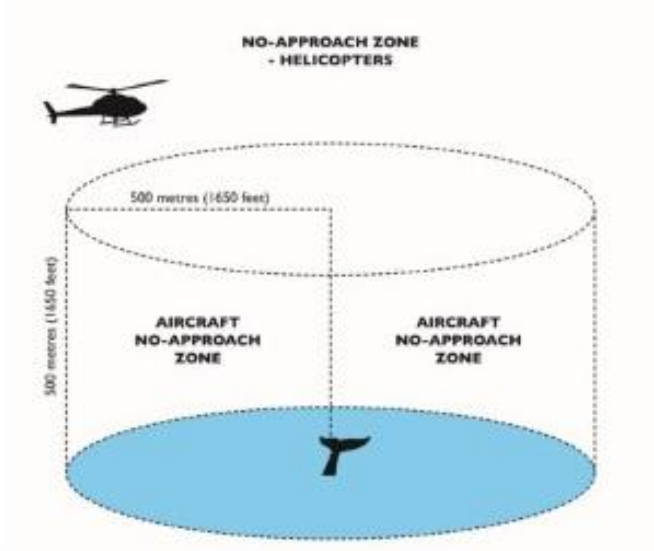


Figure G2-3 – Cetacean Approach Distances for Helicopters

3.7 End-of-Survey Procedure

The survey must stop if any of the following criteria are met:

- The activity started 90 days prior.

[6] As per Policy Statement 2.1 'Whales' includes baleen whales and larger toothed whales, such as, sperm whales, killer whales, false killer whales, pilot whales and beaked whales.

4 Protection Procedures – SRW Reproduction BIA

Pre-survey Procedures – Onshore MFOs and Drone Pilots in Command (PICs)

- Recruit, train, and brief all MFOs and PICs in SRW identification, behaviour recognition (especially mother–calf pairs), and use of optical equipment.
- Confirm observation sites along the coastline, ensuring safe access, unobstructed views, and coverage of key vantage points (e.g., Logan's Beach Whale Nursery, The Crags, Portland headlands).
- Calibrate and test equipment: binoculars, rangefinders, cameras, tablets/logbooks, and GPS units.
- Develop daily observation schedule and flight plans to ensure consistent coverage during daylight hours.
- Conduct trial observation days under different weather conditions to test protocols, and sighting forms.
- Establish clear reporting protocols for relaying sightings to the Survey Environment Adviser, including format, frequency, and escalation triggers.
- Establish contact with regional stakeholders, including DELWP, local whale groups, and other for data-sharing.
- Prepare guidance materials for field staff, including identification aids, behavioural cues, and reporting templates.

4.1 September Procedures – Onshore MFOs, PIC, and Onshore PAM Operators

- Conduct daily land-based observations and drone flights across designated coastal points.
- Communicate with and notify the Survey Environment Adviser immediately of any SRW sightings within the BIA as this will instigate a shutdown of the sound source.
- If an individual SRW or a SRW calf-cow pair is detected, record all sighting data, including:
  - Time, date, and location.
  - Group composition (e.g., mother and calf, lone adult).
  - Estimated distance from shore.
  - Behavioural state.
  - Environmental conditions (sea state, visibility).
- Note any observational limitations due to weather or sea state in daily logs.
- Track movement patterns to assess use of the BIA.
- Submit daily summary reports to the Survey Environment Adviser including full sighting and flight logs and absence confirmations.
- Participate in scheduled coordination briefings with marine fauna observers on the survey and spotter vessel to align detection data and mitigation responses.
- Ambient sound data from the SSV buoys will be monitored for any exceedances of impulsive noise over the 120 dB threshold.[7]

4.2 October Procedures – Onshore MFOs, PICs, and Onshore PAM Operators

SRWs have not been observed in the monitoring zone in October in any of the last 6 years however we recognise that does not mean SRW may not utilise the reproduction BIA in October and as such further observations to confirm presence/absence are required. However, the nature of the observer effort changes to reflect what the data indicates.

[7] The definition of exceedances can be found in Appendix G6.

The daily procedures in October are:

- Continue daily observation effort and drone surveillance with sufficient intensity to confirm presence or absence.
- Report any SRW sighting immediately to the Survey Environment Adviser, as this will instigate a shutdown of the sound source.
- If a SRW or SRW calf-cow pair is detected, record all sighting data, including:
  - Time, date, and location.
  - Group composition (e.g., mother and calf, lone adult).
  - Estimated distance from shore.
  - Behavioural state.
  - Environmental conditions (sea state, visibility).
- Use sighting trends from September to identify date thresholds for likely BIA departure.
- Continue daily logs, including 'no sightings' confirmations, environmental conditions, and any relevant incidental observations.
- Ambient sound data from the SSV buoys will be monitored for any exceedances of impulsive noise over the 120 dB threshold. In October, if there have been 14 consecutive days without a confirmed SRW detection, the shutdown trigger for repeated impulsive-noise exceedances increases to 140 dB SPL.
- Compile end-of-season summary report detailing observations, timing of departure, and any recommendations for future surveys.

4.3 SRW Spotter Vessel Procedure

This procedure governs the spotter vessel movements for monitoring SRWs and will be implemented from 16 September to 31 October. There are two modes for spotting:

Scouting Mode

The spotter vessel conducts reconnaissance 10[8] km ahead of the survey vessel before commencement of the survey and each line turn.

The spotter vessel is deployed at least 120 minutes before the survey vessel commences a new survey line.

The spotter vessel moves systematically up to 10[9] km ahead of the survey vessel and patrols areas adjacent to the Active Source Area along the expected line of travel of the survey vessel.

SRW Sentry Mode

The spotter vessel maintains a position adjacent to the SRW BIA to maximise SRW detection capabilities. This allows for proactive implementation of mitigation measures to minimise potential impacts to SRW when they are utilising the reproduction BIA. The spotter vessel will travel parallel to the seismic vessel, 20km away and on the shoreside of the seismic vessel, while it is acquiring lines 31-67 (Figure G2-4).

[8] The 10km separation distance while in Scouting Mode allows the spotter vessel to clear the first 20km (10km range of PAM on both seismic and spotter vessel) of the survey line, thus reducing the chance that a whale re-enters the previously cleared mitigation zone during the transition.
[9] The 20 km separation distance is informed by the performance of the PAM systems installed on both the seismic and spotter vessels, each capable of detecting whales at ranges of ~10 km. By positioning the spotter vessel 20 km away from the seismic vessel, CGG maximises combined detection coverage and enhances the likelihood of detecting Southern Right Whales.

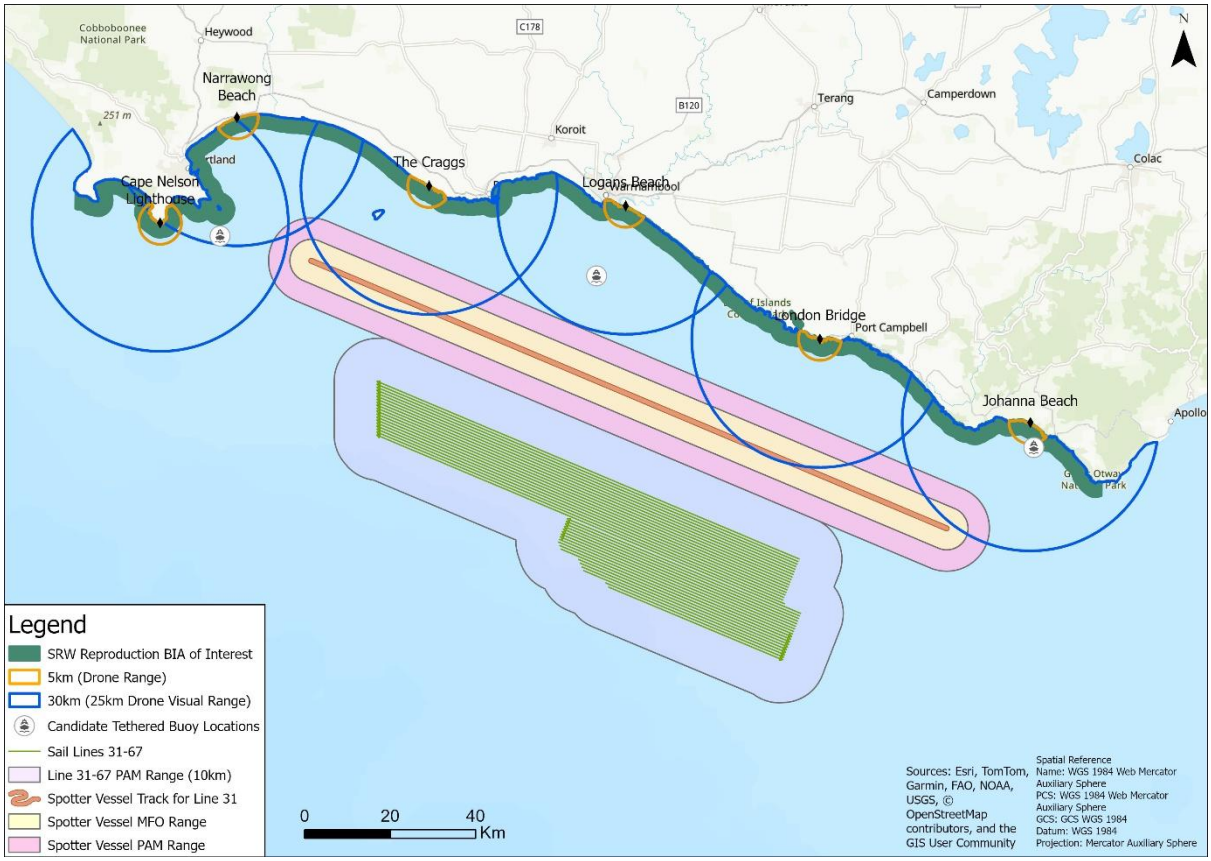


Figure G2-4 – Detection Capability for SRWs in September and October

4.4 Night-time and Low-Vis Procedures

If there is a confirmed SRW detection at night, the sound source will be shut down until daylight.

4.5 Detection Shutdown and Restart Procedures

This procedure applies from 16 September to 31 of October.

- Shutdown the sound source for 24 hours if:

  There is any confirmed[10] detection of a SRW (visual or acoustic from any detection platform) within the SRW Shutdown Area (See Figure G2-5); or
  There are any exceedances of impulsive noise over 120 dB SPL detected from the SSV buoys, and the survey is acquiring at full power in September. In October, if there have been 14 consecutive days without a confirmed SRW detection, the shutdown trigger for repeated impulsive-noise exceedances increases to 140 dB SPL.

10 A "confirmed detection" is a detection from any platform or program verified by a qualified MFO, an expert scientist in the field, or from photographic evidence that has been time and date stamped.

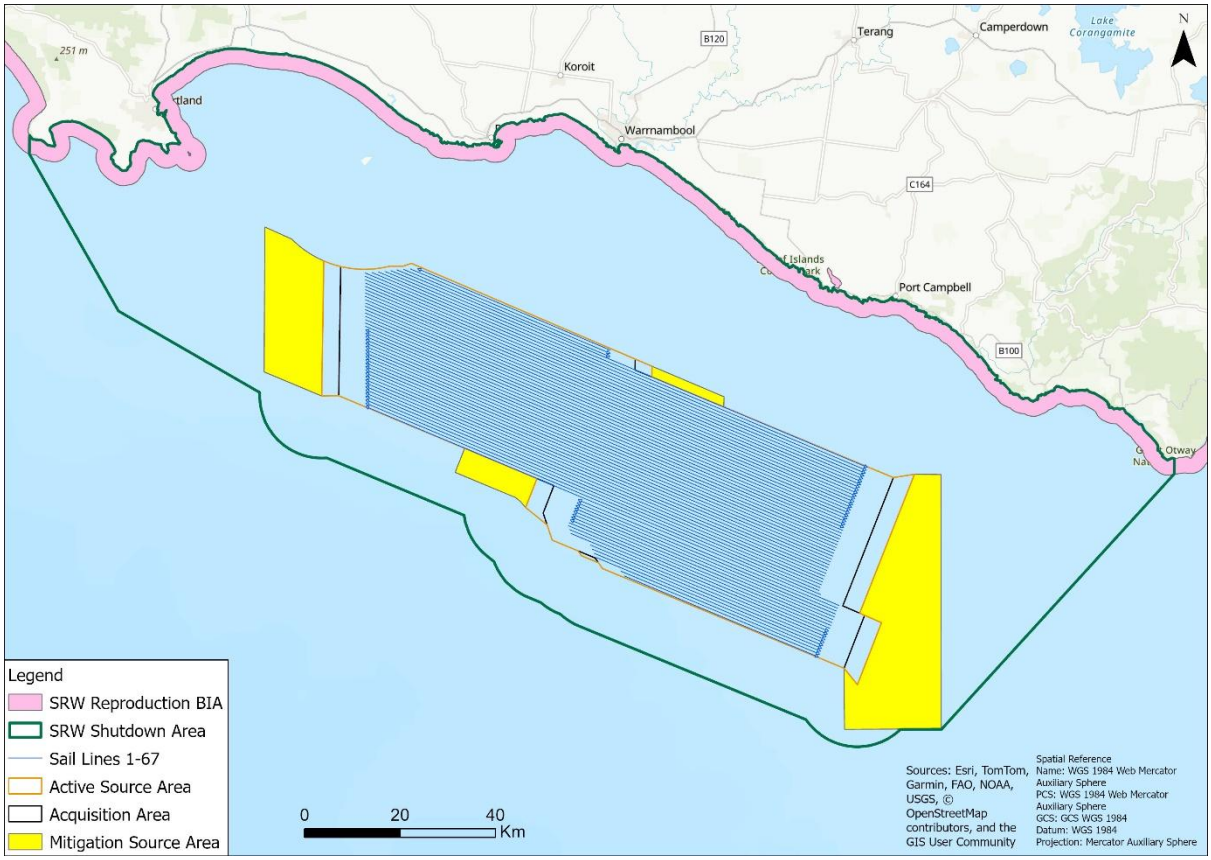


Figure G2-5 - SRW Shutdown Area

The restart protocol can only be initiated if:

- There have been no confirmed detections of any SRW from all the platforms for a period of 24 hours; and/or
- The seismic vessel has relocated; and/or
- There are no exceedances of impulsive noise above the 120 dB ultra conservative threshold from monitoring the SSV buoys during the soft start. The restart protocol will include the following procedures:

The SRW restart protocol:

- T-90 minutes: the spotter vessel will start a pre-clearance detection survey of the line; the spotter vessel will be 20 km ahead of the seismic vessel.
- T-60 minutes: the MFO's and PAM operators on the vessel will start a pre-clearance detection survey
- T-30 minutes: the soft start can commence, and the spotter vessel can resume its position, 20km away and on the northerly side, while it is acquiring lines 31-67.

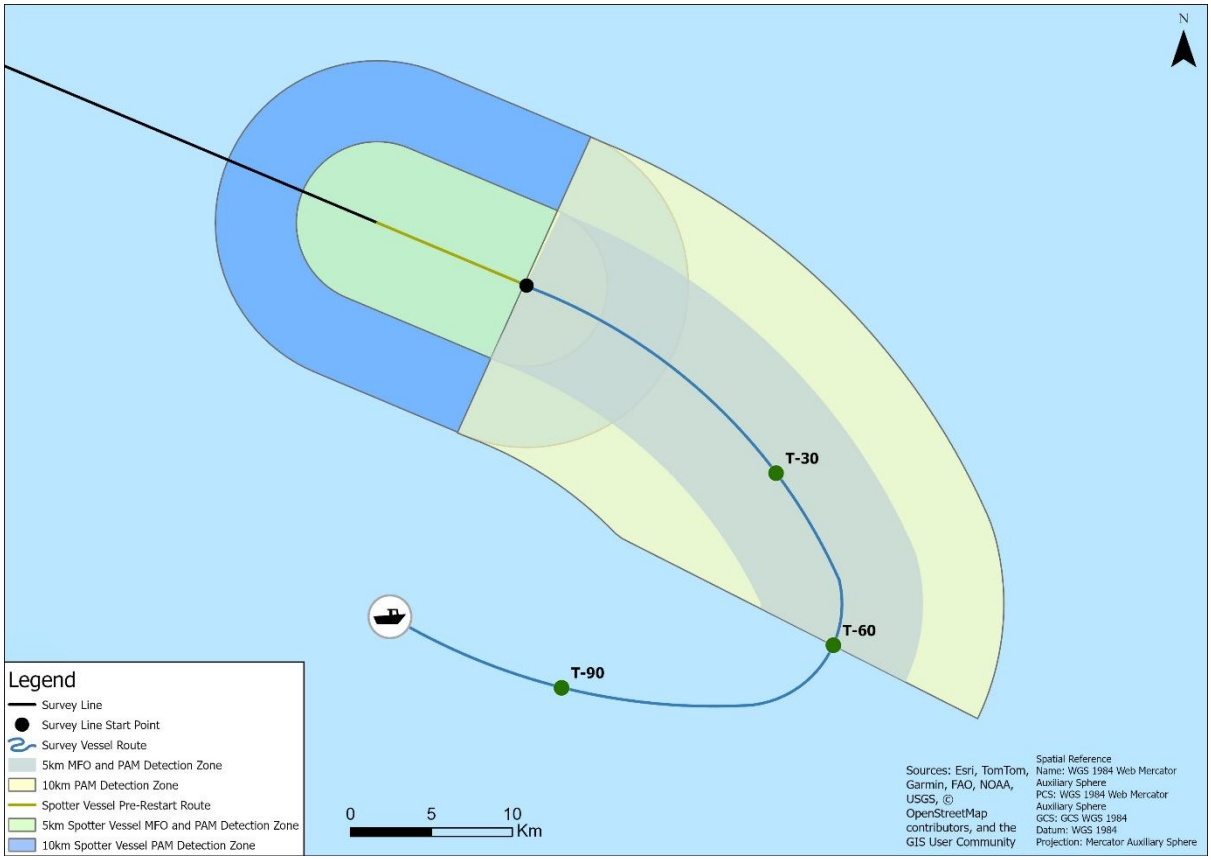


Figure G2-6: Restart procedure for SRW in September and October.

5 Protection Procedures – BW Foraging BIA

5.1 Pre-BW Season Drone and Coastal Monitoring (End of October)

One drone aerial surveillance flight will be conducted from Cape Nelson to try and detect any early arrivals of BWs into the Foraging BIA. Cape Nelson has been chosen as sighting databases indicate BWs pass by Cape Nelson when moving into the BIA.

5.2 1st November –31st December Detection Procedures

BW abundance data indicates initial feeding occurs in South Australian waters and move eastwards throughout the summer months. The BW detection measures have been designed with this in mind and to maximise all possible chances of BW detections.

Detection procedures for BWs include:

- Positioning the spotter vessel on Blue Whale Sentry Mode where the vessel will maintain a position 20 km[11] to the west of the survey vessel (see Figure G2-7 below)
- PAM and MFOs on board both the spotter and survey vessels.

5.3 BW Spotter Vessel Procedure

This procedure governs the spotter vessel movements for monitoring BWs and will be implemented from 1 November to 31 December. There are two modes for spotting:

Scouting Mode

The spotter vessel conducts reconnaissance 10 km[12] ahead of the survey vessel before commencement of the survey and each line turn. The spotter vessel is deployed at least 120 minutes before the survey vessel commences a new survey line.

The spotter vessel moves systematically up to 10km ahead of the survey vessel and patrols areas adjacent to the Active Source Area along the expected line of travel of the survey vessel.

Blue Whale Sentry Mode

The spotter vessel maintains position 20 km[11] to the west of the survey acquisition area because blue whale abundance data shows an initial tendency for foraging to occur in South Australian waters and move eastward throughout the summer months. Therefore, it is more likely that the survey will encounter blue whales on its western flank, and if the spotter vessel is in either mode, it would be positioned on the eastern side of the survey and is less likely to encounter blue whales (Figure G2-7).

[11] The 20 km separation distance while in Sentry Mode is informed by the performance of the PAM systems installed on both the seismic and spotter vessels, each capable of detecting whales at ranges of ~10 km. By positioning the spotter vessel 20 km away from the seismic vessel, CGG maximises combined detection coverage and enhances the likelihood of detecting Blue Whales.

[12] The 10 km separation distance while in Scouting Mode allows the spotter vessel to clear the first 20km (10km range of PAM on both seismic and spotter vessel) of the survey line, thus reducing the chance that a whale re-enters the previously cleared mitigation zone during the transition.

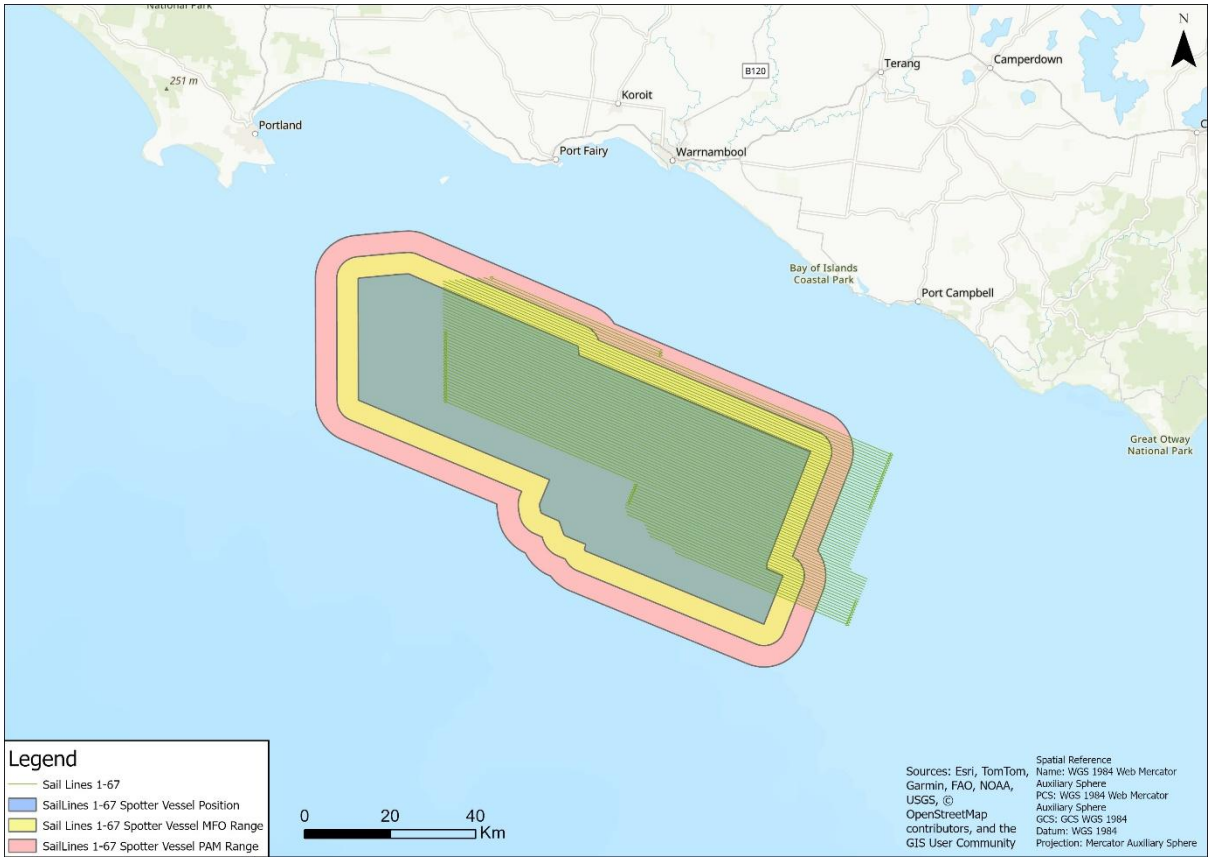


Figure G2-7 – Detection Capability for BWs in November and December

5.4 Night-time and Low-Vis Procedures

If there is a confirmed blue whale PAM detection within 5 km at night, the sound source will be shut down until daylight.

5.5 Shutdown and Restart Procedures

Once the seismic source is at full power, the sound source will be shut down for one hour [13] if:

- A Blue Whale is detected within 5 km (the TTS SEL distance) of the sound source.
- A Blue Whale is detected within 5 km (160 dB behavioural SPL distance) of the sound source.

If there is a PAM detection at night, the sound source will be shut down until daylight.

If there is an "unidentified baleen whale" within 5 km of the seismic source, this will trigger a shutdown for one hour, or until daylight if at night. Attempts will be made to identify the baleen whale, and if the individual is confirmed not to be a BW, restart procedures can commence immediately, provided all other restart measures have also been met.

The restart protocol can only be initiated if:

- there have been no confirmed detections of any BW from all the platforms for a period of one hour.

The BW restart protocol will include the following procedures:

- T-90 minutes: The spotter vessel will be 10km ahead of the seismic vessel.

[13] One hour is based on Policy Statement 2.1 which states shut down may last 30 minutes, CGG has adopted a more conservative approach extending the 30-minute shutdown to 1 hour.

- T-60 minutes: the MFO's and PAM operators on the vessel will start a pre-clearance detection survey
- T-30 minutes: the soft start can commence, and the spotter vessel transitions to sentry mode (20km due West of the survey vessel) (see Figure G2-8 below)

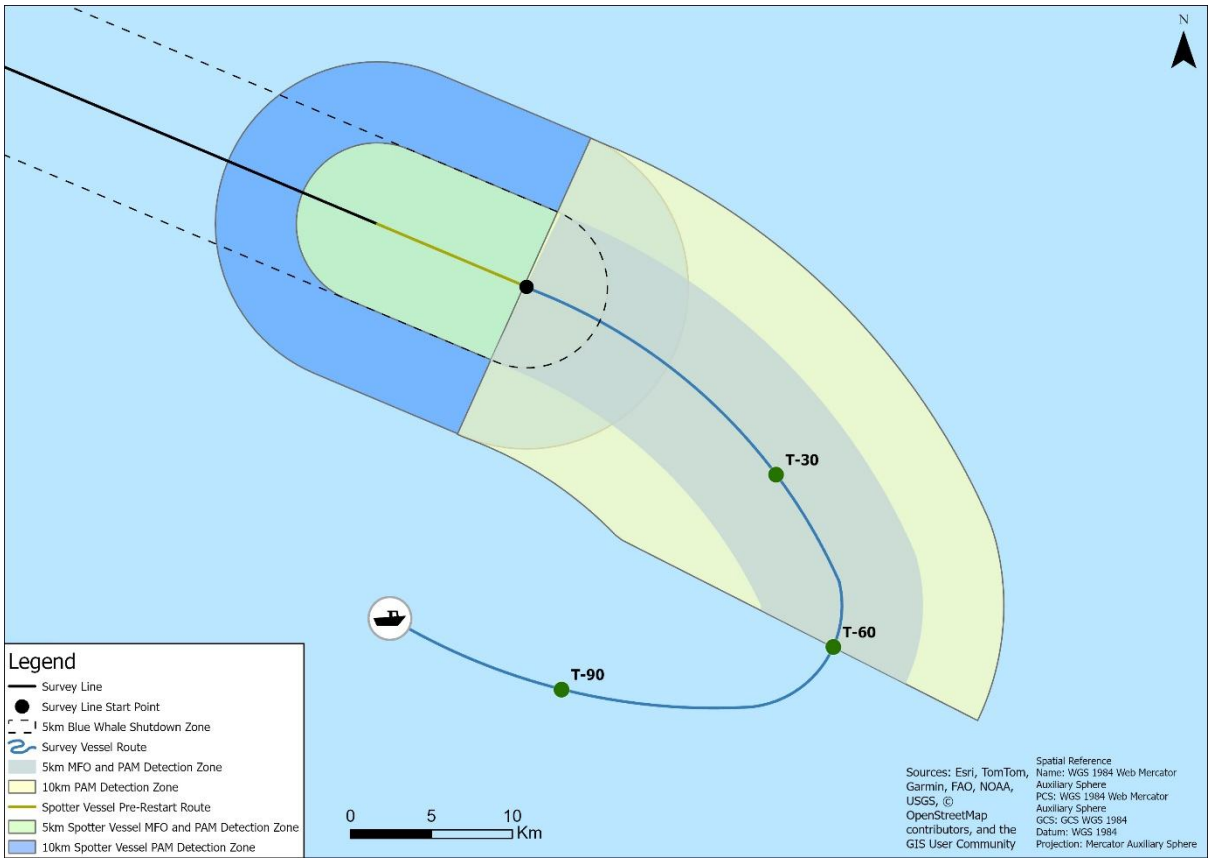


Figure G2-8: Restart procedure for BW in November and December.

6 Document Control

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	2 November 2023	MS	Document created.
0.1	19 Novmber 2023	SJ	Updates to include all fauna, not just marine mammals.
0.2	2 January 2024	SJ	Updated following completion of assessments.
1	5 January 2024	MS	Accepted all tracked changes and formatted for public comment.
1.1	10 May 2024	CT/KC	Rework of document to ensure alignment with outcomes of the consultation process, public comment, and the updated environmental assessments.
2	14 May 2024	MS	Review and update ready for resubmission.
3	28 October 2024	MS/CT	Updated following NOPSEMA assessment.
4	12 April 2025	MS/CT	Updated following NOPSEMA, review and update of E7 & F3, and inclusion of protection procedures for the SRW reproduction BIA.
5	10 December 2025	CT/RH/EO/AH/MS	Updated following NOPSEMA OMR #2 and consequential changes.

7 Glossary of Acronyms and Terms

Acronym or Term	Description
Acoustic detection	Detection of whales via in water systems such as: • Passive acoustic monitoring (PAM) • Acoustic detection monitoring (ADM) on gliders or fixed buoys
ADM	Acoustic Detection Monitoring
ALARP	As Low As Reasonably Practicable
AAZ	Activity Action Zone
BW	All blue whale sub-species, pygmy blue whales, and Antarctic blue whale.
Cetaceans	Whales and dolphins.
Detection	Detection is used to mean detection of whales which may occur via MFO observation or via acoustic detection methods.
EP	Environment Plan
EPO	Environmental Performance Outcome
FMP	Fauna Management Plan
MFO	Marine Fauna Observer
PAM	Passive Acoustic Monitoring
PIC	Pilot in Command
Policy Statement 2.1	EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales
PTS	Permanent Threshold Shift
Regia MSS	Regia Marine Seismic Survey
SDZ	Shut Down Zone where the seismic source will be shut down.
SEA	Survey Environment Adviser
SRW	Southern Right Whale
Soft start	Gradually bringing on each acoustic source over a 30 min period.
SSV Buoy	Sound Source Verification Buoy
TTS	Temporary Threshold Shift

8 References

Koessler MW, Muellenmeister AM, Connell SC & McPherson CR. (2023). Regia Marine Seismic Survey: Initial Acquisition Area. Initial Acquisition Area. Document 03076, Version 1.0. Technical report by JASCO Applied Sciences for Klarite.

Stephen T.J., V.E. Warren, S.C. Connell, M.W. Koessler and C.R. McPherson. (2024). Regia Marine Seismic Survey: Acoustic Modelling for Assessing Sound Exposures. Document 03301, Version 2.0. Technical report by JASCO Applied Sciences for Klarite.

Vallarta, J. & Eickmeier, J. (2025). Regia Marine Seismic Survey in the Otway Basin. Revision 1. Technical report by SLR Consulting (Canada) Ltd for Klarite.

Annex 1: Blue Whale Diving Summary

Diving behaviour of blue whales associated with feeding at depth was observed by Gill and Morrice (2003) in the Otway region, who note that blue whales dived steeply, submerging for 1 – 4 minutes, then returned to the surface. Tagging of a pygmy blue whale at the Perth Canyon identified 1677 dives over the tag duration (7.6 days) (Owen et al. 2016). The duration of dives was:

- Feeding - mean of 7.6 minutes, maximum of 17.5 minutes.
- Migratory – mean of 5.2 minutes, maximum of 26.7 minutes.
- Exploratory – mean of 8.6 minutes, maximum of 22.05 minutes.

Tagging of 13 pygmy blue whales (five of which had tags that monitored dive depth and duration) in the Bonney upwelling identified (Möller et al. 2020):

- Whales predominantly carried out area-restricted search (presumably foraging) with generally shallow and short dives. However, dives were generally deeper at night compared to during the day.
- Whales performed mostly square shaped dives that were shallow in depth and short in duration.
- Dives recorded to a maximum of 492 m (mean = 59.5 m ± 94.3), and for a maximum duration of 112 minutes (mean = 6.1 minutes ± 5.2).

Although the maximum recorded dive time was 112 minutes, the mean dive time of 6.1 minutes ± 5.2 provides confidence that the typical dive time is less than 30 minutes (Möller et al. 2020). Tagging of eight blue whales off California (Irvine et al. 2019) identified that dive durations were as long as 30.7 minutes, and no feeding lunges were recorded during dives > 20 minutes in duration.

References:

Gill, P. and M. Morrice. 2003. Cetacean Observations. Blue Whale Compliance Aerial Surveys. Santos Ltd Seismic Survey Program Vic/P51 and P52. November – December 2002. Report to Santos Ltd.

Irvine, L.M., D.M. Palacios, B.A. Lagerquist, and B.R. Mate. 2019. Scales of Blue and Fin Whale Feeding Behaviour off California, USA, With Implications for Prey Patchiness. Frontiers in Ecology and Evolution 7(338).

Mölle LM, Attard CRM, Bilgmann K, Andrews-Goff V, Jonsen I, Paton D and Double MC. 2020. Movements and behaviour of blue whales satellite tagged in an Australian upwelling system. Scientific Reports 10:21165.

Owen. K., Jenner CS., Jenner. M-NM. And Andrews. RD. 2016. A week in the life of a pygmy blue whale: migratory dive depths overlaps with large vessels draft. Animal Biotelemetry. 4:17. DOI 10.1186/s40317-016-0109-4.

Annex 2: Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table G2-2. If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table G2-2 - Objections and Claims raised from consultation

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4016	Pygmy blue whales migrate out of the area from April to June and return in November to December, remaining in the Portland detection area until mid-June each year (McCauley et al. 2018). The timing of the proposed seismic survey overlaps with the migration periods of these endangered whales. Mitigation measure M#01 states that seismic operations will only occur in the pygmy blue whale foraging Biologically Important Area (BIA) when "low numbers of PBWs and other foraging whales are present," specifically during April, May, and June or September, October, and November. AMCS argues that this contradicts findings from McCauley et al. (2018) and Moller et al. (2020), which indicate that pygmy blue whale presence primarily occurs from January to April, with potential activity as early as October and lasting until June. Data from tagged whales in 2015 showed use of continental shelf areas from January to July. AMCS requests that CGG provide clear and comprehensive information on how the proposed activities will minimize interactions with and harm to migrating whales during their presence in the area.	CGG will adopt a monitoring program (see Appendix G2) to be able to detect baleen whales. One of the aims of the monitoring program will be to detect either the departure or arrival of blue whales and southern right whales into their respective biologically important areas (depending on the seasonal window). As per Policy Statement 2.1, there will be a threshold set to provide clarity about when the survey can or cannot start to acquire data and when it would need to stop. The monitoring program and threshold criteria will be structured to reflect the interannual variation of PBW presence in their foraging area. This measure will ensure there the activity is consistent with the respective management plans for these whales.	5040
4048	Concern about sustained noise impact on cetaceans in the area.	CGG has conducted a thorough impact assessment relating to underwater sound and marine mammals, with mitigation measures and management adopted as a result of both this assessment (which includes relevant marine mammal species) (Appendix E7) and a further assessment (which includes two key whale species: Blue Whale and SRW) (Appendix F3). A	1835

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		comprehensive fauna management plan was also established as part of this EP development (Appendix G2).	
4050	Concern about the destruction of smaller sealife and the wounding of larger marine animals due to seismic blasting.	Regia EP has conducted thorough assessments of the literature for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures are outlined in the EP.	1669
4053	Concern about the impact on marine creatures due to noise pollution from seismic surveys.	The titleholder acknowledged the feedback, noting that potential impacts from underwater sound to relevent receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals, are assessed in the Environmental Plan (EP) and can be found in Appendices E2, E3, E4, E5, E6, and E7. Measures to minimise adverse impacts on biological receptors are outlined in the EP also, and can be found in Appendix G2.	3237
4055	Concern about the impact on shearwater birds and their breeding ground at Griffith Island.	Titleholder has conducted a thorough assessment of the literature, with potential impacts to birds assessed in the Environmental Plan (EP) (Appendix E5). Measures to minimise potential adverse impacts birds are also outlined in the EP (Appendix G2).	2908
4058	Concern about the mass destruction the blasting will cause to local sea animals, particularly mentioning the Southern Right Whales that migrate to Warrnambool every year to give birth.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of Southern Right Whales, within the area of operation. A fauna management plan, along with a suite of measures are also in place to reduce any impacts to as low as practicable.	886
4063	Concern for various birds and little penguins and the effects of sound and light.	Impacts from underwater sound and artificial light on birds, including little penguins, are assessed in the Environmental Plan (EP) and can be found in Appendices E5 and E9. Further assessment of little penguins was also undetook by CGG to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level. Measures to minimise	1783

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		adverse impacts on birds in the region are also outlined in the EP.	
4096	Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artifical light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity.The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures are outlined in the EP.	2766
4106	Feedback raises concern for the welfare of whales that come to calve in local waters, emphasising the need to consider the impact of proposed activities on these vulnerable marine animals.	We will not survey while SRW mothers and calves are in the area. Oil and gas has successfully co-existed with wildlife in this area for 25 years and we are doing everything we can do protect the wildlife and natural beauty of the area (Event ID 1781).	1781
4118	Impact on marine animals, which are the livelihood of the community.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures have been outlined in the EP.	2274
4133	Mass destruction of marine populations through the blasting process.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures have been outlined in the EP.	2274
4135	Mention of being heavily impacted by the whales in the tourism industry.	Title holder has undertaken a thorough analysis and assessment of all relevant literature related to Marine Mammals to inform its decisions. The MSS will not	1244

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		impact the population stability of marine mammals within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	
4140	No mention of ceasing activities when whales are present in the area.	CGG has conducted a thorough impact assessment relating to underwater sound and marine mammals, with mitigation measures and management adopted as a result of both this assessment (which includes relevant marine mammal species) (Appendix E7) and a further assessment (which includes two key whale species: Blue Whale and SRW) (Appendix F3). A comprehensive fauna management plan was also established as part of this EP development (Appendix G2).	1835
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high-decibel blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making them unacceptable in a whale sanctuary area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	537
4206	Stakeholder raised concerns about the number of planned overflights stating that 12 was insufficient	CGG has revised it's commitment to only 1 aerial surveillance flight as a minimum, there may be up to 10 but the need will be established by the Whale Expert Panel.	3783
4231	The feedback expresses concern that the project might disrupt blue whale migration, movements, and natural behavior due to potential interference in their habitat.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for blue whales and an extensive detection area. These measures have been assessed in Appendix E7, F3 and G2.	2081
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4270	The stakeholder asserts seismic surveying has been proven to be harmful and disruptive to marine life of many species.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the	3343

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		region and relevent mitigation measures have been outlined in the EP.	
4306	The stakeholder was concerned about potential negative impacts of gas exploration and development on Country, the marine and coastal environment, the local economy, Traditional Owners, and local communities.	The titleholder acknowledged the feedback, noting that all relevant impacts are assessed in the Environmental Plan (EP) and can be found in Appendices E1-E9. Measures to minimise adverse impacts on functions, interests and activities on relevant receptors are also adopted and can be found in Appendix G1.	3152
4309	The stakeholder was concerned about the impact on marine life sensibilities and populations.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures have been outlined in the EP.	2273
4351	There is a request for information concerning detection technologies utilised for monitoring blue whales.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. CGG has committed to several detection methods including aerial surveys, MFO's, PAM systems,and a fixed buoy detection system. CGG will also establish a whale expert panel to help infoprm decision making during the survey. This information is inlcuded in the EP E7, G1 and G2.	2007
4353	Concerns about the impact of oil and gas exploration on the marine environment, particularly in regards to seismic testing and its harmful impacts on whales.	Titleholder responded that a detailed assessment has been completed of all available relevant scientific literature to inform the management and mitigation of MSS and their interaction with whales. Spatial and temporal zoning in conjunction with mitigation measures will ensure that interactions will minimise disturbances to whales.	612
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4357	The stakeholder raised an objection to seismic surveys as they negatively effect the	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population	424

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	fishing industry, local economy and environment.	stability of commercial fish species and sensitive species within the area of operation. The MSS will also not impact the local economy. Mitigation plans are in place to reduce any impacts to as low as practicable.	
4358	The stakeholder was concerned about the impacts on flora and fauna being damaged and killed away from the coastline.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any flora or fauna within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2821
4454	Claims uncertainty due to reliance on fixed buoy, as this method is proposed as the sole strategy beyond visual and towed PAM detection ranges, means risks to threatened species have not been reduced to as low as reasonably practicable, and that CGG's environmental management system is not effectively implemented. Stakeholder argues that the system's effectiveness is undermined because triangulation of detections is not guaranteed and the testing protocol requires only a single successful unit test before deploying an array.	The EP acknowledges the limitation regarding guaranteed triangulation with the fixed buoy acoustic detection system. However, the system is one part of a multi-faceted detection and mitigation strategy that also includes towed PAM, visual observers, aerial surveys, and spatial/temporal activity restrictions. This combination of measures supports the implementation of the defined shutdown zones and activity limitations, thereby managing risks to ALARP and achieving acceptable environmental outcomes for species like BW and SRW. To note, an incorrect reference was used by the stakeholder.	EVT132
4455	The objection argues that the Environmental Plan's reliance on "near real time" data transmission between Acoustic Detection Monitoring operators and seismic operators is flawed because the term is undefined, with no limits on latency or provisions for equipment and communication failures in offshore conditions. The objection states that given the speed of whale movement and the immediacy of sound exposure, the lack of clear parameters renders the measure unreliable. Without evidence that the system can function effectively, the objection maintains that the control cannot be shown to reduce impacts to ALARP, and the ambiguity means the plan fails to meet regulatory requirements for appropriate, measurable	In Appendix G1 the EP describes standards for the control measures, including: One ADM Operator to always listen for LF cetacean calls for the duration of the survey and immediately communicate positive detections of LF cetaceans to the Environmental Officer. Further information on the towed and tethered ADM is contained in Appendix C7. This has not been made publicly available due to being commercial in confidence. In addition, the system is one part of a multi-faceted detection and mitigation strategy that also includes towed PAM, visual observers, aerial surveys, and spatial/temporal activity restrictions. This combination of measures supports the implementation of the defined shutdown zones and activity limitations, thereby managing risks to ALARP and achieving acceptable environmental outcomes for species like BW and SRW. To note, an inncorrect reference was used by the stakeholder.	EVT132

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	environmental performance standards.		
4456	The objection contends that CGG's proposed tethered buoy Passive Acoustic Monitoring (PAM) system is an unproven and unreliable primary mitigation measure for detecting marine mammals beyond the range of visual observation and towed PAM. It highlights contradictions within Appendix F5, which claims such systems have been used in seismic surveys while also stating their application in this context is "unknown." Published research shows only limited use in very different settings, such as large-scale Arctic noise monitoring arrays, rather than real-time whale detection. The objection concludes that relying on this experimental technology as a primary safeguard does not meet the regulatory requirement to reduce environmental impacts to ALARP, given the absence of evidence demonstrating its effectiveness in comparable operational environments like the Otway Basin.	Regarding the alleged contradiction in F5: The EP describes both the potential and general use of PAM systems deployed near the survey area (which can include buoys) during seismic surveys for real-time monitoring, and then a detailed, vendor-specific assessment of the actual documented history of particular tethered buoy PAM products. As stated in the EP, the PAM system is one part of a multi-faceted detection and mitigation strategy that also includes towed PAM, visual observers, aerial surveys, and spatial/temporal activity restrictions. The tethered buoy is also undergoing real-world testing, prior to any activity. This combination of measures supports the implementation of the defined shutdown zones and activity limitations, thereby managing risks to ALARP and achieving acceptable environmental outcomes for species like BW and SRW.	EVT132
4457	The objection references NOPSEMA's 2019 inspection report for the Otway Basin 2DMC Marine Seismic Survey, which concluded that published scientific evidence does not support passive acoustic monitoring (PAM) as an effective method for detecting Whales, including foraging Blue Whale and lactating females with calves, when the system is towed directly behind an active seismic or support vessel, stating that CGG has not addressed known limitations and therefore is inconsistent with the precautionary principle without providing peer-reviewed evidence that addresses the limitations previously identified.	The 2019 comments from NOPSEMA are related to a different proposal, with an alternative towed PAM system. The Sercel Quietsea PAM system has been accepted and used during Australian seismic surveys. In addition, as stated in the EP, the PAM system is one part of a multi-faceted detection and mitigation strategy that also includes towed PAM, visual observers, aerial surveys, and spatial/temporal activity restrictions.	EVT132
4458	Objects to the procedures concerning 'flocks of forgaing birds' not providing	Appendix G2 has been updated to footnote definition of flock and forgaing as follows: There is no set number of birds that constitutes a	EVT132

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	criteria for what constitutes a flock.	flock. For the purposes of mitigating impacts/risks to all foraging birds, a small flock is considered a group of less than 20 birds, a medium flock a group of 20 to 100 birds and a large flock a group of over 100 birds. Mitigations should consider medium to large flocks of birds to minimise potential for negative impacts to occur. These impacts could include alterations to resting regime, alterations to foraging success, collision, alterations to group cohesion. Foraging, as it relates to birds, includes bird species participating in feeding behaviours such as plunging and diving.	
4459	Objects to the commitment in the Fauna Management Plan (FMP) to adhere to the EPBC regulations regarding vessel speed and direction changes, due to the assertion that this is beyond the capability of a seismic vessel.	As stated in the EP, if a whale approaches within 300m of any vessel, the vessel must: • Reduce speed and maintain at least 300 m from the whale • Position vessel to not impede the path of the whale • Avoid sudden changes in speed or direction • Communicate the sighting These are all within the ability of the vessel.	EVT132
4503	GMTOAC claims inconsistencies and contradictions within CGG's April 2025 EP, particularly regarding the enforceable activity limitations intended to reduce risks to Southern Right Whales and Blue Whales. GMTOAC notes that NOPSEMA previously identified this issue in 2024, stating that duplication and inconsistencies left "no single source of truth" for assessing the EP. GMTOAC believes this fundamental flaw remains unresolved in the April 2025 version, undermining the reliability and enforceability of CGG's proposed control measures. GMTOAC provided the following examples: • Although the EP states that Appendix A2 contains the "final" list of enforceable activity limitations, it later states that Appendix G1 is "controlling" and overrides other lists. GMTOAC notes that many	CGG rejects claims of inconsistency between Appendices A2, G1 and G2, however the stakeholder may have misunderstood the distinction between activity limitations and control measures. Appendix A2 sets enforceable activity limits, measures that restrict operations to avoid or reduce impacts—while Appendix G1 details the control measures, performance standards, and procedures used to implement those limits in line with NOPSEMA's definition of controls. A2 and G1 serve different but complementary purposes, with A2 defining mandatory constraints and G1 outlining the operational steps required to meet them, together ensuring SRWs are protected from behavioural disturbance. G1 and G2 are also complementary rather than conflicting: G2 defines roles and responsibilities, while G1 outlines the controls and measurement criteria used to verify them. CGG maintains that the Environmental Officer and Survey Environment Advisor roles are clearly aligned across both appendices, collectively providing continuous oversight, shutdown authority,	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	measures appear in one appendix but not the other, and others contain conflicting descriptions. For example, Appendix A2 and Appendix G1 both outline conditions for discharging the sound source in the Southern Right Whale reproduction BIA, but the conditions differ in scope and detail. GMTOAC warns that such internal discrepancies create confusion for vessel crews and contractors and could jeopardise the species the measures are intended to protect. • GMTOAC highlights conflicting and unclear role descriptions across appendices, particularly for key positions such as the Survey Environment Advisor and Environmental Officer. Responsibilities differ between Appendix G1 and G2, creating uncertainty about who is accountable for shutdowns, communication, monitoring, aerial surveys, technology trials, and 24/7 oversight. GMTOAC notes that the EP does not clarify whether multiple staff will be appointed to fulfil these demanding roles. • Several measures appear in one appendix but not another. For instance, Appendix G2 requires pre-survey aerial surveys, but this requirement is absent from the controlling Appendix G1. Similarly, Appendix G1 includes commitments to trial drone and satellite detection technologies, but these are not included in the Fauna Management Plan, leaving unclear whether they are required or how their effectiveness will be assessed. • GMTOAC claims that these inconsistencies make it difficult, if not impossible, for operators to understand or correctly implement the required measures, with potential serious consequences for Nyamat Mirring, its ecosystems, and culturally	monitoring coordination, and expert engagement. CGG also notes that activity-level commitments, such as drone and satellite detection trials, rightly sit in G1, while position-specific duties like aerial surveys sit in G2. It states that the EP is intentionally structured so A2, G1 and G2 each fulfil distinct functions within an integrated management system, providing operators with clear instructions, objective decision-making criteria, and independent oversight from the Expert Panel. CGG concludes that this framework ensures transparent, robust management and effective protection of Southern Right Whales and Pygmy Blue Whales.	

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	significant species such as Southern Right Whales and Pygmy Blue Whales. They also express concern that CGG's qualitative measures, such as determining whether disturbance is "acceptable", lack objective criteria and fail to involve the Whale Expert Panel or reference Recovery Plan standards.		

Oil Pollution Emergency Plan and Operational and Scientific Monitoring Plan

Appendix G3: REG-EP-037-G3

Rev 5

December 2025

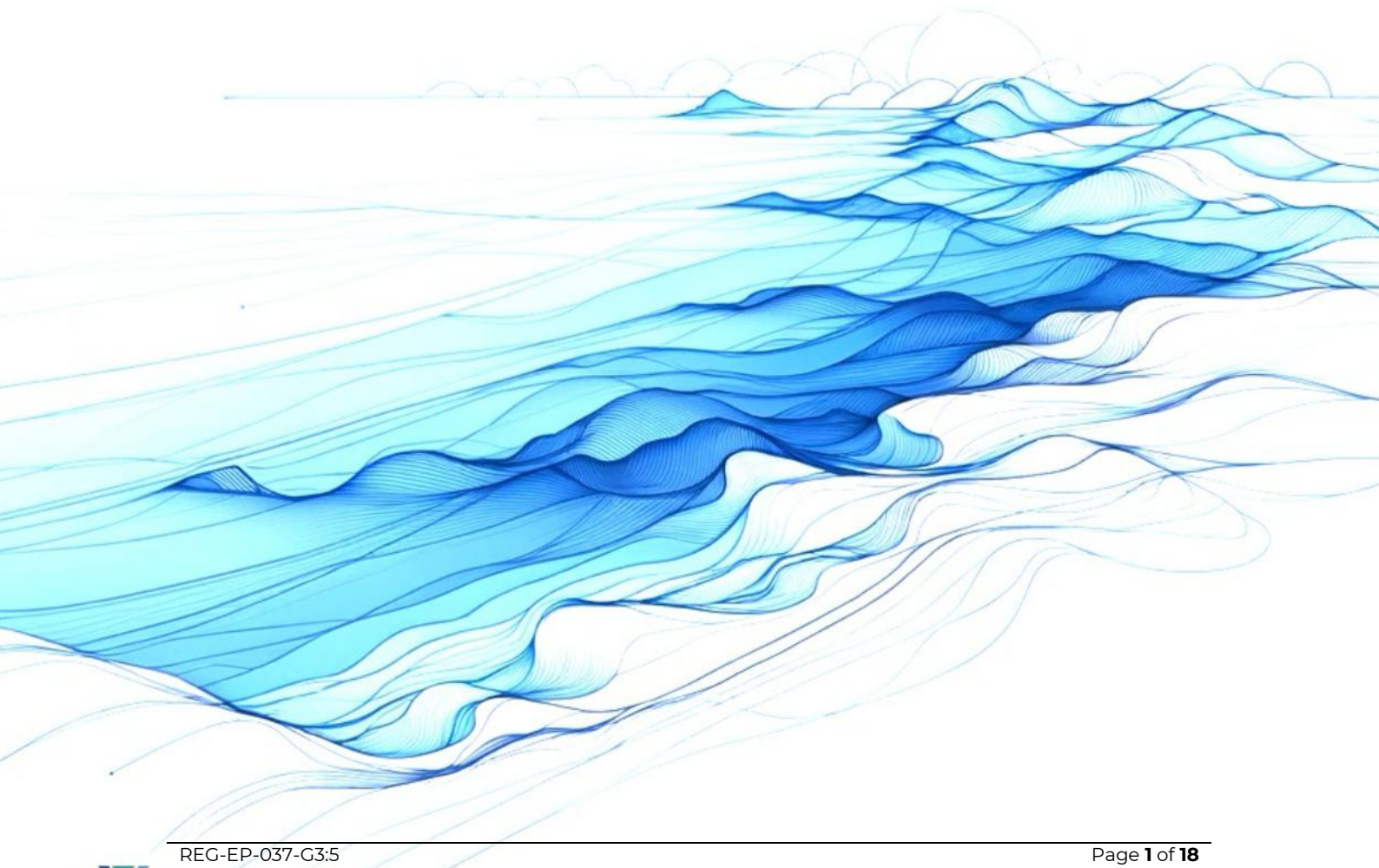


Table of Contents

1 Introduction 5

2 Purpose of the Document 5

3 OPEP Objectives 5

4 Scope of the OPEP 5

5 The National System for Preparedness and Response 6

5.1 Jurisdictional Authority (JA) 6

5.2 Control Agency (CA) 6

5.3 State Waters 6

5.4 Roles and Responsibilities 7

6 Assessment Of Spill Scenarios 7

7 Environment That May Be Affected (EMBA) 8

7.1 Protection priorities within the EMBA 8

8 Spill Response Preparedness 8

8.1 Oil Spill Resources 8

8.2 Proposed Spill Response Strategies 8

8.3 Oil Spill Response Run-sheet 9

8.3.1 Oiled Wildlife Response 10
8.3.2 Communication with Other Marine Users 10
8.3.3 Communication with other relevant interested persons or organisations 10

9 Operational And Scientific Monitoring Plan (OSMP) 11

9.1 Operational Monitoring 11

9.2 Scientific Monitoring 12

9.2.1 Scientific Monitoring Program 1 12
9.2.2 Scientific Monitoring Program 2 13
9.2.3 Scientific Monitoring Program 3 13
9.2.4 Scientific Monitoring Program 4 13
9.2.5 Scientific Monitoring Program 5 14
9.2.6 Scientific Monitoring Program 6 14
9.2.7 Scientific Monitoring Program 7 14

9.3 Initiation Of Scientific Monitoring 15

9.4 Scientific Monitoring Team 16

9.5 Study Template 16

10 Document Control 18

First Response Actions

In the event of a hydrocarbon release, first call the AMSA Rescue Co-ordination Centre Australia (JRCC Australia) via:

Phone: 02 6230 6811, 1800 641 792 (24 hours)
Fax: 02 6230 6868
Telex: 62349
AFTN: YSARYCYX

The following information should be provided wherever possible:

- ☐ Name and contact details.
- ☐ Where and when the spill occurred.
- ☐ A description of the pollutant.
- ☐ The size of the area where the oil is visible.
- ☐ The source of the spill including vessel registration numbers if known.
- ☐ Any photographs of the incident.

Victoria
If the spill is in, or is likely to move into Victorian State waters, the spill must be reported using the contact details below. If the spill occurs outside port jurisdictions, relevant port authorities will be notified as defined in the relevant State response plan. In the case of a Level 1 release within or close to State waters Portland Port will be the Control Agency. Contact the Port of Portland via:

Reporting (24-hour) Port of Portland +61 3 5525 2450.

For a Level 2 or 3 spill, or where a spill originates in Commonwealth waters and is likely to enter State waters (and where AMSA hand over Control Agency role), DJSIR will be the Control Agency.

Contact DJSIR via: DJSIR State Duty Officer on 0428 863 564.

In the event of a spill in one of the Victorian ports to be used by the Regia MSS seismic vessels, the relevant Port Authority must be notified immediately.

Tasmania
If the spill is in, or is likely to move into Tasmanian State waters, the spill must be reported using the contact details below.

In the case of any spill within State waters the Environment Protection Authority Tasmania is the Control Agency. TasPorts is the control agency for oil spills within Port waters.

For a Level 2 or 3 spill, or where a spill originates in Commonwealth waters and is likely to enter State waters (and where AMSA hand over Control Agency role), the Tasmanian Environment Protection Authority (EPA) is the Control Agency.

Ship's masters, owners, charterers, and agents must provide notification in accordance with statutory requirements (under Marine-related Incidents (MARPOL Implementation) Act 2020).

Telephone: Control Officer (SOPCA): +61 (0)3 6165 4599 or 1800 005 171 (within Tasmania only)
Radio: TasPorts Vessel Traffic Services

VHF radio channel 16/14/12, Call sign “relevant port name VTS" (e.g. Grassy VTS)

Email: incidentresponse@epa.tas.gov.au
EPA: Pollution Incidents: 1800 005 171
General enquiries: +61 3 6165 4599 enquiries@epa.tas.gov.au

The name, IMO number and radio call sign of the vessel must be provided, along with a written report commencing with the code letters “POLREP”. The report must include key basic information, including location, nature and scale of the spill, and contact details. A detailed written report may

also be required. Notify the relevant party when injured/oiled wildlife is confirmed or could potentially occur.

1 Introduction

Welcome to the Regia MSS Oil Pollution Emergency Plan (OPEP). The Regia MSS OPEP serves as a blueprint for responding effectively to potential oil and chemical spill emergencies that may arise during our operations at sea.

The development of an Oil Pollution Emergency Plan (OPEP) is required by Section 14(8) of the OPGGS(E) Regulations. This OPEP for the Regia MSS comprises relevant components of the CGG seismic vessel or contractor's Shipboard Oil Pollution Emergency Plan (SOPEP) and the National Plan for Maritime Environmental Emergencies (NATPLAN) (AMSA 2014).

2 Purpose of the Document

The primary purpose of the Regia MSS OPEP is to establish a clear and systematic framework for preventing, managing, and mitigating oil pollution incidents on the vessels deployed during the Regia MSS. By outlining specific procedures and responsibilities, this document can be followed to ensure that our crews address environmental emergencies swiftly and efficiently.

3 OPEP Objectives

The Regia MSS OPEP strives to achieve the following objectives:

Environmental Protection: Our commitment to safeguarding the marine environment is paramount. This document is designed to prevent and minimize the impact of oil and chemical spills on aquatic ecosystems, marine life, and coastal regions.

Compliance: The Regia MSS OPEP is developed in accordance with the Offshore Petroleum and Greenhouse Gas (Environment) Regulations. It is also designed to be consistent with the Australian national system for oil spill preparedness and response.

Safety: The safety of our crew members and the vessels themselves is of paramount importance. This plan outlines measures to protect our personnel while responding to pollution emergencies and prevent accidents that could lead to such incidents.

Reputation Management: Recognizing that environmental responsibility is a core value of CGG, this OPEP reinforces our commitment to stakeholders, partners, and the broader community. Effective pollution response measures help safeguard our reputation as a responsible and conscientious maritime operator.

4 Scope of the OPEP

The Regia MSS OPEP applies to all vessels and operations under the jurisdiction of the Australian Maritime Safety Authority (AMSA). The scope of this document encompasses:

Response Protocols: Clear and decisive steps to be followed in the event of a pollution incident, including containment, clean-up, and notification procedures.

Personnel Responsibilities: Allocation of roles and responsibilities to crew members, ensuring a coordinated and effective response to emergencies.

Documentation and Reporting: Requirements for maintaining records, reporting incidents, and cooperating with relevant authorities and organizations.

This document does not include the testing arrangements for this OPEP which can be found in the Regia MSS Implementation Strategy and are not part of this document.

The Regia MSS OPEP is a dynamic and evolving document, subject to periodic reviews and updates to reflect changes in technology, regulations, and best practices. It is our collective responsibility to implement and uphold the principles outlined in this plan, ensuring the continued success of our operations while preserving the integrity of our oceans and marine ecosystems.

This document is not a Shipboard Oil Pollution Emergency Plan (SOPEP). The SOPEP is part of the response arrangements for the Regia MSS as it is a critical document and preparedness measure required for vessels operating at sea. Each SOPEP is designed to outline the procedures and responsibilities that the crew of a vessel must follow in the event of an oil spill to minimize environmental damage and respond effectively to such emergencies. SOPEPs are a mandatory requirement under the International Maritime Organization's (IMO) International Convention for the Prevention of Pollution from Ships (MARPOL).

5 The National System for Preparedness and Response

NATPLAN is the framework that integrates Commonwealth and State Government(s) response, facilitating an effective response to marine pollution incidents via Australian Emergency Management Arrangements. AMSA manages NATPLAN and is the control agency for vessel spills in Commonwealth waters. As such, AMSA works with State Governments, emergency services and relevant industries (shipping, oil and gas, exploration, and chemical industries) to maximise Australia's response capability.

NATPLAN applies to all spills from vessels in Commonwealth waters. The SOPEP recognises the divisions of responsibility to provide effective response to marine pollution incidents, as defined under NATPLAN. The SOPEP is the principal response document that will be implemented in the event of a marine oil spill, which provides specifics and provision for guiding management response to mitigate oil spills from vessels.

NATPLAN applies to Commonwealth waters seaward of the boundary of State Waters (3 NM offshore) and integrates with State response plans. NATPLAN identifies several of the roles that are fulfilled by State agencies as defined in the relevant State contingency plan.

5.1 Jurisdictional Authority (JA)

A JA is a statutory responsibility required to ensure that an adequate spill response plan has been prepared. In the event of a spill, the JA also ensures that a satisfactory response can be implemented by the Control Agency. In Commonwealth waters, the JA for petroleum activities is NOPSEMA, and AMSA for vessel spills.

5.2 Control Agency (CA)

The CA is responsible for operational control and response to an oil spill in the marine environment. The Commonwealth waters CA for the Regia MSS is AMSA. AMSA may request that State CAs assume the lead CA role, even where the spill has occurred in Commonwealth waters (but where there is a likelihood that spill hydrocarbons may impact State resources/shorelines).

National Plan response equipment and resources are managed and controlled by AMSA's Marine Environment Protection (MEP) Division, and include:

- Maritime Emergency Response Commander (MERCOM)
- Oil spill response equipment managed via the Marine Oil Spill Equipment System (MOSES)
- Oil Spill Response Atlas (OSRA) which identified sensitive receptors (e.g. marine and shoreline ecosystems and biological resources)
- Oil Spill Trajectory Modelling (OSTM).

In addition, the Australian Marine Oil Spill Centre (AMOSC) is an oil spill response organization funded by industry membership fees that can be contracted as an oil spill response agent.

5.3 State Waters

If a hydrocarbon release occurs in state waters (or if it is likely to move into State waters), the following relevant state oil spill contingency plans will apply:

The Victoria state plan is the State Maritime Emergencies (non-search and rescue) Plan (Emergency Management Victoria 2016). The State Jurisdictional Authority (JA) and Control Agency (CA) is the Department of Economic Development, Jobs, Transport and Resources (DEDJTR).

The Tasmania state plan is the Tasmanian Marine Oil Spill Contingency Plan (TASPLAN) (EPA Tasmania January 2022). The State JA is the Environmental Protection Authority Tasmania, and the State CA is the Tasmanian Environment Protection Authority (EPA).

The deployment of state resources in Commonwealth waters will be requested and coordinated by AMSA.

5.4 Roles and Responsibilities

AMSA is the Control Agency and hence responsible for managing response to all oil spills in Commonwealth waters under NATPLAN. Both MARPOL 73/78 and the vessel's SOPEP require the vessel master to report to the nearest State whenever there is an incident involving actual or probably discharge. The vessel SOPEP is implemented to initiate clean up resources and control discharges.

The following roles will also provide key support:

Prior to commencement of the survey **the Survey Vessel Master will ensure that all relevant personnel have undergone relevant inductions and are familiar with the SOPEP** (and oil spill response arrangements therein) and are appropriately trained to undertake their responsibilities under the SOPEP.

The Seismic Survey Vessel Master will be responsible for notifications and reporting all spills to the sea to the AMSA JRCC, via a POLREP form included in the vessel SOPEP. Further reports will be sent at regular intervals to inform AMSA, NOPSEMA, CGG, survey contractors, State Control Agencies).

The Survey Vessel Master will continue to provide situation reports (SITREPs) throughout the response activity, at the direction of AMSA. AMSA will maintain the response until relevant termination criteria are achieved.

The Survey Vessel Master will make the area safe (protect human life) and to make reasonable efforts to stop the leak to prevent further spillage, for example by transferring fuel to another tank.

The Survey Vessel Master will be responsible for ensuring that the spill containment and recovery kits are serviced and in-date (where relevant), and appropriately always stocked.

The CGG Client Site Representative on board the vessel is responsible for reporting directly to CGG. The CGG Technical Operations Manager (shore-based) is then responsible for notifying NOPSEMA of any spills in Commonwealth waters.

AMSA will appoint the MERCOM, who is supported by statutory powers under the Protection of the Sea (Powers of Intervention) Act 1981. The responsibilities of the MERCOM include the management of emergency intervention issues during a response to maritime casualty incidents where there is a real (or even potential) risk of significant pollution.

6 Assessment Of Spill Scenarios

The level of hydrocarbon release is used to identify the level of resources required to respond to the spill. This approach allows scaling of response in line with the evolving nature and scale of the incident. Incident classification (Levels 1 to 3) are defined in NATPLAN as follows:

Level 1 incidents with a release of 0 to 10 m³, and where sensitive species or habitats are not at risk. These incidents are generally resolved through a First Strike response (i.e., local, or initial resources only).

Level 2 incidents with a release of 10 to 1000 m³ may require deployment of jurisdictional resources supplementary to the initial response due to the more complex size/duration/resource management/risks involved. A Level 1 release may be escalated to a Level 2 where sensitive environmental/socio-economic receptors may be at risk.

Level 3 incidents with a release of greater than 1,000 m³ may require national and international resources, and where the incident controller must delegate all management functions and focus on strategic leadership and response coordination. A Level 2 release may

be escalated to a Level 3 where sensitive environmental/socio- economic receptors may be at risk.

The following spill scenarios have been identified for the Regia MSS:

Level 1 (<10 m^3): The complete loss of hydrocarbons from a transfer hose during refuelling operations.

Level 2 (>10 m^3 of Marine Diesel Oil (MDO)): The complete loss of inventory from the largest fuel tank of an example wide-tow capable survey vessel resulting from collision or grounding. Note that should a release of this volume pose a significant risk to key sensitive receptors, then escalation to Level 3 may be triggered.

7 Environment That May Be Affected (EMBA)

The Environment That May Be Affected (EMBA) is the sea surface area, water column, seabed and any relevant shorelines that could be impacted by oil spilled from a petroleum activity. The EMBA for a Level 1 bunkering incident is expected to be limited to the immediate vicinity of the release point due to rapid spreading, evaporation, and dilution of the spilled MDO and the actions taken under the vessel SOPEP.

The EMBA for a Level 2 spill is based on the outcomes of extensive SIMAPs modelling for various scenarios ranging from 200m^3 to 373m^3 (Appendix B11).

7.1 Protection priorities within the EMBA

The NATPLAN protection priority hierarchy has been used to define protection priorities and response objectives within the EMBA:

PRIORITY 1: protection of human health and safety remove marine users and any potential casualties from areas considered to be a safety hazard.

PRIORITY 2: protection of habitat and cultural resources.

PRIORITY 3: protection of rare and/or endangered fauna prevention of oil exposure to threatened fauna that are or may be present in (or near) the operational area.

PRIORITY 4: protection of commercial resources prevent exposure to commercial fisheries in (or near) the operational area.

8 Spill Response Preparedness

8.1 Oil Spill Resources

Typical oil spill resources expected to be carried onboard the survey vessel are listed in the vessel's SOPEP. The vessel will carry spill containment and recovery kits with sufficient absorbent booms and materials to contain small to medium-scale deck spills. Minor spills will be managed through good housekeeping practices and the use of absorbent materials. Deck spills will not be discharged into the ocean. Spill clean-up materials will be retained on board the survey vessel and stored in covered containers for subsequent disposal at an appropriate onshore facility.

8.2 Proposed Spill Response Strategies

Spill response strategies for the credible scenarios identified (<125 L and 268 m3 MDO) are presented in Table G3-1. In the unlikely event of a spill, the potential use of each spill response strategy would be assessed for feasibility with the recommended responses subject to a Net Environmental Benefit Analysis (NEBA) or Spill Impact Mitigation Assessment (SIMA) by the CA (e.g., AMSA in Commonwealth waters). Any rejected response strategy may be adopted if directed by the CA.

Table G3-1 - Assessment of Spill Response Strategies.

Response Strategy	Assessment	Recommendation	Termination Criteria
Monitor and evaluate	Vessel observation is the easiest and most available option available in all spills. Information gathering for spills is critical for situational awareness and supporting a coordinated spill response. Visual operations of surface hydrocarbons are limited to daylight. Understanding of entrained or dissolved hydrocarbons distribution is limited to spot-point water column sampling using suitable equipment (e.g., fluorometer).	Adopt	No visible surface sheen, slick, or floating oil remains in the affected area, as confirmed by systematic visual surveys over multiple tidal cycles.
Mechanical dispersion	Undamaged vessels in the area can be used to breakup surface slicks if safe to do so. This strategy may be effective in sheltered/near shore areas and is unlikely to be effective in open ocean conditions where wind and wave energy will naturally disperse the slick.	Reject	Not required.
Containment and recovery	The wind and wave conditions are likely to breakup any surface slicks and limit the operational window of this strategy to port or nearshore areas. The relative thickness and spreading of MDO renders this strategy ineffective.	Reject	Not required.
Shoreline protections and shoreline clean-up	The spreading and relative thickness of MDO slicks on shorelines would mostly be below the 10 g/m^2 impact threshold. This along with the exposed and high energy shorelines of the Otway coast make this strategy ineffective.	Reject	Not required.
Chemical dispersion	Due to the spreading and relative thickness of MDO slicks on water, chemical dispersants would not be used as they are unlikely to be effective on an MDO spill (CSIRO 2016). This along with the exposed and high energy shorelines of the Otway coast make this strategy ineffective.	Reject	Not required.

8.3 Oil Spill Response Run-sheet

Given the location of the proposed Regia MSS, the preferred strategy for MDO spills will be to allow small spills to disperse and evaporate naturally, and to monitor and evaluate the position and trajectory of any surface slicks. This passive response and reliance on natural processes greatly reduces the potential for impacts associated with spill response activities.

For Level 1 fuel spills in Commonwealth waters, initial actions will be undertaken by the survey vessel in accordance with the vessel SOPEP (See Page 1), with subsequent actions determined in consultation with AMSA (under NATPLAN). In such situations, the Survey Vessel Master (or delegate) will monitor the spill and notify AMSA of the situation status. AMSA will monitor and continue to assess this level of spill.

For Level 2 spills, AMSA is the responsible CA for oil spills from vessels within the Commonwealth jurisdiction and will respond in accordance with its Marine Pollution Response Plan, as approved by the AMSA Executive. Upon notification of an incident, AMSA will assume control of the incident (AMSA 2014). CGG and the vessel contractors will support the response as required.

After ensuring the safety of the crew and fire prevention (and notifying AMSA), the Survey Vessel Master will implement the SOPEP and consider relevant actions (e.g., tank lightering) to reduce the oil volume released to the environment. AMSA will determine the appropriate response strategies depending upon the protection priorities at risk within the EMBA.

AMSA will determine the potential need for oil spill trajectory modelling (OSTM) and possible sea/aerial surveillance to confirm/inform trajectory predictions, depending on the location, prevailing weather conditions, available vessel responses and volume released.

Recognising that there is potential for impacts associated with spill response activities, these risks would be assessed as part of any NEBA/SIMA coordinated by AMSA, to which CGG would contribute if requested by AMSA.

The NEBA/SIMA process requires several data and information inputs to allow a robust and transparent assessment. AMSA will require CGG to provide this information in a timely manner. Information requirements will likely include:

- The oil spill risk assessment in the accepted EP.
- Vessel observations obtained immediately prior to and following the spill.
- On water capability information to support spill response.
- Any available baseline data.

Where hydrocarbons from the spill are likely to cross from Commonwealth to State waters, AMSA will undertake the NEBA/SIMA in conjunction with representatives from the relevant State CAs.

8.3.1 Oiled Wildlife Response

If AMSA identify that an oiled wildlife response is required in Commonwealth waters, this will be based on the Oiled Wildlife Response Plan (AMSA 2017). Responses in State waters will be implemented by or under the direction of State CAs and align with current State oiled wildlife response plans. The accumulation of hydrocarbons on shorelines is considered unlikely based on the credible scenarios; however, to allow for an adaptable response, consideration will be given to migratory shorebird feeding and roosting sites/nesting colonies and any seal colonies in and adjacent to the EMBA (e.g., on the northern coast of King Island). In addition, species protected under Part 3 of the EPBC Act will be given particular attention, with consideration of information provided in relevant plans, guidelines, and policies (e.g., NOPSEMA 2016a).

8.3.2 Communication with Other Marine Users

Commercial and recreational fishers and other users that operate in the area would be advised of any spill and associated response activities within 2 hours of the incident, and every 24 hours for the duration of the incident. This would minimise the potential for interaction with their activities or unnecessary risks to personnel or property.

Subsequent actions will be determined in consultation with the Control Agency and regulatory authorities (AMSA and NOPSEMA) under NATPLAN, with regards to the low potential for impacts posed by the spill. AMSA has indicated that it does not require titleholders to directly consult on OPEPs for seismic surveys or those addressing the operations of offshore supply vessels (AMSA 2014). Such operations are already covered by existing NATPLAN arrangements.

Any reportable fuel or oil spills will be reported using CGG's Event Reporting Management Procedure (GRP_HSE_GEI_17E).

8.3.3 Communication with other relevant interested persons or organisations

There is no specific commitment for CGG to communicate the details of the spill to relevant persons consulted in the preparation of the EP, or to other relevant interested persons or organisations as part of ongoing consultation. This position is justified because the Control Agency under the National Plan would be responsible for such communication. CGG will issue updates to relevant persons if requested to do so by the Control Agency and prior approval of the content.

9 Operational And Scientific Monitoring Plan (OSMP)

The specific operational and scientific monitoring program undertaken following an oil spill would be developed based on the following information:

- location of the spill
- nature and scale of the spill, and likely evolution
- types of values and assets within the EMBA
- potential for impact upon sensitive resources
- review of available baseline data.

An assessment of gaps in available baseline data and potential/requirements for post-spill/pre-exposure baseline data collection will be considerations in the monitoring design. AMSA will direct and lead any monitoring requirements in the event of an oil spill, supported by CGG.

All monitoring personnel will be suitably experienced and qualified for their role. A pre-mobilisation assessment of experience and certifications will be used to allocate specific roles to personnel. Multiple personnel will be allocated to monitoring roles to allow for shift rotations (where multiple shifts per day are required) or survey rotations (where staff are rotated from the field as part of effective fatigue management planning). The availability of personnel with in-date certificates (e.g., offshore medical, TBOSIET and MSIC) will then identify which personnel will support immediate mobilisation or comprise the second rotation.

9.1 Operational Monitoring

In the event of a hydrocarbon release, CGG would implement Operational (Type I) Monitoring in consultation with AMSA, and where appropriate, relevant State agencies. This monitoring will be implemented to;

- determine the extent and character of a spill.
- track the movement and trajectory of surface MDO slicks.
- identify areas/ resources potentially affected by surface slicks.
- determine sea conditions/ other constraints.
- identify the efficacy and potential impacts of spill response strategies and tactics (to inform any remediation activities and any subsequent NEBA assessments).

Oil Spill Trajectory Modelling (OSTM), used in conjunction with water quality monitoring, will help determine the potential extent and direction of travel of the plume of entrained MDO, and to determine the risk of hydrocarbon toxicity impacts to sensitive receptor locations.

This monitoring will be instigated by AMSA and will enable CGG to provide the necessary information to AMSA, to assist in planning appropriate response actions under NATPLAN. Specific monitoring and data collection would include aspects of the following, as agreed with AMSA:

- immediate monitoring (approximately 0 to 6 hours):
- estimate of sea state
- estimates of wind direction and speed
- characteristics of the surface MDO slicks (thickness and areal extent)
- GIS mapping
- OSTM triggered for a Level 2 spill or greater.

Modelling, if triggered, will be used in conjunction with other field observation/monitoring data to identify the likely direction, spread and potential speed of the slick. This will be used as a guide to support the planning for other operational monitoring scopes (e.g., water quality, sampling and fluorometry). This information will allow initial identification sites for sampling, which may also provide information on the subsurface distribution of hydrocarbons via vertical profiling of the water column (should sufficiently levels of hydrocarbons remain to be detectable).

Water column profiling data will be used to identify the sites and depths at which water samples will then be taken for laboratory analysis. Water sampling for hydrocarbons should be undertaken using suitable equipment by personnel trained in the relevant procedures. “Improvised” approaches will not be used as the samples obtained may result in inaccurate results or a failure or a delay in confirming the credible source of the spill (as described in NOPSEMA 2017c).

The following operational monitoring techniques must be mobilised once immediate response actions have concluded:

- aerial surveillance for Level 2+ spills (if aircraft available offshore).
- GPS tracking using satellite drifter buoys (if available).
- measuring concentrations of entrained hydrocarbons through the water column (e.g., from water samples or using fluorometers calibrated to an appropriate hydrocarbon type).
- stochastic modelling predictions for Level 2+ spills (requires up to two weeks to receive results).

Field-based operational monitoring will be restricted to daylight hours only when surface slicks will be visible from either vessels or via aerial surveillance. Where available and practicable, remote sensing (e.g., using satellite-mounted optical imagery and Synthetic Aperture Radar (SAR)) may be used to provide situational awareness of the spatial distribution of the surface slick(s) during daylight, at night, or during overcast days.

The information gathered from this monitoring will be passed on to AMSA is it becomes available and via ongoing SITREP reports. Where GPS tracking using satellite drifter buoys, real-time spill modelling, aerial surveillance, water quality sampling and/or visual slick estimation is required, CGG can engage RPS under existing contractual arrangements to provide urgent specialist response services.

Should there be the need to implement field response activities using external parties, a response logistics plan would be developed and initiated immediately on notification of the spill. The plan would detail logistics, equipment personnel and detailed OSMP plans. CGG will implement, assist with, or contribute to (including funding if required) any other operational or scientific monitoring as directed by AMSA.

9.2 Scientific Monitoring

Scientific (Type II) Monitoring would be triggered and implemented if there is a reasonable expectation that there may be adverse impacts to marine biota or habitats in the area. The scientific monitoring likely to be implemented includes the programs listed in the sections below. The key receptors for which scientific monitoring studies would be considered are:

- benthic sediments (particularly soft sediments able to retain hydrocarbons, infauna)
- subtidal marine benthos (filter-feeders, macroalgae)
- seabird populations (foraging individuals)
- non-avian marine wildlife (cetaceans, marine reptiles, and fish).
- intertidal sediments and habitats.
- fisheries and aquaculture operations.

9.2.1 Scientific Monitoring Program 1

SMP1 is about monitoring for hydrocarbons in benthic sediments. The aims of SMP1 are to understand the characteristics, persistence, and fate of hydrocarbons in sediments to provide data for the assessment of potential impacts on seabed sediments and to understand the effect of hydrocarbon concentrations on infaunal macrobiota.

The objectives of SMP1 are to:

- Quantify hydrocarbon concentrations at locations within the EMBA.
- Quantify change in sediment hydrocarbon concentrations at sampling locations over time (considering seasonal and inter-annual change).
- Provide sediment hydrocarbon data to support determination of potential cause-effect relationships between spill hydrocarbons and changes in benthic communities.
- Identify potential areas of benthic impact based on sediment hydrocarbon concentrations and impacts to benthic macroinfaunal assemblages.

SMP1 will start in the event of a Level 2 or 3 spill and where modelling and/or operational monitoring (e.g., water quality) indicates likely exposure to benthic sediments.

SMP1 will end when sediment contamination results showed recovery to a point where hydrocarbon concentrations are no longer demonstrated to be a primary driver of infauna assemblage composition.

9.2.2 Scientific Monitoring Program 2

SMP2 is about monitoring and surveys of shoreline and intertidal benthos to determine impacts of oil spill and recovery. The aim of SMP2 is to determine and monitor the impact of the spill, dispersants or response activities and potential subsequent recovery for intertidal benthos at both individual (species) and community (habitat) levels.

- The objectives of SMP2 are to:
- Monitor the spill and spill management operations on intertidal marine coastal habitats (like tidal seagrass, tidal mud flats, mangroves, intertidal saltmarsh, and saltpans).
- Monitoring associated organisms (like fishes, crustaceans, arboreal mangrove biota, microphytobenthos, macroalgae, mangrove/saltmarsh plants, seagrass)
- Establish necessary responses.
- Quantify the biological and ecological effects of the spill and response activities.

SMP2 will start in the event of a Level 2 or 3 spill and if modelling predicts possible shoreline/intertidal contact or there are any reports of shoreline/intertidal contact.

SMP2 will end when all reasonable and practical measures have been taken to assess the impact of the spill on intertidal benthos and affected intertidal benthos has returned to baseline (or reference site) conditions or oil pollution impacts on critical intertidal benthos species and taxa are no longer identifiable.

9.2.3 Scientific Monitoring Program 3

SMP3 is about monitoring of subtidal marine benthos to determine impacts of oil spill and recovery. It aims to enable assessment of impacts and potential for subsequent recovery of benthic marine habitats (soft and hard substrate habitats) and associated macro-epibenthic organisms (e.g., macroalgae, seagrass, sponges and other filter feeders, motile invertebrates, and associated fishes) in response to a spill event and associated response activities. It also aims to document recovery of affected biota and habitats.

The objectives of SMP3 are to:

- characterise and quantify habitat composition and coverage/abundance of macro-epibenthic organisms and site-associated demersal fish.
- allow comparison with historical (baseline) data and seasonal/interannual surveys.
- define recovery in macro-benthic and demersal populations and recovery/change in habitat type.

SMP3 will start in the event of a Level 2 or 3 spill and where modelling and/or operational monitoring (e.g., water quality) indicates likely exposure to benthic habitats or if there are any reports of subtidal contact.

SMP 3 will end when reasonable and practicable scientifically robust measures have been taken to assess the effects or impact of the spill on benthic habitats / communities and oil pollution effects / impacts on benthos are no longer detectable, or impacts shown to be within accepted protection limits (to be defined in Sampling and Analysis Plan) and when a trend towards post-impact recovery or alternate developmental trajectory has been demonstrated (in comparison with control/reference sites) at sites that were exposed to elevated concentrations of hydrocarbons.

9.2.4 Scientific Monitoring Program 4

SMP4 is about undertaking wildlife surveys to determine impact of oil spill on seabird and shorebird populations and recovery. It aims to assess any short-term or longer-term environmental effects on seabird and shorebird populations within the study area that may have resulted from the oil spill (i.e., damage extent and recovery). It also aims to document recovery of affected biota and habitats.

The objectives of SMP4 are to:

- Quantify foraging seabird and shorebird populations.
- Quantify foraging, nesting or breeding shorebird populations.
- Quantify records of oiled birds and bird mortalities.
- Allow comparison of changes in populations over time (seasonal and inter-annual).

SMP4 will start in the event of a Level 2 or 3 spill and where post-spill observations indicate possible contact with foraging seabird populations and/or any reports of oiled or dead seabirds and/or shoreline oil indicates possible contact with shoreline bird habitats or populations.

SMP4 will end when the extent of damage and rate of recovery of key seabird/shorebird behaviour and breeding activities has been quantified using scientifically robust methods and the affected environment or natural resource has returned to baseline conditions (taking into account natural variability) in terms of breeding population (for seabirds) or counts (for shorebirds), with regard to reference sites and/or baseline data and oil pollution effects/impacts on critical species and taxa are no longer detectable.

9.2.5 Scientific Monitoring Program 5

SMP5 is a desktop study and survey about occurrences of oiled/mortalities of non-avian marine wildlife to determine impacts of oil spill and recovery. SMP5 aims to assess any short-term or longer-term environmental effects on non-avian marine wildlife that may have resulted from the oil spill (i.e., damage extent and recovery). It also aims to document recovery of affected biota and habitats.

The objectives of SMP5 are to:

- quantify records of sightings of dead or oiled marine wildlife.
- allow seasonal or inter-annual comparison of records of dead or oiled wildlife.

SMP5 will start in the event of a Level 2 or 3 spill and where modelling indicates possible contact with populations and/or any reports of oiled or dead non-avian marine wildlife.

SMP5 will end when reasonable and practical measures have been taken to assess the effects or impact of the spill on non-avian marine wildlife and restoration or resumption of key biological processes (e.g., abundance, distribution, breeding) necessary to ensure post-impact recovery have been identified and oil pollution impacts on non-avian marine wildlife are no longer detectable.

9.2.6 Scientific Monitoring Program 6

SMP6 is about monitoring of intertidal receptors to determine impacts of spill hydrocarbons and recovery. SMP6 aims to understand the behaviour, persistence, and fate of hydrocarbons in intertidal sediments, and enable assessment of potential impacts and recovery to intertidal habitats. It also aims to identify the potential implications of changes in intertidal communities to other biota (e.g. shorebirds).

The objectives of SMP6 are to:

- Quantify hydrocarbon concentrations at locations within the EMBA.
- Characterise and quantify habitat composition and coverage/abundance of epibenthic and infaunal organisms.
- Quantify change at sampling locations over time (considering seasonal and inter-annual change).
- Define recovery/change in habitat type and epibenthic and infaunal organisms.
- Provide sediment hydrocarbon data to support determination of potential cause-effect relationships between spill hydrocarbons and changes in benthic communities.

SMP6 will start in the event of a Level 2 or 3 spill and where modelling or operational monitoring indicates likely exposure to intertidal habitats.

SMP6 will end when the results of the monitoring tasks achieved the objectives and appropriate, meaningful, and defensible scientific monitoring results have been achieved and sediment contamination results have shown recovery to a point where hydrocarbon concentrations are no longer demonstrated to be a primary driver of habitat composition.

9.2.7 Scientific Monitoring Program 7

SMP7 is about impacts to fisheries and aquaculture. SMP7 aims to understand the potential short and long-term impacts and recovery of fisheries (should they be closed), and aquaculture facility/operation that have been exposed to spill hydrocarbons.

The objectives of SMP7 are to:

- quantify hydrocarbons in tissue of organisms targeted by fisheries or aquaculture.

- determine potential effects on population size/structure.
- identify potential impacts to organism health.
- determine potential risks to human health.

SMP7 will start in the event of a Level 2 or 3 spill and where fisheries have been closed in response to a hydrocarbon spill and/or where modelling or operational monitoring indicates likely exposure to aquaculture operations or key brood stock collection locations.

SMP7 will end when the results of the monitoring tasks achieved the objectives and appropriate, meaningful, and defensible scientific monitoring results have been achieved and sediment contamination results have shown recovery to a point where risks to human health are understood and data on population structure have shown that recovery is possible through retention of sexually mature adults and demonstrated recruitment of juveniles.

9.3 Initiation Of Scientific Monitoring

CGG will implement scientific monitoring in the event of a Level 2 spill (or greater), in accordance with initiation criteria described in Table G3-2. A detailed OSMP Implementation Plan based on commonly used, scientifically robust and easily accessible methods would be developed to ensure an efficient and technically defensible response. This approach builds time efficiencies into development of the OSMP as existing RPS documentation (e.g., Health and Safety Plans) can be adapted to meet the requirements of the OSMP. Potential suppliers of available survey equipment would be identified as a priority, with a preference for those with existing contracts.

Relevant permit applications (e.g., for sediment/biota sampling) will be identified and submitted as soon as reasonably practicable. This approach does not work from the base assumption that permit requirements will be waived by relevant authorities to minimise potential delays in mobilisation and permit approval should permit requirements not be waived.

The OSMP Implementation Plan will detail the equipment required for each study, travel and freight arrangements, notifications, vessel support, HSE planning, and the sampling and analysis plan. Within 12 hours of RPS being notified, a teleconference will be held between the CGG, AMSA, the nominated scientific personnel, and the Vessel Master to finalise the requirements for implementation. Scientific teams can be on site within 48 to 72 hours of the implementation plan and budget being approved (and where permits are not required or have been approved). It is recognised that MDO is only likely to remain measurable on the water surface for a few days, and that realistically a response team would not be on site until it had dispersed.

Given the extremely low probability of a catastrophic spill and MDO subsequently contacting sensitive biota, and the rapid weathering and likely dispersal of spill hydrocarbons before a response team could be mobilised, CGG considers the costs associated with pre-emptive development of the Implementation Plan and full assembly and preparation of the response team to be grossly disproportionate to the benefit of a more rapid response.

The area of potential impact to be targeted in the scientific monitoring plan would be based on observations of the slick trajectory, water quality data collected during the operational phase, and available modelling. Due to the nature of the spill, potential for spread/dispersion, constrained spatial area of the EMBA, and likely field team mobilisation period, it is considered that post-spill pre-impact baseline data collection will likely not be feasible (but will remain a consideration for planning purposes).

Scientific monitoring would focus on determining potential short and long-term environmental impacts of the spill and response actions, and subsequent recovery). Scientific monitoring may continue for some time following the termination of the operational monitoring response (NOPSEMA 2016c).

9.4 Scientific Monitoring Team

In the event of the requirement to undertake scientific monitoring, CGG would engage a specialist subcontractor such as RPS to rapidly finalise response plans and to deploy the required resources to undertake the monitoring activities. Primary scientific monitoring studies could include some, or all, of the elements described in Table G3-2 depending on the size, timing, and location of the spill.

An adaptable scientific monitoring response must allow for the potential for operational monitoring or situational awareness obtained during a spill to indicate exposure to additional sensitive receptor types, depending on the nature and scale of the actual release. Where such an occurrence is identified, additional optional SMPs may be implemented, following agreement with AMSA.

9.5 Study Template

For each SMP described above, a detailed study template would be developed following implementation. This is summarised in Table G3-2.

Table G3-2 - Scientific Monitoring Studies Template

Study Heading	Description
Monitoring objective and rationale	Details the monitoring objectives for the study to focus sampling design.
Natural resource description and/or importance	Provides background information relevant to the context of the study; distribution, temporal patterns, life-stages present, critical habitats, and processes.
Activation trigger for monitoring tasks	Criteria to initiate the scientific monitoring study, based on likely exposure to harmful concentrations (acute and/or chronic)
Potential sensitivity to spilled MDO at exposure levels	General context of possible impacts associated with the spill, exposure pathways and effects concentrations. Range of measurable responses.
Spatial awareness	Outcomes of operational monitoring that support survey design
Monitoring methods / sampling and analysis plan	
Overview of the monitoring method	Provides a scientific and practical context for the monitoring methods to be used. Includes consideration of statistical methods and sampling effort required to achieve the monitoring objectives.
Details of the survey design, methods, standards and techniques to be utilised	Provides the information required to collect samples in a defined geographic area (based on operational monitoring data) as part of a robust scientific study program. Includes relevant specifications, standards, and requirements of the study.
Permits	Details any permit requirements and/or exemptions.
Data collection, analysis, and reporting requirements	Provides details on the necessary data requirements including baseline information, analytical parameters and detection limits, and metadata. Details the deliverables from the study.
Personnel resourcing requirements, qualifications, and skills	Provides minimum skill/experience, qualifications/certifications, and resourcing requirements to deliver the study safely and robustly. Considers shifts and survey rotations for effective fatigue management. Includes contingency resource planning.
Field equipment, survey platforms and logistics	Details equipment and logistics requirements to fulfil the study requirements.
Recommended procedures for data collection, sampling, storage, transport, and analysis	Provides the necessary sampling and analytical techniques, and standards to ensure data quality and ensure consistency throughout the study (including Chain of Custody (CoC) forms).

Study Heading	Description
Risk assessment, occupational health, and safety considerations	Describes the risks and mitigation controls associated with undertaking the study.
Data management, QA/QC, transmittal, and archiving	Provides QA / QC requirements for all data obtained as part of the study.
Supporting documents, standards, and references	Identifies the relevant guidelines and high-level references required to implement the study.
Reporting requirements	Provides description of reporting of the scientific outcomes of the survey(s), including identification and qualification/quantification of potential impacts and subsequent recovery. Each survey report identifies the need for any further scientific monitoring based on the survey outcomes.
Termination criteria	
Criteria for the terminating the monitoring activity	Completion criteria to be met to demonstrate that study objectives have been achieved to terminate the study.

10 Document Control

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	21 September 2023	MS	Document started.
0.1	27 September 2023	MS	Sent to Tasmanian and Victorian Control Agencies for review.
1.0	28 September 2023	MS	PDF published online.
1.1	4 December 2023	MS	Updated following review from Tasmanian EPA.
2.0	6 December 2023	MS	Update published online.
3.0	8 November 2024	MS/EOR	Updated following NOPSEMA's assessment.
4.0	16 April 2025	AH	Updated following NOPSEMA's OMR 1 letter
5.0	9 December 2025	EOR	Updated following NOPSEMA's OMR 2 letter

Otway Marine Industries Coexistence Cooperative (OMICC)

March 2025

OTWAY ADJUSTMENT PROTOCOL (Consultation Draft)

Displacement |Loss of Catch | Fishing Gear Loss or Damage

Contents

1 Protocol Overview 3
1.1 Purpose 3
1.2 Background 3
1.3 Commitment 3
1.4 Definitions 4
1.5 Scope 6
1.6 Consultation 6
1.7 Operation of the protocol 7
2 Commercial Adjustment Available Under This Protocol 8
2.1 Displacement 8
2.2 Loss-of-Catch Adjustment 8
2.2.1 Method of Assessing Loss-of-Catch Adjustment 9
2.2.2 Calculating an average CPUE 9
2.2.3 Loss-of-Catch Adjustment Assessment Method 10
2.2.4 Adjustment Method Loss of Catch Adjustment Calculation Example 11
2.2.6 Exceptions to loss-of-catch assessment method information requirements. 13
2.3 Fishing gear loss or damage 13
3 Claim Information and Assessment Process 14
3.2 Who can lodge a claim and when? 14
3.3 What information is needed to lodge a claim? 15
3.4 Who will assess the claims and what information will be in the report? 15
3.5 How long will it take to deal with a claim? 16
3.6 Independent expert review of a claim 16
3.7 How long will it take to be paid adjustment? 16
4 Protocol Review and Maintenance 17
4.1 Revision History 17
Appendix 1: Otway Commercial Marine Operator Adjustment Protocol Members 18
Appendix 2: Consent and Confidentiality Form 19
Appendix 3: Displacement Application Form 20
Appendix 4: Loss of Catch Application Form 22
Appendix 5: Fishing Gear Loss or Damage Application Form 24
Appendix 6: Adjustment Protocol Timeframes 26
Appendix 7: Legislation Section 603 27

1 Protocol Overview

1.1 Purpose

This protocol establishes a baseline environmental standard to underpin petroleum activity adjustment for displacement, loss of catch, and fishing gear loss or damage, between petroleum titleholders and commercial marine operators, including fishers.

This protocol provides a practical, evidence-based process and reasonable monetary adjustment to licensed commercial fishers for displacement, loss of catch, and fishing gear loss or damage. Adjustment is available during a petroleum activity and will remain available for a specified period after the completion of a petroleum activity conducted under an Environment Plan (**EP**) that references, and is therefore subject to, this protocol.

This protocol also serves as the mechanism for other marine operators (e.g. fishing co-operatives, fishing charters, dive schools) to initiate discussions with titleholders on evidence-based monetary adjustment if they could potentially be impacted by petroleum activities.

1.2 Background

In 2018, National Energy Resources Australia (**NERA**) in consultation with an industry consortium, established the Collaborative Seismic Environment Plan (**CSEP**) Project, to seek approval from the National Offshore Petroleum Safety and Environmental Management Authority (**NOPSEMA**) for seismic survey activities in an area in Commonwealth waters off Western Australia and the Northern Territory from 2021 and beyond. The CSEP Project was aimed at achieving fundamental and long-term improvements to the way that seismic activities were planned with due consideration for commercial fishing activities.

As part of this project, an adjustment protocol (the NERA Protocol) was developed by the CSEP Project Steering Committee in consultation with State, Territory and Commonwealth commercial fishing license holders as well as relevant fishing associations, regulators, and petroleum industry associations.

In recent years the NERA Protocol has become a petroleum industry standard for all types of activities and has been used as the basis of this Otway Commercial Marine Operators Adjustment Protocol (Otway Adjustment Protocol (OAP)).

1.3 Commitment

Recognising the collaborative benefits the NERA Protocol has provided where it has been adopted, petroleum titleholders in the Otway offshore region (refer **Appendix 1**) commit to minimising impacts on commercial marine operators, including commercial fishing and the fish stocks that support the fishing industry primarily through avoidance of each others' activities.

However, petroleum titleholders recognise that their activities may, from time-to-time, take place in the same area and at the same time as commercial operations of others who have a history of using that area. Minimising interference with each other's rights and interests is also reflected in primary petroleum and fishing legislation[1].

[1] For relevant statutory information refer to section 280 Offshore Petroleum and Greenhouse Gas Storage Act 2006, section 124 Petroleum (Submerged Lands) Act 1982 (Vic), section 124 Petroleum (Submerged Lands) Act 1982 (Tas), and section 171 Fish Resources Management Act 1994.

Best endeavours will be made to avoid, minimise, and mitigate potential impacts on other marine operators, including the commercial fishing industry, before the adjustment processes contained in this protocol are applied.

1.4 Definitions

Activity – A petroleum activity or greenhouse gas storage activity and includes, where the context permits, a reference to a proposed activity or any stage of an activity.
Adjustment Area – An area extending 10 kilometres around the perimeter of a seismic survey Acquisition Area or a circular area of radius 4 kilometres around a drilling activity (refer Figure 1 for explanatory diagram).[2] [3]

Acquisition Area - The area of petroleum activity where seismic data is acquired (not a permitted Acquisition Area in an Environment Plan).

Active Source Area – An area including and around the Acquisition Area in which the seismic energy source (airgun array) can be active. This includes survey line run-ins and run-outs.

Affected person – for the purpose of this protocol, an affected person is a commercial fishing licencee, other commercial marine operator, company or business who would have either a) received the revenue from the landed catch or other activity that is the subject of a claim under this protocol, or b) can show they have incurred the cost of lost or damaged fishing gear, equipment or displacement.

Catch Per Unit of Effort (CPUE) – For the purposes of this protocol the catch will be defined in kilograms of landed catch and the unit of effort will be defined in hours (decimal hours where available) fished for trawl, hours fished or kilometres of line set or number of hooks per kilometre for line fishing, or number of pot lifts, resulting in the landed catch e.g. CPUE = kilograms per (trawl/line) hour or pot lift.

Claim Period – The period during and after a petroleum activity for which a claim for loss adjustment can be made, which is from the notified start date of an activity and no more than 30 days after the notified end date of an activity.

Commercial fisher – for the purpose of this protocol, a commercial fisher is the affected entity, person, licence holder, company or business who would have received the revenue from the landed catch that is the subject of a claim under this protocol, or who can show they have incurred the cost of lost or damaged fishing gear or displacement.

Displacement – the relocation of commercial fishing activity or other commercial marine operations from within the Adjustment Area to a Displacement Area as a result of a petroleum activity.

Displacement Area – an alternative fishing ground that is within 50 kilometres of the Adjustment Area.

Fishing gear – Fishing equipment deployed in the water by a vessel engaged in a commercial fishing activity.

[2] 10 kilometers is proposed as a reasonable distance around the Acquisition Area of a seismic survey and consistent with existing industry standards.

[3] Spatial parameters of an Adjustment Area for a 2D survey will require case-by- case specification due to the differing survey layout.

Historical fishing activity, block – A statistical fishing block (as defined here), or fishing event location (latitude/longitude) plotted within the 10 x 10 nm grid system, with fishing activity detailed in either a) Government catch and effort information or b) recorded in a statutory Catch and Disposal Record for at least two out of the previous five years, prior to a relevant petroleum activity conducted under this protocol.

Landed catch – The whole landed weight as detailed in Government catch and effort information provided for the purpose of this protocol, or as recorded in statutory Catch and Disposal Records.

Lodgement Period – The period during and after a petroleum activity within which a claim can be lodged, which is from the notified start date of an activity and no longer than 183 days after the notified end date of an activity.

Market price – The price received by a commercial fisher at the point of first landing, excluding any price margins for marketing, transport, sales commissions, value adding or packaging. In respect to a claim under this protocol, the market price should reflect the price at the time the loss of catch was incurred by the claimant.

Other commercial marine operator – means a commercial marine operator who identified they could potentially be impacted by the petroleum activity during relevant persons consultation in preparation of the relevant EP.

Petroleum activity – means operations or works in an offshore area undertaken for the purpose of exercising a right conferred on a titleholder under the OPGGSA by a petroleum title or discharging an obligation imposed on a petroleum titleholder by the OPGGSA.

Statistical fishing block – Government statistical grid/block numbering system used to record commercial fishing activity data and referred to in this protocol as a block.

Titleholder – The registered holder of the Access Authority, Special Prospecting Authority, Exploration Permit, Retention Lease or Petroleum Production Licence over which the petroleum activity will be acquired, as detailed in the EP for the petroleum activity subject to this protocol.

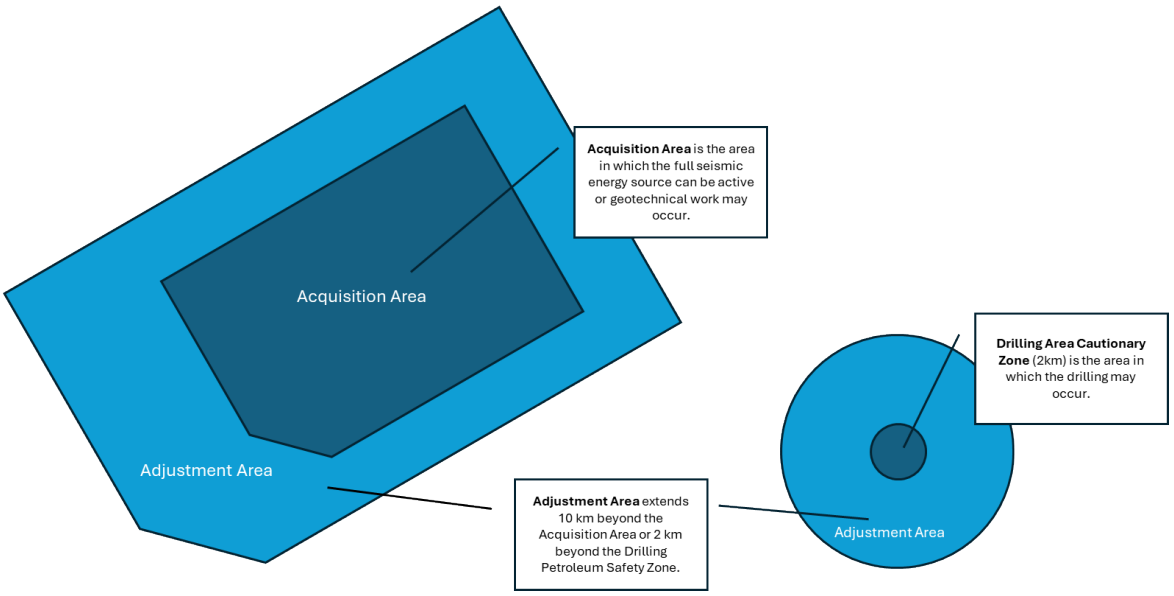


Figure 1 - Representation of defined terms for Acquisition Area and Adjustment Area

1.5 Scope

The OAP is intended to apply to commercial users of the marine environment who are directly affected by petroleum activities, where interference is unavoidable.

This protocol covers:

- A marine operator who is a commercial fisher (refer definition) who fishes as a normal part of their commercial fishing activity within an Adjustment Area (refer definition), during and/or for a specified period after a petroleum activity, conducted under an accepted EP that references and is therefore subject to this OAP. Adjustment is also available for fishing outside of an Adjustment Area in some circumstances, if agreed in advance with the titleholder.
- Other commercial marine operators who identified they could be potentially affected by the petroleum activity during relevant persons consultation, who utilise an area as a normal part of their commercial activity within an Adjustment Area (refer definition) during a petroleum activity conducted under an accepted EP that references and is therefore subject to this OAP.

This protocol applies to marine operators with one or more Victorian, Tasmanian, or Commonwealth fishing licences.

1.6 Consultation

This protocol has been founded by CGG and ConocoPhillips Australia and developed by Klarite Sustainable Ventures (**KSV**) building on the NERA CSEP Commercial Fishing Industry Adjustment Protocol. While preparing EPs for petroleum activities in the Otway, the founding titleholders consulted with fishers, fishing license holders, and fishing associations, which indicated a single method for compensation was desirable. Subsequently, on the request of the founders, KSV has undertaken preliminary consultation with some fishing industry associations and other commercial marine users identified during relevant persons consultation, as relevant persons, to provide input.

Each titleholder will continue to consult as per the requirements of the regulations with each relevant person. Consultation on this protocol may also be carried out by KSV on behalf of each titleholder proposing to adopt this protocol. All records of consultation will be treated as confidential in accordance with Section 25(4) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023.

Consultation on the OAP will include:

- Writing to all commercial fishers (Commonwealth and State) who may have rights within the Otway region providing an opportunity for input into the content and format of the protocol.
- Writing to other commercial marine operators who identified they could be potentially impacted by the petroleum activities during consultation in preparation of the Eps.
- Inviting fishing associations and commercial marine operators, including fishers to nominate appropriately qualified and experienced claims assessors for their industries/fisheries.

1.7 Operation of the protocol

Notification of the establishment of an Adjustment Area will be provided to relevant commercial fishing licence holders and other commercial marine operators in writing, no less than 28 days before a petroleum activity starts. Notification is to be provided in the form of a map plus digital files in easily readable formats such as KML, GPX or shapefiles.

Fishers (the fishing vessel/licence) must have established previous fishing history, at a minimum of two out of the previous five years, for all block(s) or fishing event(s) for which they wish to make a claim for loss of catch or displacement adjustment under this protocol.

To receive adjustment under this protocol, a commercial fisher must be able to show that they would have received the revenue from the landed catch that is the subject of a claim, incurred additional costs for displacement, or show that they have incurred the cost of lost or damaged fishing gear.

Adjustment under this protocol is dependent on a commercial fisher or commercial marine operator continuing to carry out their activities to the best of their ability and to mitigate and limit financial loss despite the occurrence of a petroleum activity. Titleholders using this Protocol reserve the right to refuse a claim if fishers interfere with a petroleum activity through deliberately operating in properly notified areas, noting that such interference may also be in breach of Section 603 of the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (See Appendix 7).

Note that this protocol may be referred to in the EP developed by each titleholder to manage potential impacts to commercial fishing licence holders and other marine users, where identified during consultation, and will therefore be subject to inspection under NOPSEMA's environmental inspection program.

2 Commercial Adjustment Available Under This Protocol

2.1 Displacement

If a commercial fisher is unable to fish in their historical fishing area (refer definition) within an Adjustment Area during a petroleum activity and incurs costs over and above the normal running costs for a fishing trip while relocating to another historical fishing area, then additional costs associated with increased distance/transit time, fuel and crewing will be considered under this protocol for monetary adjustment. The Displacement Area is an alternative fishing ground within 50 kilometres of the Adjustment Area.

For fishers, displacement will be assessed based on a comparison of the running costs per day at sea against the previous yearly average. A commercial fisher who decides it is necessary to relocate to another fishing ground because of a petroleum activity subject to this protocol and wants to be considered for displacement adjustment must notify the titleholder of the petroleum activity, where possible, prior to undertaking the relocation. When making a claim, evidence must also be provided to substantiate fishing gear in use at the claim time.

Claimants undertaking commercial activities within their normal operating range during a petroleum activity may be eligible to make a claim where the fisher can evidence that the average distance travelled per fishing operation is greater compared to the historical pattern during the same calendar month(s) in the preceding 5 years. This includes the distance travelled between the fishers' home port and subsequent fishing locations. It is not necessary to have records for all years for that calendar month, but there must be at least one year for the corresponding calendar month.

For other commercial marine operators, displacement will be assessed on a case-by-case basis through prior agreement with a titleholder on the method of calculation. Timeframes related to displacement claims can be found in Appendix 6.

2.2 Loss-of-Catch Adjustment

Evidence-based loss-of-catch adjustment under this protocol relates to fish lawfully caught and retained by a fishing vessel under a Victorian, Tasmanian or Commonwealth fishing licence. The adjustment process applies to historical fishing activity over established fishing grounds, and not to speculative fishing activity.

The loss-of-catch adjustment process applies to commercial fishing activity conducted by a licensed fishing vessel within an Adjustment Area, and other fished areas within a given calendar month. For each month where adjustment is claimed, the licensed fishing vessel must conduct fishing within an Adjustment Area.

Loss-of-catch adjustment is available for the period of an activity and for six months after an activity is completed[4]. However, claims must fall within the thirty-day claim period after the activity. This adjustment process assumes that any loss-of-catch experienced will be demonstrated through a reduced CPUE for that fishing vessel (or license if subject to boat replacement) compared to previous years for the same eligible claim block/fishing event location by species by month.

Loss of catch assessments will be conducted using the petroleum activity period catch and effort

[4] Temporal parameters for a 2D survey will be considered on a case-by-case basis.

data per month plus the previous 10 years (by same block/fishing event location and month) where available.

Timeframes related to loss-of catch claims can be found in Appendix 6.

2.2.1 Method of Assessing Loss-of-Catch Adjustment

Treatment of catch-and-effort data to determine eligible fishing events to be included in the adjustment assessment process.

As detailed in this protocol, adjustment is available for fishing activity where it can be shown there is a minimum of two out of the prior five years where fishing activity has taken place in the same block or fishing event location that is the subject of a claim. This requirement applies to the Adjustment Area and for any other block/fishing event location/area for which adjustment is being claimed.

For State fisheries, catch-and-effort data are provided in a 10 x 10 nm statistical grid format, the same block by month will be checked for the five years preceding the activity year to ascertain the minimum requirement of a minimum of two years fishing activity within the previous five years. Where catch-and-effort data are provided in larger than 10 x 10nm statistical grid format, applicants may be asked for additional positional information for blocks that partially overlap the Adjustment Area, or are outside of the Adjustment Area, to assess the minimum fishing history requirement.

For Commonwealth fisheries, catch-and-effort data from AFMA are provided for the location of each fishing event identified with latitude and longitude coordinates. The existing Victorian grid system will be used to assess the minimum fishing history requirement. The start point of each fishing event will be plotted within the 10 nm grid system to aid the assessment of previous fishing history by allocating each event to a 10 nm block to determine fishing events eligible to be included in the adjustment assessment process. Note that assessors have the flexibility to make judgements that will enhance the statistical accuracy of an assessment and/or provide balanced practical assessment outcomes.

2.2.2 Calculating an average CPUE

Catch-and-effort history covering the prior 5 years is required to calculate an average CPUE value. Averaging across this period reduces the influence of yearly fluctuations in recruitment and environmental parameters.

CPUE will be defined in kilograms of landed catch and the unit of effort will be defined in hours (decimal hours where available) fished for trawl, hours fished, or kilometres of line set or number of hooks per kilometre for line fishing or number of trap lifts, resulting in the landed catch, for example CPUE = kilograms per trawl/line hour or trap lift. Average CPUE will be based on the mean catch-and-effort values of all eligible fishing events per claim month.

It is recognised that in some cases, 5 years of catch history data may not be available and where this occurs an assessor should determine an appropriate average CPUE based on the information available in the application and any other information that an assessor deems appropriate.

The use of 5 years prior catch history and the intention of this protocol is that assessments are conducted based on the available catch and effort information. However, an assessor may also consider significant catch trends within a fishery and/or management changes if they are thought to materially affect resulting catch rates or landed catch volumes.

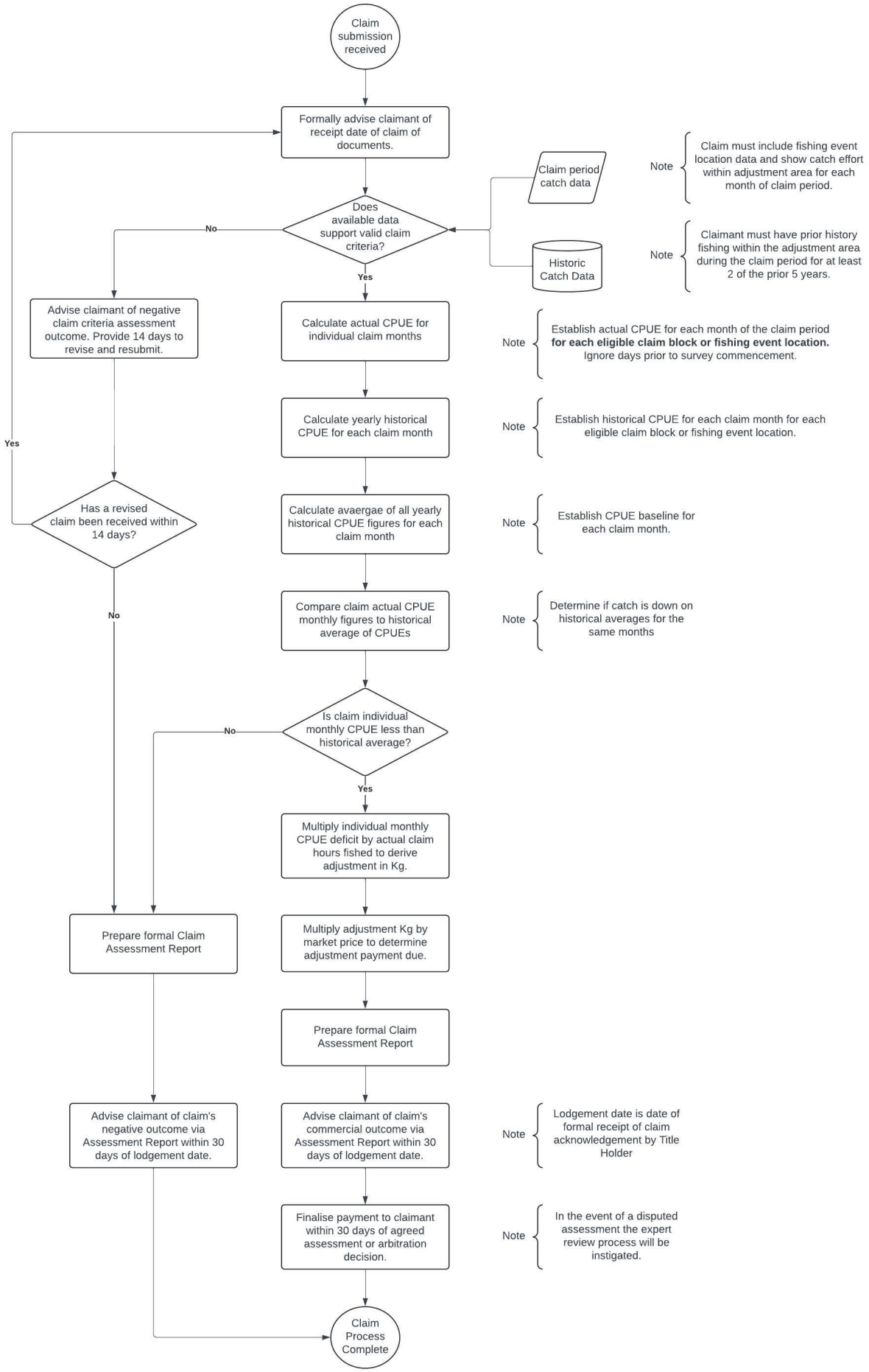
2.2.3 Loss-of-Catch Adjustment Assessment Method

1. Claim month must contain fishing activity within the Adjustment Area.
2. A claimant must have historical fishing activity (refer definition) for each block or fishing event location subject to a claim.
3. Average CPUE's are calculated for each calendar month for all eligible fishing events, using the previous 5 years of data. These averages are used as a baseline CPUE from which to assess claims.
4. The CPUE for the month/s and block/s being claimed for will then be compared to the baseline CPUE's calculated for the same block/fishing events and month/s, and where a shortfall is established, an adjustment will be calculated.
5. The established shortfall in CPUE will be multiplied by the unit of effort (number of pot lifts, trawl hours, kilometres of line set/number of hooks per kilometre,) fished for that claim month, and then the grouped species market price, to provide the amount of monetary adjustment due for that month.
6. Adjustment can be calculated for individual species or combined as appropriate.

2.2.4 Adjustment Method Loss of Catch Adjustment Calculation Example

Claim period April 2020	Species: Rock Lobster Pot Lifts: 400 Market price: $80/kg Total catch: 500 kgs.
Claimant has historical fishing activity within Adjustment Area prior to April 2020	Condition met
Claimant fished in Adjustment Area during April 2020	Condition met
April historical baseline CPUE	1.75kg/potlift
April 2020 CPUE	1.25kg/potlift
Shortfall in CPUE	0.50 kg/potlift
Shortfall multiplied by 400 pot lifts in April 2020	200kg
200 kgs multiplied by market price of $80 per kg	$1,600
Monetary adjustment due for reduced catch April 2020	$1,600
Administration Allowance for claim with supporting documents	$1,950
Total Remuneration for claim	$3,550

2.2.5 Loss of Catch Assessment Flow Chart



2.2.6 Exceptions to loss-of-catch assessment method information requirements.

Where a fisher is unable to provide 5 years prior catch-and-effort data due to Government confidentiality requirements or other reason, an assessment may still be conducted subject to the claim assessor being satisfied that an accurate assessment can still be conducted using the volume of data available.

If requested by the claimant, an assessment may be conducted using a fisher's own catch and effort data where a claim assessor forms the view that the data is consistent with Government data accuracy and formatting and that the data is suitable to conduct an accurate assessment.

The loss of catch adjustment process under this protocol does not cover circumstances where there may be discussions and/or agreement reached between a petroleum activity titleholder and a commercial fisher prior to an activity taking place, that it is not appropriate for fishing to occur within the area of a petroleum activity. Likewise, if a commercial fisher feels that they will be disadvantaged by a petroleum activity due to alternative suitable fishing grounds not being available to them during the petroleum activity, then they should engage with the titleholder ahead of an activity commencing.

A commercial fisher wishing to lodge a claim for adjustment should notify the titleholder of their intention to lodge a claim as soon as possible after the conclusion of operations of a petroleum activity.

2.3 Fishing gear loss or damage

A commercial fisher may lodge a claim in accordance with this protocol if they experience accidental loss or damage of deployed fishing gear where a fisher can demonstrate that the petroleum activity and/or the in-water equipment or supporting vessels subject to this protocol.

Through pre-activity notifications and communications, titleholders and commercial fishers should have an awareness of activity and fishing activities and make all reasonable efforts to avoid direct interaction and fishing gear loss or damage. It should be noted that petroleum activity vessels/rigs carrying out petroleum activities identify as 'vessel restricted in her ability to manoeuvre' under international marine navigation laws.

If fishing gear loss or damage occurs, the commercial fisher should immediately notify the titleholder.

When lodging a claim, the claimant should clearly document when, where and how the gear damage or loss occurred and where possible, the name and details of vessel(s) involved in the incident. A claim should include a quote (two where possible) with costs associated with repairing or replacing the lost or damaged fishing gear.

As a result of assessing the claim, by mutual agreement with the claimant, the titleholder may offer to cover the cost of repairing or replacing the damaged fishing gear or providing like-for-like replacement equipment.

Fishers making a claim for lost or damaged gear may also make a CPUE based claim for the lost catch associated with the lost or damaged gear.

In the event a claim for forgone catch has been submitted, the titleholder may (at their sole expense) enlist the services of an independent person or organisation to assess the claim. If agreement cannot be reached between the claimant and titleholder, then refer to the independent expert review provisions in the *How long will it take to deal with my claim and independent expert review process* section of this protocol.

A claim for fishing gear loss or damage must be lodged within 6 months of the conclusion of the activity.

3 Claim Information and Assessment Process

Titleholders conducting petroleum activities in accordance with an EP subject to this protocol will provide a centralised contact point and online portal to relevant commercial fishers/marine operators relating to lodging a claim or notification regarding displacement, loss of catch, or fishing gear loss or damage, as relevant. Contact information will also be provided to relevant fishing associations as the respective peak commercial fishing industry bodies.

All information provided in an application under this protocol must be kept confidential by the titleholder, an assessor or expert reviewer of a claim and any other person who has access to the information.

Provided a claimant can demonstrate the required previous fishing history within an Adjustment Area, if all the remaining information requirements set out in this protocol are not available to a claimant, then such claims will be considered on a case-by-case basis, in consultation with the nominated competent claim assessor. For example, if a commercial fisher, whose regular fishing grounds are within the Displacement Area, believes they are indirectly affected by another commercial fisher who has been displaced and has moved into the first fishers regular fishing grounds they may qualify as a claimant under the CPUE adjustment process detailed above.

An option for applicants lodging a claim is to authorise an assessor to access the relevant fishing catch and effort information directly with the appropriate Government Department. Alternatively, applicants may provide the required Government catch and effort information with their claim application.

Applicants will receive confirmation of a claim being lodged with the titleholder. If an assessor forms the view that the information lodged with a claim is not sufficient to conduct a meaningful assessment or support the application, then the claimant will be advised in writing and given 14 days to respond to the assessor. If no response is received within 14 days, then the assessment will be completed, and the claimant advised of the outcome.

Claims will be assessed by separate monthly fishing activity, with each month assessment outcome not influencing or impacting on any other month's assessment outcome. This protocol outlines the adjustment processes in a manner to provide consistent assessments over time. However, assessors have the flexibility to make judgements that will enhance the statistical accuracy of an assessment and/or provide balanced practical assessment outcomes.

For fully documented claims that meet the Adjustment Area historical fishing/usage activity requirement, whether successful or not, clerical costs relating to preparing, submitting, and engaging in the adjustment process under this protocol, up to a value of $2,000 per claim, will be reimbursed by the activity's titleholder as part of the claim process. A statement outlining time and resource costs to support an amount up to $2,000 should be included with a claim. Clerical costs that exceed $2,000 may also be included with a claim and reimbursed under this protocol if evidenced by documentation.

3.2 Who can lodge a claim and when?

A commercial fisher who is an affected person who has suffered displacement, a loss of catch, or gear loss or damage whilst operating in and around a petroleum activity Adjustment Area, subject to this protocol can lodge an adjustment claim.

Other commercial marine operators (refer definition), identified during relevant persons consultation during the preparation of the relevant EPs, who suffers displacement whilst operating in and around a petroleum activity Adjustment Area, subject to this protocol can lodge an adjustment claim.

A person so authorised may lodge a claim on behalf of a commercial fisher/marine operator. Claims may be lodged by a person, company, or association on behalf of more than one commercial fisher/marine operator, provided that the required individual usage/catch history is provided and there is evidence of the authority to lodge the claim on behalf of others.

Claims can be submitted up to 6 months after the conclusion of a relevant petroleum activity.

3.3 What information is needed to lodge a claim?

Claimants will need to be able to identify the relevant vessel and licence(s) that are involved in the claim, and to provide evidence of the entity that would have received the revenue that is the subject of a claim. For fishers, a key information requirement when lodging a loss of catch claim will be to either authorise access to the relevant Government catch and effort data or provide the catch and effort data with the application. For other commercial marine operators, the information needed for lodging a claim will have been agreed between the titleholder and the entity that would have received the revenue that is the subject of a claim.

Full details on the information required to be lodged with a claim are contained in the application forms at:

- Appendix 2 – Claim for Loss-of-catch, Displacement, Gear damage and C&E Permission
- Appendix 3 – Statutory declaration for making claim

Each claim should relate to only one petroleum activity and associated titleholder. If a claimant is not sure which titleholder is undertaking the activity the claim may be delayed whilst a claim assessor confirms the correct titleholder.

3.4 Who will assess the claims and what information will be in the report?

Subject to a claim being lodged, the titleholder of a petroleum activity (at their expense) in consultation with the claimant, will engage a suitably experienced/qualified independent person or organisation as the assessor of the claim.

The titleholder is to provide the assessor with a letter of instruction/project brief, which is to be provided to the claimant as part of the assessment report.

An assessment report prepared by an assessor should include the following information:

- a copy of the letter of instruction/project brief received by an assessor when engaged to carry out the independent assessment,
- confirmation (or otherwise) that the information provided in the claim is sufficient to conduct a meaningful assessment,
- a summary of the claim details (activity, applicant, vessel, month(s)),
- for a loss of catch claim, monthly CPUE assessments as outlined in this protocol including an estimation of any loss of catch (in kilograms) and its market price, and
- any other information, comments, or views relevant to the assessment that

the assessor may wish to include.

Upon receiving and considering the assessment report, the titleholder will provide a copy of the report to the claimant and offer to meet with the claimant to discuss/address the claim.

3.5 How long will it take to deal with a claim?

An appropriately documented claim (including relevant catch and effort information) should be assessed, and a report provided to the claimant within 30 days of the lodgement date of the claim. If an assessor is authorised to access catch and effort data, then the 30-day period begins upon receipt of the necessary catch-and-effort data. If an appropriately documented claim report cannot be made available to the claimant within 60 days of a claim being lodged or receipt of catch and effort information as appropriate, and no mutual agreement to extend the time period has been entered into, then the titleholder (at their expense) in consultation with the claimant, shall appoint a suitably experienced/qualified independent person or organisation to provide an expert review of the claim.

Included as part of the settlement of each claim, will be a binding agreement that summarises the claim outcomes and an agreement by the claimant that acceptance of the settlement negates any further claims for the same species and month(s) of that petroleum activity.

3.6 Independent expert review of a claim

If a claimant disagrees with a claim assessment outcome and cannot reach agreement with the titleholder, they may opt to go to an independent expert review (funded by the titleholder of the activity).

If a claim is subject to independent expert review, then as part of that process, both the claimant and the titleholder shall be given the opportunity to address the assessor to state their position, prior to an independent expert review decision being reached.

An independent expert reviewer must provide a view as to whether the claim assessment process has been conducted in line with the requirements of the protocol. The independent expert reviewer may also consider any additional information deemed appropriate by themselves, including information provided by either the claimant or the titleholder. An independent expert review decision is binding on the claimant and the titleholder and may differ from the initial assessment report. A timeline diagram setting out the relevant time frames under this protocol can be found at Appendix 4.

3.7 How long will it take to be paid adjustment?

Once a claimant and titleholder agree with a claim outcome, or an expert reviewer has issued a report, the titleholder will provide monetary adjustment to the claimant as soon as possible and within 30 days.

4 Protocol Review and Maintenance

This protocol will remain in force for the validity period of any accepted EP for any of the titleholders who become members of the OAP, anticipated to be a five-year term from date of acceptance by NOPSEMA. The protocol will be subject to review and update by KSV and the members at least once in each 12-month period. Changes will be considered in consultation with relevant fishing associations (and other stakeholders as appropriate) and subject to agreement by the titleholder members.

The forms in the Appendices will be made available for download through the OMICC Portal, or online forms may be used to submit a claim.

4.1 Revision History

Revision	Date	Notes
0.1	2 February 2024	Creation of document based on the NERA protocol and following consultation inputs from commercial fishing industry consultation in preparation of relevant EPs.
0.2	22 February 2024	Amendments to add other commercial marine operators and prepare for consultation with OMICC founders.
0.3	14 March 2024	Amendments following OMICC founder input and clarifications to scope. Preparation for first legal review by titleholders.
0.4	30 April 2024	Reviewed and updated for distribution and comment.
0.5	29 August 2024	Updated following consultation with commercial fishers.
0.6	18 March 2025	Updated following further consultation with commercial fishers and amendments following OMICC founder input.

Appendix 1: Otway Commercial Marine Operator Adjustment Protocol Members

Founding Members

- CGG Services (Australia) Pty Ltd
- ConocoPhillips Australia SH1 Pty Ltd and ConocoPhillips Australia SH2 Pty Ltd
- Klarite Sustainable Ventures Pty Ltd

Appendix 2: Consent and Confidentiality Form

CATCH & EFFORT and CATCH DISPOSAL RECORDS CONSENT
Records from this year and previous years are needed to support your claim. Please complete the following consent form for lodgement with the appropriate fisheries management agency.

I, (insert name) ……give permission to the Klarite Sustainable Ventures

nominee to have access to my (insert fishery) ……. catch and effort records at

(fisheries management agency) ……..

I affirm that the fishing cooperatives listed below (leave blank if not applicable):

(insert fishing cooperative) …… receive (insert percentage) ……% of my landed catch.

(insert fishing cooperative) …… receive (insert percentage) ……% of my landed catch.

(insert fishing cooperative) …… receive (insert percentage) ……% of my landed catch.

I, (insert name) …… do:

(a) Certify that the details and particulars in this application are true to the best of my knowledge, information, and belief; and

(b) Acknowledge that the making of a false statement is unlawful and open to prosecution.

Signed: …….. Date: ……..

Appendix 3: Displacement Application Form

Commercial Fishing Industry Adjustment Protocol - Application Form for Displacement Claim

Application Form - Commercial Marine Operator Adjustment Protocol - Displacement	
Activity Details	
Petroleum activity name	
Activity titleholder	
Claimant Details	
Name of person/company making claim	
Address	
Email	
Contact number	
I am the entity that would have received the revenue from the catch that is the subject of this claim. Please include evidence of above statement	Yes or No
Relevant authorisation holder details (if different from claimant)	
Name	
Address	
Email	
Contact number	
Authorisation/licence(s) name and number	
Claim details	
Evidence of the additional distance, fuel and crew costs incurred by the relocation of the fishing/other marine operation.	Attach receipts/evidence of costs for claim month. Include vessel track data, fuel receipts, transit time, distance travelled etc.
Evidence of previous year daily (at sea) average distance, fuel and crew costs	Attach receipts/evidence of costs for previous year.

Application Form - Commercial Marine Operator Adjustment Protocol - Displacement
Include five years catch data preceding the year of the claim in the following form: • Vessel • Year • Month • Fishery • Fishing event location/blocks fished provided at the highest available block resolution. • Whole weight calculated based on the reported landed weight and listing any relevant conversion factor(s). For other commercial marine operators, include five years historical area usage data preceding the year of the claim in the following form: • Vessel • Year • Month • Location provided at the highest available resolution. Note 5 years of data is required for displacement purposes to show recent operational history has occurred within an Adjustment Area. If less than 5 years data available, then claim assessor should evaluate appropriate method of assessment.
Please list the documents provided with your application
1.
2.
3.
4.

Appendix 4: Loss of Catch Application Form

Commercial Fishing Industry Adjustment Protocol - Application Form for Loss of Catch claim

Application Form - Commercial Marine Operators Adjustment Protocol - Loss of Catch	
Activity Details	
Petroleum activity name	
Activity titleholder	
Claimant Details	
Name of person/company making claim	
Address	
Email	
Contact number	
I am the entity that would have received the revenue from the catch that is the subject of this claim. Please include evidence of above statement	Yes or No
I wish to authorise direct access to my catch and effort history relevant to this application.	Yes/No (If yes then authorisation holder to sign here)
Relevant authorisation holder details (if different from claimant)	
Name	
Address	
Email	
Contact number	
Authorisation/licence(s) name and number	
Claim details	
Months for which loss of catch adjustment is being claimed	

<table>
<tr><td colspan="2">Application Form - Commercial Marine Operators Adjustment Protocol - Loss of Catch</td></tr>
<tr><td colspan="2">Market price information – please include documentary evidence of price received from normal buyer/processor for catch relevant to loss of catch claim.</td></tr>
<tr><td>Catch and effort information for blocks/area by month by species for which loss of catch is being claimed plus previous 10 years. If 10 years Government catch history is not available and/or or you wish to provide your own validated catch history, please indicate here.</td><td>Indicate whether Government or own catch and effort data is being provided and number of previous years of data available.</td></tr>
<tr><td colspan="2">NOTE: If any information is not available from Government and fishers own catch data is being submitted, then copies of the relevant statutory catch and effort fishing returns should be submitted with the claim.</td></tr>
<tr><td colspan="2">Catch and effort information should be provided in the form of:
Vessel
Year
Month
Fishery
Blocks fished provided at the highest (e.g., 10x10nm) available block resolution, or fishing event locations (by latitude and longitude).
Block days including fishing events in identified area/blocks per month.
Fishing hours (in decimal hours) showing the duration of each fishing event at highest available block/fishing event resolution.
Whole weight calculated based on the reported landed weight and listing the relevant conversion factor(s) if applicable.</td></tr>
<tr><td colspan="2">Other relevant information may be submitted with a claim and will be assessed on a case by case basis. Questions regarding the claim process may be directed to a person nominated by the titleholder.</td></tr>
<tr><td colspan="2">Please list the documents provided with your application</td></tr>
<tr><td colspan="2">1.</td></tr>
<tr><td colspan="2">2.</td></tr>
<tr><td colspan="2">3.</td></tr>
<tr><td colspan="2">4.</td></tr>
</table>

Appendix 5: Fishing Gear Loss or Damage Application Form

Application Form - Commercial Marine Operators Adjustment Protocol – Fishing gear loss or damage	
Activity Details	
Activity name	
Activity titleholder	
Claimant Details	
Name of person/company making claim	
Address	
Email	
Contact number	
I am the entity that has incurred the costs of the lost or damaged fishing gear that is the subject of this claim. If claiming for loss of catch, I am the entity that would have received the revenue from the catch that is the subject of this claim. Please include evidence of above statements.	Yes or No and supporting information.
I wish to authorise direct access to my catch and effort history relevant to this application.	Yes/No (If yes then authorisation holder to sign here)
Relevant authorisation holder details (if different from claimant)	
Name	
Address	
Email	
Contact number	
Authorisation/licence(s) name and number	
Claim details	
Evidence of notification to the titleholder of the gear loss and/or damage incident.	
Information describing when, where, and how the gear damage and/or loss occurred.	
Where possible, the name and details of vessel(s) involved in the incident.	

A claim should include a quote (two where possible) with costs associated with repairing or replacing the lost or damaged fishing gear.	
Estimate of any proportionate loss of catch including market price, plus catch and effort information sufficient to calculate CPUE for claim month or same month in previous year.	
Please list the documents provided with your application	
1.	
2.	
3.	
4.	

Appendix 6: Adjustment Protocol Timeframes

The titleholder will provide 28-day notice of a future Adjustment Area including a map and coordinates.

The titleholder will provide notice of activity start and activity end through the OMICC portal and any other communications methods specified in the associated accepted Environment Plan.

The Claim Period:

1. A claim can be made from the starting date of the activity.
2. A claim can be made once per month for the whole month, or part thereof.
3. A claim can be made for evidence-based losses up to 30 days after the end date of the activity.

The Lodgement Period:

1. All claims must be lodged within 183 days (6 months) after the end of an activity.

Timeframes for processing a claim:

1. Claims to be finalised within 60 days of being lodged, or receipt of catch and effort information, unless mutual agreement reached between claimant and titleholder to extend time frame.
2. If agreement cannot be reached between the titleholder and claimant within the prescribed times above then the titleholder, in consultation with the claimant, must appoint an independent expert reviewer to decide the claim.
3. Subject to an independent expert review decision, the titleholder shall settle the claim in accordance with the decision within 60 days.

Appendix 7: Legislation Section 603

Offshore Petroleum and Greenhouse Gas Storage Act 2006
No. 14, 2006

Compilation No. 54
Compilation date: 18 October 2023
Includes amendments up to: Act No. 74, 2023
Registered: 21 October 2023

603 Interfering with offshore petroleum installations or operations

(1) A person commits an offence if:

(a) the person engages in conduct; and

(b) the person's conduct results in:

(i) damage to, or interference with, any structure or vessel that is in an offshore area and that is, or is to be, used in exploring for, recovering, processing, storing, preparing for transport, or transporting, petroleum; or

(ii) damage to, or interference with, any equipment on, or attached to, such a structure or vessel; or

(iii) interference with any operations or activities being carried out, or any works being executed, on, by means of, or in connection with, such a structure or vessel.

Penalty: Imprisonment for 10 years.

REGIA
Marine Seismic Survey

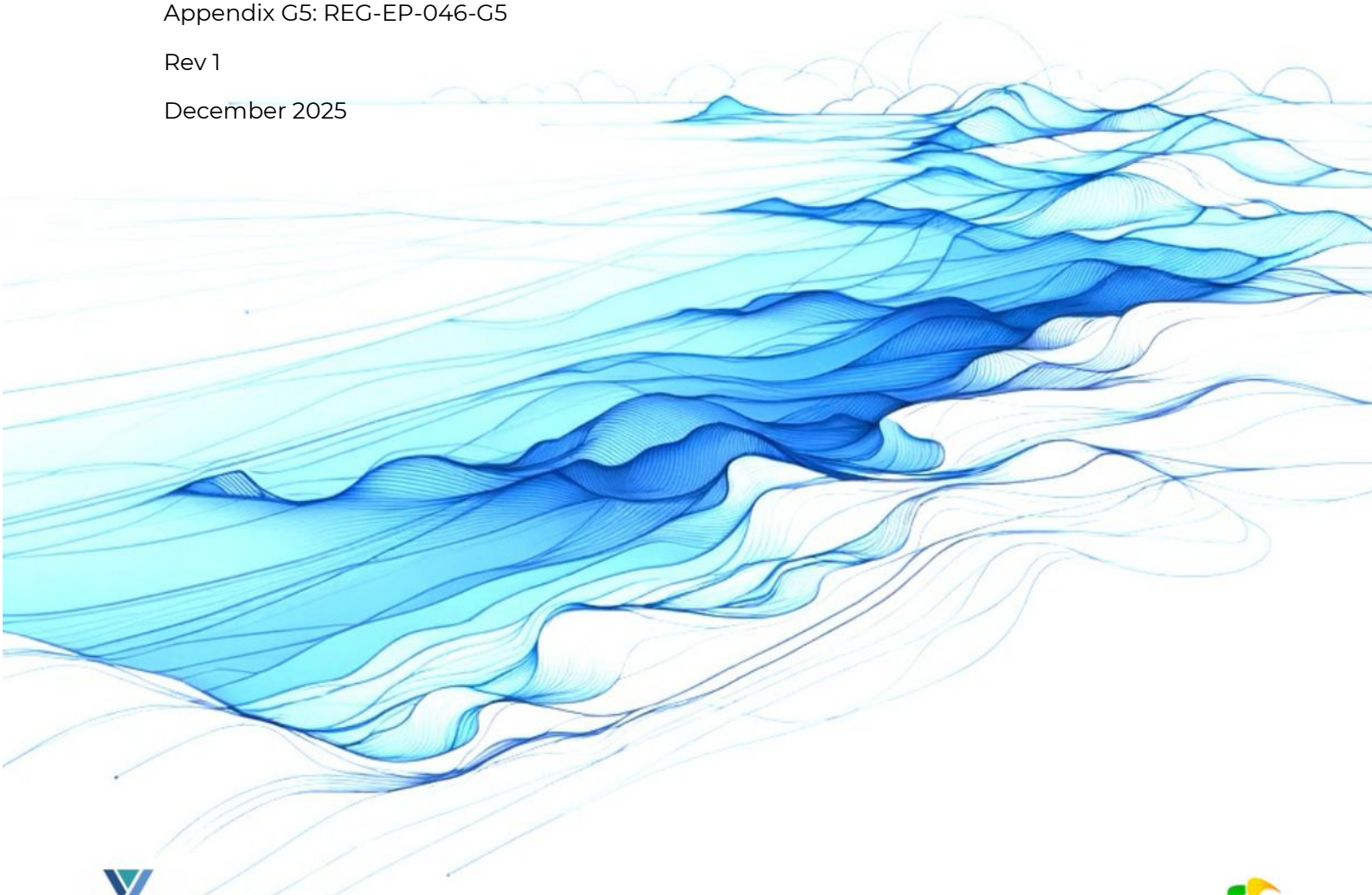
Coastal Monitoring Programme for Southern Right Whales and Pygmy Blue Whales

Implementation Plan

Appendix G5: REG-EP-046-G5

Rev 1

December 2025



Klarite

Table of Contents

1 Introduction 4
2 Monitoring Framework – Southern Right Whale 5
2.1 Monitoring Objective 5
2.2 Coastal Activities within the Monitoring Framework 5
2.2.1 Detection Methods Selection 5
2.2.2 Coastal Monitoring Area 5
2.2.3 Resources 6
2.2.4 Program Duration 6
2.2.5 Program Tasking 7
2.3 Coastal Deployment Plans 8
2.3.1 Optimal Weather Deployment Plan 8
2.3.2 Sub-Optimal Weather Deployment Plan 10
2.3.3 No-Fly Plan 11
2.4 SRW Detection and Escalation Procedure 13
2.4.2 SEA Decision Pathway 13
2.4.3 Daytime Procedure (Post-Confirmation) 13
2.4.4 Night-Time Procedure 13
2.4.5 External Sightings and Citizen Science Information 13
3 Monitoring Framework – Blue Whale 15
3.1 Purpose and Objectives 15
3.2 Site Rationale 15
3.3 Operational Context 15
3.4 Summary 15
4 Document Control 17
5 Appendix 1 - Cape Nelson Lighthouse - September-October Operational Weather Analysis (1995 - 2025 Analysis) 18
5.1 Executive Summary 18
5.2 Introduction 18
5.3 Site Selection Rationale – Cape Nelson Lighthouse 19
5.4 Wind 19
5.5 Defined Operational Conditions – Wind 21
5.6 Rain 22
5.7 Defined Operational Conditions – Rainfall 22
5.8 Wind-Rain Relationship at Cape Nelson 23
5.9 Adjusted Interpretation of Deployment Opportunity 23
5.10 Summary 24
5.11 Full Operational Conditions Parameters 25

5.12 Justification of Flight Environment Parameters 26
6 Appendix 2 – Technology Specifications – Drone and Camera 28
6.1 Example of Drone Specifications -DJI Matrice 400 28
6.2 Example of Camera Specifications - Zenmuse H30 Specs: 28
6.3 Demonstration that the H30T Tele Camera Can Visually Detect a Whale at 25 km 28
6.4 Conclusion 29

1 Introduction

This document describes a monitoring programme required because of the outcomes of an environmental impact assessment conducted by CGG for the Regia Marine Seismic Survey (**Regia MSS**). Context for this document can be found in the Regia MSS Environment Plan (**EP**) and users unfamiliar with the Regia MSS EP should read, in the following order:

- Impact Assessment – Underwater Sound: Marine Mammals (Appendix E7)
- Further Assessment – Southern Right Whales (Appendix F3, Section 3.1.1)
- Implementation Strategy (Appendix B3)
- Fauna Management Plan (Appendix G2)

Section 0 of this document presents the implementation plan for Southern Right Whales (**SRW**). This coastal monitoring program is designed to ensure the requirements of the National Recovery Plan for SRW are met and impacts from the activity are kept below an acceptable level.

Section 3 of this document presents the implementation plan for Blue Whales (Antarctic and Pygmy) (**BW**s). This pre-season coastal aerial surveillance plan is designed to detect BWs as they arrive at the Otway region ahead of their foraging season, with the aim to provide an early signal for scaling protection measures before their arrival near the survey.

2 Monitoring Framework – Southern Right Whale

Herein we outline the framework for a dedicated SRW monitoring program along the south-west Victorian coastline to monitor the presence and movements of SRW in the lead-up to and during the Regia MSS.

2.1 Monitoring Objective

The key objective of this program is to provide real-time visual assessment of SRW whale presence within the greater Otway offshore region encompassing waters exposed to elevated levels of sound from the Regia MSS.

The program forms part of a multiple lines-of-evidence approach to SRW detection that will work in parallel with in-water ambient sound monitoring, citizen science data, social media monitoring, and offshore detection methods (Passive Acoustic Monitoring (PAM) systems and vessel-based Marine Fauna Observers (MFO's)) to provide a continual scanning system for whale presence to inform management and mitigation decisions.

2.2 Coastal Activities within the Monitoring Framework

2.2.1 Detection Methods Selection

CGG has evaluated various visual (coastal and aerial) surveillance methods. A full evaluation of these methods is presented in Appendix F2. In short, Unmanned Aerial Vehicles (UAVs)[1], otherwise known as drones, allied with qualified Marine Fauna Observers (MFOs) have been selected as the preferred coastal detection method with the largest geographical coverage due to their lower cost, lower safety risk, higher uptime, and operational flexibility.

2.2.2 Coastal Monitoring Area

The primary study area is a strip extending 5 km from the shore and running continuously between Cape Bridgewater and Cape Otway. This strip encompasses the SRW Biologically Important Area (BIA) (extending 5 km from shore) and covers the portion of the Victorian coastline with possible sound exposure exceedances above ambient levels from the Regia MSS (Figure G5-1).

[1] The terms Remotely Piloted Aircraft System (RPAS), Drones, Unmanned Aerial Vehicle (UAV), and Remotely Piloted Aircraft (RPA) are used interchangeable across industries and refer to the same generalised technology. For this framework, these systems are collectively referred to as "drones."

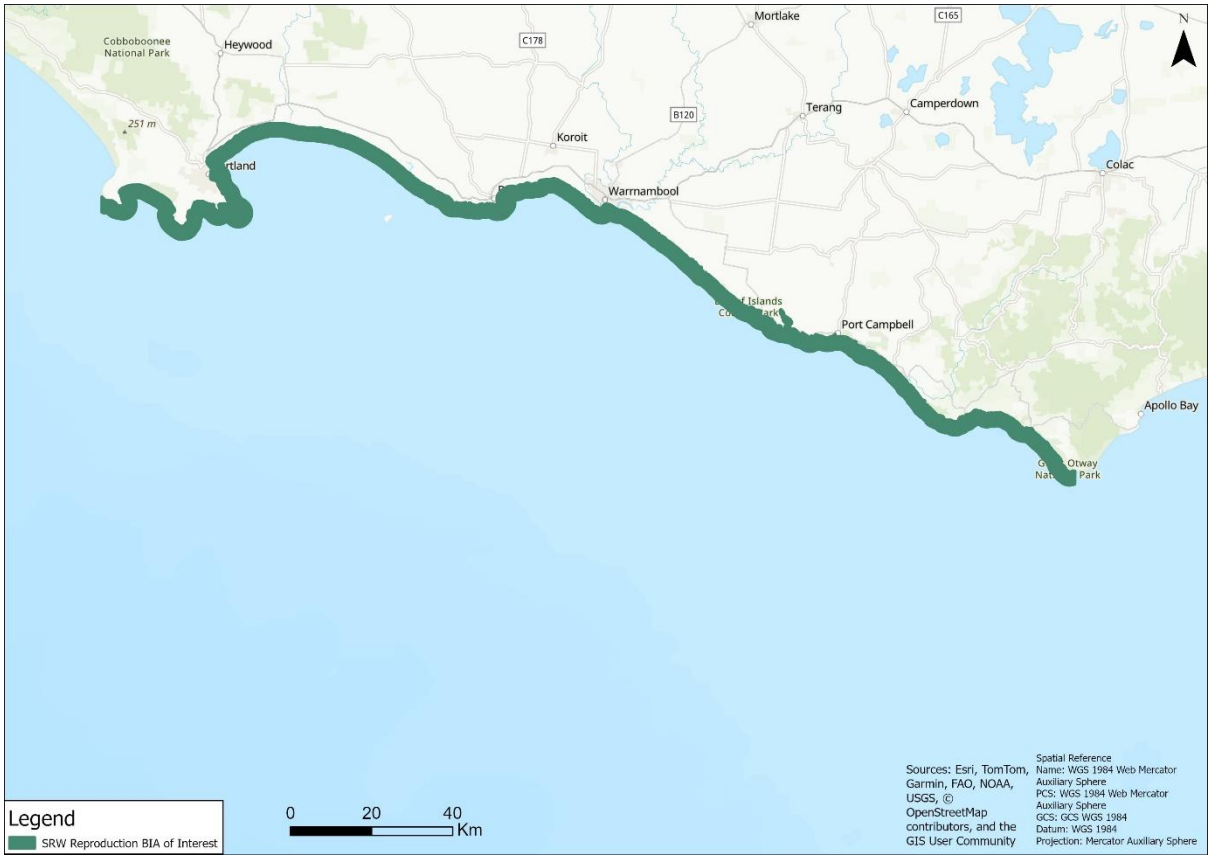


Figure G5-1 – Primary Study Area - SRW Reproduction BIA from Cape Bridgewater to Cape Otway

2.2.3 Resources

The monitoring will be undertaken with two "Whale Monitoring Teams" (WMTs) - each comprising one trained MFO and one Drone Pilot-in-Command (PIC) – who will be responsible for conducting flights west (Zone 1) and east (Zone 2) of Logans Beach respectively (See Figure 2 for flight area delineations). A third team will serve as a backup should extra observation capability be needed.

Using MFOs and drones together provides a more comprehensive approach to coastal marine fauna monitoring. WMT's will move between coastal vantage points each day. Drone PICs will operate their UAVs to extend effective observation ranges, enhance spatial coverage, increase detection probability, and allow for dynamic monitoring of whale movements. MFOs will conduct systematic visual watches and provide taxonomic identification through firsthand observations and through reviewing drone footage. Behavioural observations may also be recorded. Together, these coordinated efforts are expected to support near real-time mitigation enforcement and ensure continued compliance with all relevant regulatory (NOPSEMA and CASA) requirements.

This strategy provides a flexible and operationally efficient approach to whale monitoring, enabling rapid mobilisation across an array of coastal locations. This adaptability is particularly valuable given the variable and often unpredictable weather conditions characteristic of the Otway Coast, ensuring that monitoring efforts remain effective throughout the season.

2.2.4 Program Duration

The program will run for the entirety of the SRW season in Southern Australia which is nominally from May until November.

2.2.5 Program Tasking

Three operational plans have been developed, based around daily weather conditions:

1 Optimal Weather Deployment Plan
2 Sub-Optimal Weather Deployment Plan, and
3 No-Fly Plan

Analysis of long-term weather records for the area indicates there will be optimal conditions up to 15 % of the time, and sub-optimal conditions for up to 60 % of the time (See analysis of weather records in Appendix 2).

The Drone PIC holds ultimate authority and the responsibility for the planning and safe conduct of all flight operations lies with them. Therefore, the daily operational plan will be selected by the Drone PIC, and signed off by the Environment Officer, after assessing forecast weather conditions. While operational weather thresholds and procedural guidelines provide a framework for decision-making, the PICs assessment of real-time conditions always takes precedence. Factors such as visibility, wind strength, cloud ceiling, sea state, and crew readiness must all be evaluated on-site, and the PIC may modify, delay, or cancel a flight at any time if safety could be compromised.

All nominated flight locations identified in this document are publicly accessible areas that have been visually assessed as the most suitable sites for drone deployment based on current information. However, access to these sites may become temporarily restricted due to factors such as high visitor activity, local events, or other unforeseen circumstances. As such, the locations outlined should be considered indicative only. If a preferred site is inaccessible, a nearby alternative location offering comparable vantage and operational safety will be identified and utilised. Final deployment sites will be confirmed and adjusted as required on the day of operations, in accordance with access conditions and safety considerations.

2.3 Coastal Deployment Plans

2.3.1 Optimal Weather Deployment Plan

Optimal weather days represent conditions that are highly suitable for drone operations, characterised by low wind speeds, good visibility, and minimal precipitation. Under these conditions, drone endurance and stability are maximised, allowing for extended flight durations and broader spatial coverage. The weather conditions are expected to permit each WMT to operate efficiently across larger zones, enabling comprehensive monitoring with reduced operational overlap across the survey region.

This monitoring design has four central locations with two to the west and two to the east of Warrnambool (Figure G5-2), with the aim to provide visual coverage of up to 100% of the defined scope area each day during daylight hours. One WMT will monitor the eastern locations and another WMT will do the western locations. A summary of the meteorological parameters that will typically define this plan are presented in Table G5-1. These conditions are predicted to occur on approximately 10-15 % of days in September and October (Refer to Appendix 2 for analysis of climate data).

The primary monitoring sites (PMSs) were identified based on elevated vantage and visual arc, drone deployment feasibility, and accessibility. At each PMS, WMTs will undertake shore-based visual monitoring and at least one drone flight. Drone transects will be defined for each plan in the lead-up to the activity and will be designed to optimise battery efficiency and spatial coverage.

The primary monitoring sites to the west of Warrnambool have a visual range encompassing the Reproduction BIA offshore of Cape Bridgewater, Cape Nelson, Portland, The Craggs, Port Fairy, and Warrnambool. The PMSs within Zone 1 are:

(i) Cape Nelson Lighthouse
(ii) The Craggs.

The primary monitoring sites to the east of Warrnambool have a visual range encompassing the Reproduction BIA offshore of Warrnambool, Logan's Beach Whale Nursey, Mathiesons Road, the Gables, and Cape Otway Light Station. The PMSs within Zone 2 include

(i) Mathiesons Road
(ii) The Gables.

A third WMT will be stationed at a central base located at Logan's Beach, Warrnambool near the midpoint of the scope area between Cape Bridgewater and Cape Otway on days when this plan is active. This WMT will serve as a contingency resource, ready to be deployed at short notice in the event of an unforeseen situation, or if additional monitoring effort is required.

Table G5-1 - Optimal Deployment Plan – Meteorological Parameters

Parameter	Optimal Conditions Threshold	Description
Wind	≤ 10 kt sustained (gusts ≤ 15 kt)	Stable hover, no gimbal shake
Beaufort Sea State	≤ Bft 3 (wave height < 0.5 m)	Minimal whitecaps; stable horizon
Visibility	≥ 10 km	Full horizon clarity for long-range optical ID
Precipitation	Nil	Keep airframe and optics dry
Cloud ceiling	≥ 300 m	Ample vertical separation
Glare / Sun angle	Low or manageable	Smooth horizon contrast
Temperature	5–35 °C	Normal battery operating range

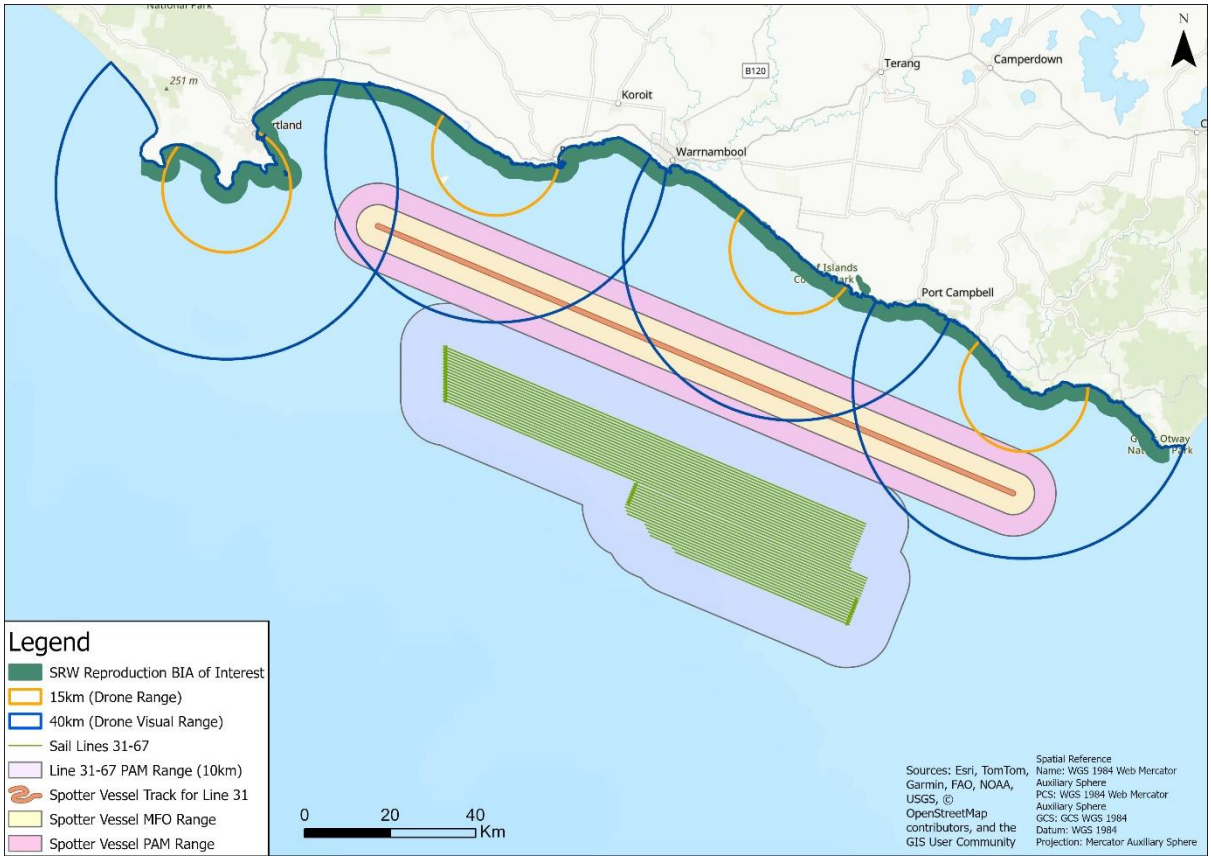


Figure G5-2 - Optimal Weather Deployment Plan Coverage – Figure also shows the Regia MSS survey lines for September & October (lines 31-67) and indicative location of the spotter vessel that has PAM and MFO capacity.

2.3.2 Sub-Optimal Weather Deployment Plan

Sub-optimal weather days are characterised by conditions that may not be ideal for drone operations but are still considered suitable for deployment. On these days, while drone flights are likely to remain feasible, operational efficiency and endurance may be affected. Stronger winds, increased cloud cover, or intermittent light rain can reduce visibility, shorten safe flight windows, and accelerate battery depletion, limiting the duration or range of individual flights.

To maintain effective monitoring coverage under these conditions, three WMTs will be deployed in accordance with the weather-dependent deployment plan. By reducing the spatial extent each team is responsible for, operational demands can be balanced against weather constraints, allowing teams to focus on shorter missions within safer operating limits. This adaptive approach permits monitoring even under less favourable meteorological conditions and remains consistent with the required performance standards.

Under this monitoring design, six primary monitoring sites will be utilised, with WMTs allocated across these sites each day to support broad visual coverage of the defined scope area during daylight hours (See Figure G5-3). Team distribution will remain flexible and may vary according to weather, access, and operational considerations, enabling the intent of achieving up to 100% daily coverage while adhering to all applicable SRW coastal monitoring requirements.

A summary of the meteorological parameters that will typically define this plan, are presented in Table G5-2 below. Long term averages suggest these conditions will prevail on approximately 55-60 % of days in September and October.

At each PMS, WMTs will undertake coastal visual monitoring effort combined with the aim of at least one drone flight at each PMS. Drone transects will be defined for each plan in the lead-up to the activity and will be designed with the intention to optimise battery efficiency and spatial coverage to search for SRWs.

The western third of the scope area, has a visual range encompassing the Reproduction BIA offshore of Cape Bridgewater Cape Nelson, and Portland. The central area encompasses The Craggs and Warrnambool while the eastern third encompasses London Bridge and Johanna Beach (Figure G5-3).

Table G5-2 - Sub-Optimal Deployment Plan – Meteorological Parameters

Parameter	Sub-Optimal Conditions Threshold	Description
Wind	11–21.5 kt sustained (gusts ≤ 23 kt)	Fly only ≤ 5 km; limit altitude 90 m
Beaufort	Bft 4–5 (0.5–2.0 m waves)	Whitecaps frequent; avoid long-range optical ID
Visibility	5–10 km	Thermal useful
Precipitation	Light intermittent drizzle only	Abort on sustained rain
Cloud ceiling	≥ 150 m	Maintain visual horizon
Glare / Sun angle	Moderate; sun on water	Adjust gimbal tilt ≥ 25°
Temperature	0–5 °C or 35–40 °C	Monitor battery performance

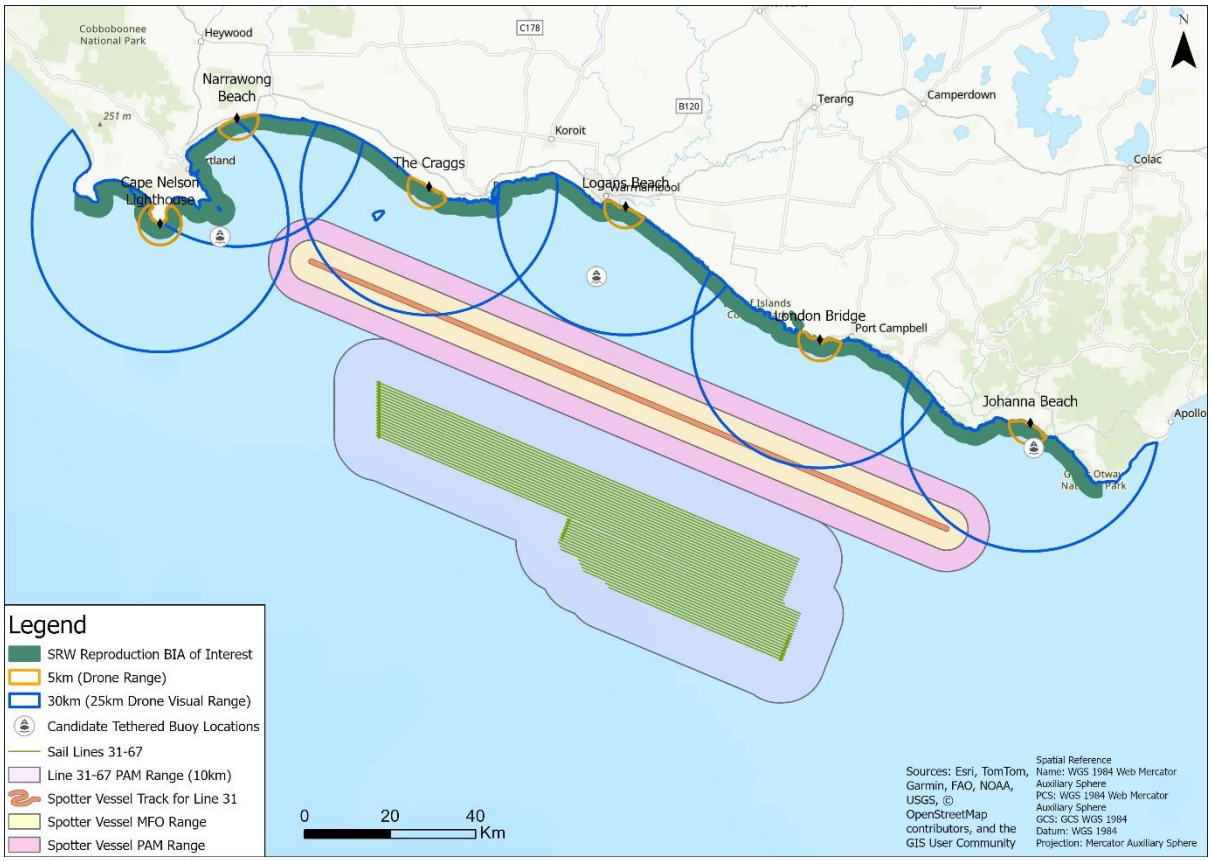


Figure G5-3 - Sub-Optimal Deployment Plan Coverage - Figure also shows the Regia MSS survey lines for September & October (lines 31-67) and indicative location of the spotter vessel that has PAM and MFO capacity.

2.3.3 No-Fly Plan

No-Fly weather days are characterised by adverse meteorological conditions that render drone operations unsafe or impractical. These conditions typically include high or gusting winds, heavy or persistent rainfall, low cloud cover, or reduced visibility, any of which can compromise flight stability, sensor performance, or personal safety. On these days, drone deployment will be suspended, and the focus of monitoring will shift entirely to shore-based visual observation.

Under this monitoring design, multiple PMSs are established along the coast wherever safe access can be gained, with the intent to provide broad visual coverage of the defined scope area during daylight hours. WMTs will be distributed across the broader region in a manner that supports this coverage objective (Figure G5-4).

A summary of the meteorological parameters that will typically define this plan is presented in Figure G5-4. These conditions are predicted to occur on approximately 25-30 % of days in September and October (see Appendix 2).

Under No-Fly conditions there will be no predefined PMSs due to the variable and unpredictable nature of adverse weather conditions. Instead, each WMT will identify and select the most suitable vantage points available on the day to maintain safe and effective visual coverage of their respective portion of the coast.

Given that heavy rain, strong winds, or rough coastal conditions may render certain locations unsafe or inaccessible, site selection on these days will remain highly adaptive. Teams will assess local

conditions in real time and make informed decisions regarding the safest and most practical observation points. In some cases, no coastal observations may be possible if weather or safety conditions prevent effective or safe deployment.

This approach is designed to maintain the maximum monitoring effort across the scope area that weather, and visibility allow. Even when drone deployment is not possible, WMTs will remain active and adaptive throughout the survey period.

Table G5-3 - No Fly Plan – Meteorological Parameters

Parameter	Threshold / Description
Wind	≥ 21.5 kt sustained or gusts > 23 kt
Beaufort Sea State	≥ Bft 6 (waves > 2 m, heavy whitecaps, spindrift)
Visibility	< 5 km or heavy haze / rain curtain
Precipitation	Rain, squalls, hail, or low cloud over site
Thunderstorms	Any convective activity within 10 NM
Temperature	< 0 °C or > 40 °C
Equipment / telemetry	GPS lock < 10 satellites, link instability, compass/IMU warning
Glare	Extreme surface reflection making horizon unreadable
Sea spray / salt fog	Persistent aerosol reducing visibility and risking corrosion

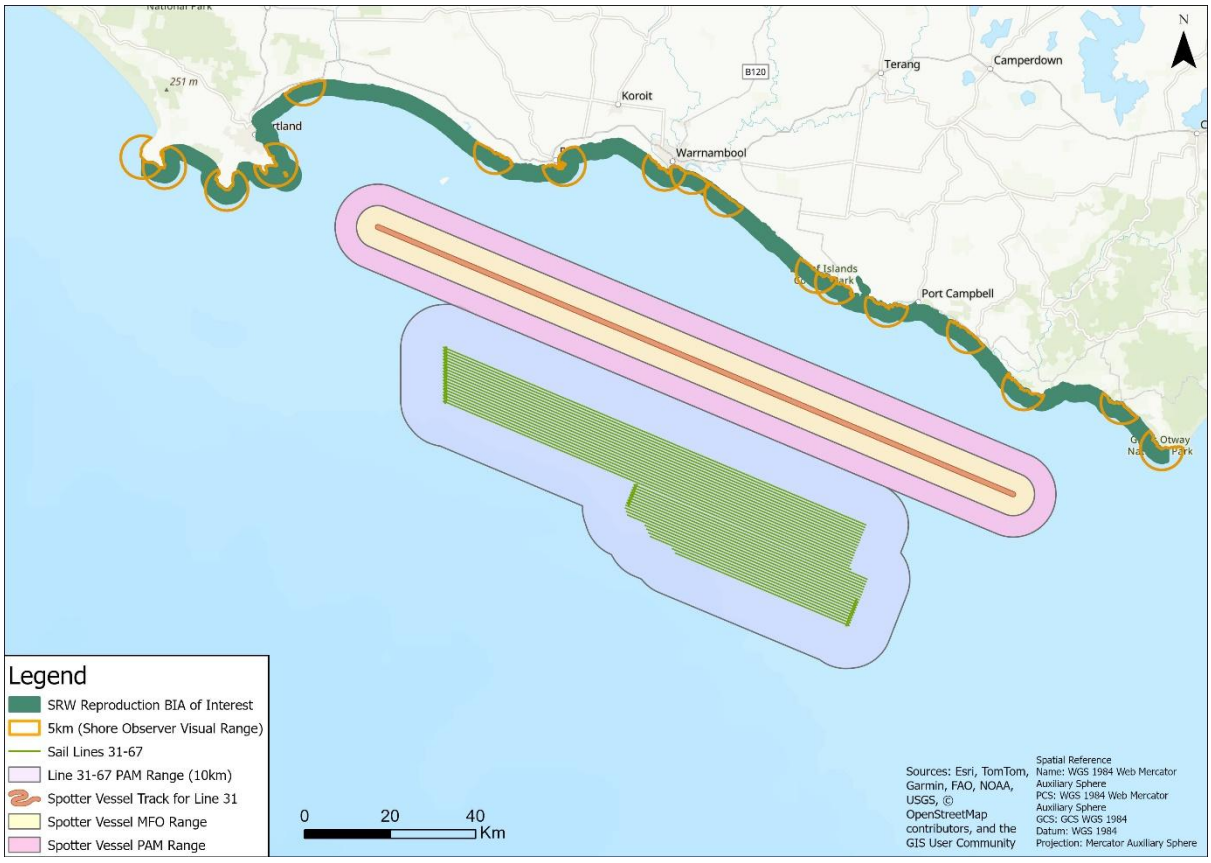


Figure G5-4 - No-Fly Plan Coverage - Figure also shows the Regia MSS survey lines for September & October (lines 31-67) and indicative location of the spotter vessel that has PAM and MFO capacity.

2.4 SRW Detection and Escalation Procedure

2.4.1.1 Confirmed Detection

A confirmed detection is a SRW sighting that has been verified by:

- a qualified MFO or an expert scientist in the field, and
- photographic/video evidence showing a visible time/date stamp and a geographically traceable location.

Only detections meeting this standard are treated as confirmed for shutdown and restart decisions. All confirmed and unconfirmed detections must be reported immediately to the Survey Environment Adviser (SEA) and the CGG Environment Officer.

2.4.2 SEA Decision Pathway

Upon receiving a detection, the SEA determines which pathway applies:

A. Confirmed Detection (from any platform)

1) If the survey is acquiring, the sound source must be shut down immediately.
2) The SEA records time and location and provides instructions to the Party Chief consistent with Appendix G2.
3) Restart may only occur after 24 hours with no confirmed detections from any platform.

B. Unconfirmed Detection

1) The SEA refers the sighting to the Whale Expert Panel (WEP) for advice within 2 hours of receiving the report.
2) The WEP provides advice on whether the sighting is likely to represent a SRW in or near the BIA.
3) If the WEP advises that the sighting is credible, the SEA must treat it as requiring precautionary action. If the survey is acquiring, the SEA will direct an immediate shutdown.
4) The SEA must also direct the nearest WMT to mobilise within 12 hours, where conditions allow, to investigate and attempt to verify the sighting.
5) If the WEP advises that the sighting is unlikely to be a SRW, the SEA may choose not to shut down but must still direct WMT verification.

This approach ensures potential SRW presence is taken seriously while maintaining evidence-based decision-making.

2.4.3 Daytime Procedure (Post-Confirmation)

If a WMT confirms a SRW inside the BIA after shutdown, the team will continue monitoring for as long as daylight and visibility allow or until visual contact is lost. The 24-hour restart clock begins from the last daylight confirmed observation of the SRW within the BIA.

2.4.4 Night-Time Procedure

If a WMT has confirmed SRW presence during daylight and daylight ends:

- Night-time monitoring is not feasible due to safety and visibility constraints.
- The WMT must return to the last confirmed location at first light.
- If the SRW is not observed, the 24-hour restart clock begins from the time absence is confirmed.

The survey remains shut down overnight.

2.4.5 External Sightings and Citizen Science Information

WMTs may use external information (citizen science programs, whale-watching platforms, or social-media reports) to support situational awareness and detection confirmation.

Only reports with verifiable photographic/video evidence (time/date-stamped, traceable location) may be treated as confirmed detections unless verified independently by a WMT or expert.

All other external reports are treated as unconfirmed detections and escalated through the SEA and WEP as per Section 2.2.2(B).

3 Monitoring Framework – Blue Whale

3.1 Purpose and Objectives

The proposed timing of the Regia MSS sits between the end of the SRW season and the beginning of the BW season. Managing the interaction of these two groups with the MSS requires a real-time understanding of their numbers in time and space. Shore or boat based visual surveillance is a traditional method for visual detection of whales, but the spatial coverage is limited due to vessel speeds and viewing height above water. Drones, however, now provide a relatively low-cost method for drastically increasing visual coverage at higher speeds and vantage points.

Drones will be used to detect BW as they arrive at the Otway region ahead of their foraging season, which typically occurs between November and March each year.

BW arrive in the Otway region following historical marine highways, which lead them down the West Coast, around the SW Cape and directly across the Great Australian Bight to feed on krill associated with the upwelling systems off the Otway coast. Because of this consistent west to east path, flights launched from Cape Nelson could improve early detectability through more extensive searching of offshore waters than is otherwise possible.

3.2 Site Rationale

Cape Nelson is one of the few vantage points along the southwest Victorian coast where BW can, at times, be observed from shore. Located west of the Operational Area, it is likely to be the first location through which BW pass as they arrive at the region. Its elevation above sea level and orientation toward the offshore feeding zone reduce curvature limitations, maximise sensor line-of-sight, and minimise transit time to areas of interest. The lighthouse precinct offers secure ground infrastructure suitable for controlled Beyond Visual Line of Sight (**BVLOS**) operations. Taken together, these characteristics make Cape Nelson the most suitable site for launching long-range surveillance intended to detect early BW presence.

3.3 Operational Context

Flights will focus on monitoring near-shore to mid-shelf sectors, up to approximately 40 km offshore of Cape Nelson, aligned with recent historical observations (Figure G5-5 and Figure G5-6) and expected prey distribution, using established altitudes, ranges, and sensor configurations appropriate to BVLOS over-water operations. Weather-responsive scheduling will be used to capitalise on short windows of suitable conditions. Outputs will include time-stamped georeferenced imagery and observation notes sufficient to confirm presence/absence, general distribution, and indicative movement, providing an early signal for subsequent survey scaling.

3.4 Summary

Pre-season aerial surveillance from Cape Nelson Lighthouse has the potential to provide a practical and strategically positioned means to confirm early blue whale arrival using an already trialled drone platform and procedures. The activity supports timely decision-making for the duration of the Regia MSS and offers a low-impact, cost-effective approach to initiating broader monitoring efforts once presence is confirmed.

Figure G5-5 - Sub-optimal Drone Range and Historical Blue Whale Sightings in November (OBIS-SEAMAP)

Figure G5-6 - Optimal Drone Range and Historical Blue Whale Sightings in November (OBIS-SEAMAP)

4 Document Control

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.1	1 December 2025	RH, EO	Document Created

Appendix 1 - Cape Nelson Lighthouse - September-October Operational Weather Analysis (1995 - 2025 Analysis)

4.1 Executive Summary

This report provides an analysis of a 30-year (1995–2025) climatological dataset that considers wind, rainfall, and associated environmental factors that have the potential to affect drone operations at Cape Nelson Lighthouse, Victoria. Cape Nelson was chosen as the sole analysis site because it is the most exposed headland on the regional coastline, directly influenced by the Southern Ocean.

Of the total feasible fly-time, optimal conditions are projected to occur based on historical averages, between 10 and 15 percent of the time, while sub-optimal but flyable conditions are anticipated for approximately 55 to 60 percent of the period.

Taken together, these results indicate that drone deployment is feasible for an estimated 70 to 75 percent of the September–October period, with the remaining 25 to 30 percent classified as no-fly conditions due to wind or rainfall exceeding operational thresholds.

The weather analysis conducted was used to develop threshold-based definitions for three categories of drone operations: Optimal, Sub-optimal, and No-Fly conditions. These definitions are presented below:

Condition Level	Wind Speed (km/h)	Rainfall (mm/day)	Environmental Description	Operational Guidance
Optimal	≤ 20	≤ 1	Calm to light winds and dry or near-dry conditions. Excellent visibility and platform stability.	Safe for full-scale drone operations. Ideal for mapping, whale observation, and precision video capture.
Sub-optimal	21–40	>1 to ≤10	Moderate winds or intermittent light rain. Some turbulence and minor visibility reduction expected.	Proceed with caution. Experienced pilots only. Reduce altitude, range, and payload weight. Monitor gusts.
No-fly	>40	>10	Strong winds or moderate to heavy rain associated with frontal systems. High turbulence and low visibility.	Suspend all drone operations. Unsafe for launch, flight, or recovery. Resume only when conditions improve.

4.2 Introduction

This report presents a climatological assessment of environmental conditions relevant to drone deployment at Cape Nelson Lighthouse, Victoria. Using 30 years of Bureau of Meteorology (BOM) data (1995–2025), the analysis evaluates wind speed, direction, and rainfall to determine operational feasibility for over-water drone surveys during the Austral spring months of September and October. This assessment draws on daily climate observations obtained from the Bureau of Meteorology's Climate Data Online database (Station ID: 090184) for the full 1995–2025 period.

The findings provide a data-driven foundation for defining optimal, sub-optimal, and no-fly thresholds, enabling informed scheduling, risk management, and field safety planning for marine monitoring activities.

Overall, the results show Cape Nelson experiences drone-deployable conditions approximately 70% of the time, when wind and rainfall are within acceptable operational limits.

Fully optimal conditions are defined as wind speeds below 20 km/h and rainfall less than 1 mm per day - occur on average 10-15% of the time, primarily during calm morning windows associated with high-pressure systems. Sub-optimal conditions, where operations remain viable but require pilot discretion, represent on average 55-60% of the period, while no-fly conditions (winds >40 km/h or rainfall >10 mm) occur on average 30% of the time, generally aligned with frontal weather systems. This report combines these meteorological patterns to provide practical guidance for deployment planning, ensuring that operations can be conducted safely, efficiently, and with minimal disruption due to environmental constraints.

4.3 Site Selection Rationale – Cape Nelson Lighthouse

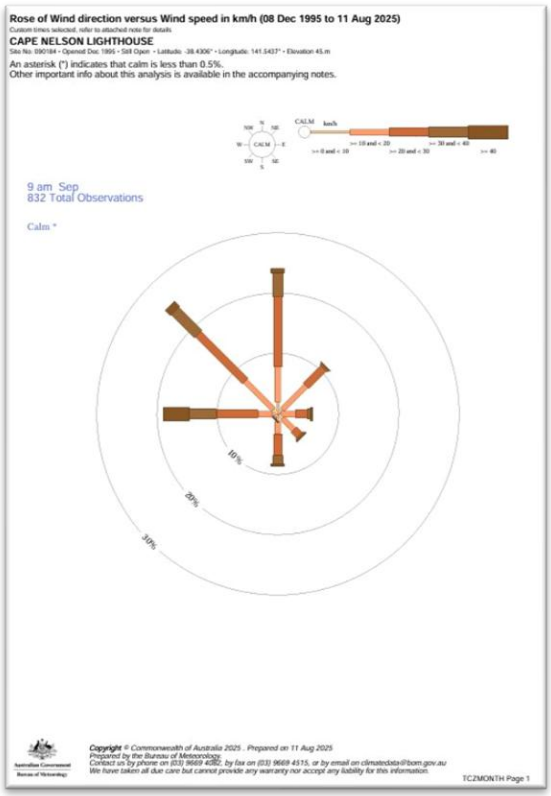
Cape Nelson Lighthouse was selected as the single reference location for this weather analysis because it represents the most exposed and meteorologically demanding site along the regional coastline. Positioned on a prominent headland facing the Southern Ocean, Cape Nelson experiences the full impact of prevailing westerly and south-westerly systems, including the strongest winds, highest rainfall totals, and most rapid weather changes. These conditions consistently exceed those recorded at more sheltered inland or coastal stations. As a result, using Cape Nelson as the baseline ensures that the operational thresholds and risk assessments presented in this report are based on worst-case environmental conditions. If drone deployment is feasible under Cape Nelson parameters, it is expected to remain safe and viable at any nearby site with more moderate exposure, providing a conservative and reliable foundation for regional flight planning.

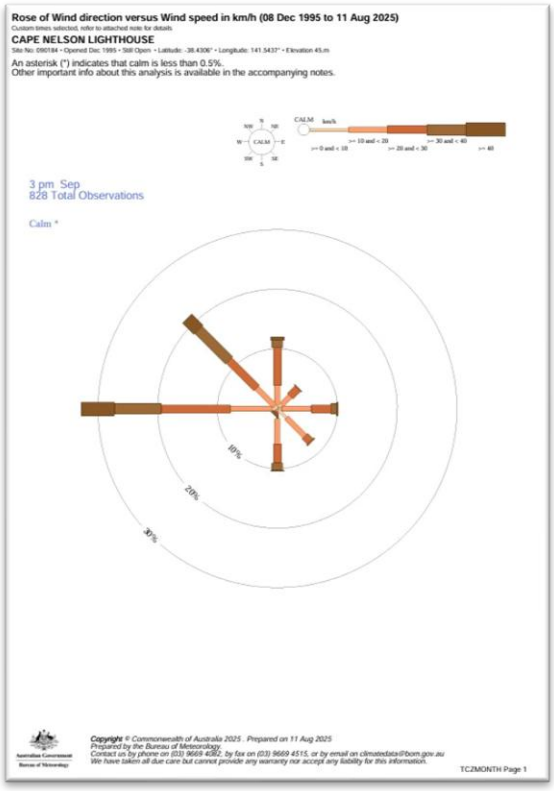
4.4 Wind

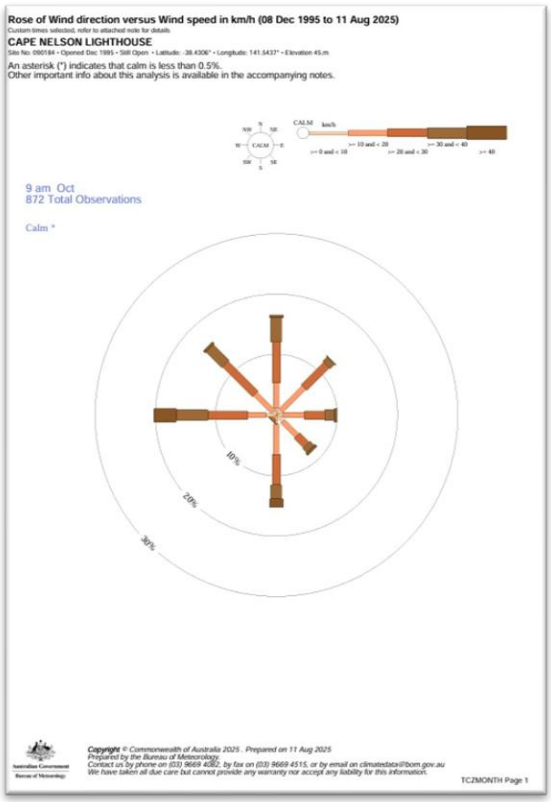
Wind conditions at Cape Nelson Lighthouse were observed to be consistently strong throughout September and October, reflecting the region's exposure to prevailing westerlies from the Southern Ocean. Long-term BOM data show mean wind speeds of approximately 24 km/h at both 9 AM and 3 PM, with stronger afternoon winds being common, especially in October. Wind rose analysis confirms that winds exceeding 20 km/h occur over 80% of the time, while calm conditions (<10 km/h) are rare (<5%). The dominant wind directions are from the west to northwest, occasionally shifting southerly in the afternoon.

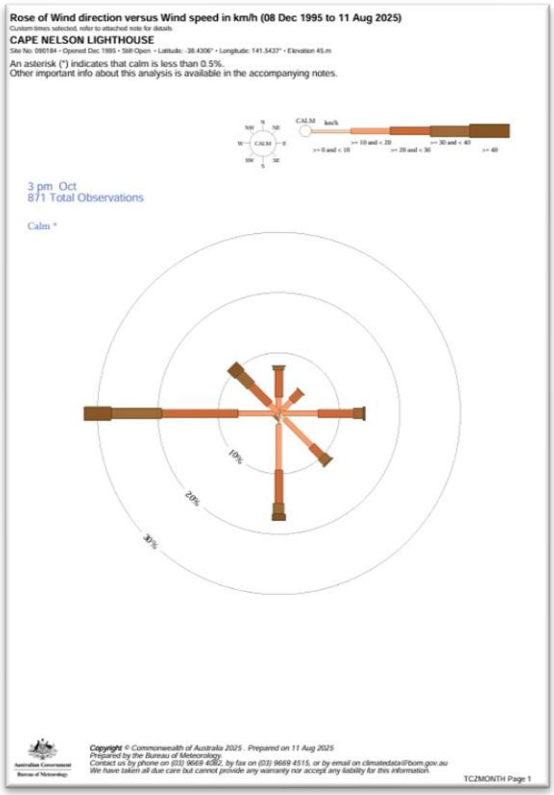
For drone operations, these conditions indicate that moderate to strong winds (20–40 km/h) should be expected during most daylight hours. Optimal flight windows are likely to occur during brief calm periods in the early morning, especially under wind speeds below 20 km/h, which represent only 15–20% of observations. Pilot discretion should remain critical due to the expected rapid onset of gusts exceeding 40 km/h.

Time / Month	<10 km/h	10–20 km/h	20–30 km/h	30–40 km/h	>40 km/h	Most Prevalent Wind Directions	Additional Information
9 AM Sep	~5 %	~10 %	~25 %	~40 %	~20 %	W, NW, N	Strong morning westerlies
3 PM Sep	~5 %	~10 %	~25 %	~40 %	~20 %	W, NW, S	Afternoon pattern mirrors morning but slightly more southerly winds
9 AM Oct	~5 %	~10 %	~30 %	~35 %	~20 %	W, NW, N	Persistent westerlies with slightly higher moderate winds
3 PM Oct	~5 %	~10 %	~25 %	~35 %	~25 %	W, NW, S	Strongest winds overall; higher incidence >40 km/h


Rose of Wind direction versus Wind speed in km/h (08 Dec 1995 to 11 Aug 2025)
CAPE NELSON LIGHTHOUSE
An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.
9 am Sep
832 Total Observations
Calm *
10%
20%
30%
TCZMONTH Page 1


Rose of Wind direction versus Wind speed in km/h (08 Dec 1995 to 11 Aug 2025)
CAPE NELSON LIGHTHOUSE
An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.
3 pm Sep
828 Total Observations
Calm *
10%
20%
30%
TCZMONTH Page 1


Rose of Wind direction versus Wind speed in km/h (08 Dec 1995 to 11 Aug 2025)
CAPE NELSON LIGHTHOUSE
An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.
9 am Oct
872 Total Observations
Calm *
10%
20%
30%
TCZMONTH Page 1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An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.
3 pm Oct
871 Total Observations
Calm *
10%
20%
30%
TCZMONTH Page 1

4.5 Defined Operational Conditions – Wind

September

Condition Level	Wind Speed (km/h)	Approx. Frequency (% of time)	Operational Guidance	Key Points for Planning
Optimal	0–20	15%	Safe for full-scale drone operations. Ideal for long-range surveys, whale detection, or detailed mapping.	Calm morning windows before strengthening westerlies. Occurs mainly around sunrise to mid-morning.
Sub-optimal	21–40	65%	Suitable for experienced pilots only. Maintain shorter flight durations and reduced altitudes.	Moderate to strong westerlies dominate most of the day. Maintain visual line-of-sight over water.
No-fly	>40	20%	Suspend all drone operations. Winds and gusts exceed safe control limits.	Frequent strong westerly gusts; ensure all equipment secured. Pilot discretion required to resume.

October

Condition Level	Wind Speed (km/h)	Approx. Frequency (% of time)	Operational Guidance	Key Points for Planning
Optimal	0–20	15%	Proceed with operations during calm early-morning periods. Excellent visibility and platform stability.	Calm periods shorter than September; prioritise early flights.
Sub-optimal	21–40	63%	Continue operations with caution. Reduce flight range and duration. Maintain awareness of shifting wind direction.	Afternoon conditions stronger and more variable (W–S sector). Maintain buffer for gusts.
No-fly	>40	22%	Suspend operations. Turbulent airflow and high gusts exceed control tolerances.	October prone to stronger spring winds; monitor gust forecasts.

Combined Averages

Condition Level	Wind Speed (km/h)	Approx. Frequency (% of time)	Operational Guidance	Key Points for Planning
Optimal	0–20	15%	Fully suitable for over-water flights, high-resolution observation, and extended coverage.	Short, reliable windows—mostly in early morning under stable westerlies.
Sub-optimal	21–40	64%	Viable for limited operations under pilot discretion. Shorter flights and reduced payloads recommended.	Most common condition; use this band for regular flight planning.
No-fly	>40	21%	Ground all operations; unsafe for drone control or recovery over water.	Expect multiple high-wind days per week; plan standby or alternate tasks.

4.6 Rain

Rainfall during this period averages 18.7 days in September and 15.8 days in October, though most events are light (<10 mm).

	September	October
Mean number of days of rain >= 1 mm for years 1995 to 2025	12.8	9.1
Mean number of days of rain >= 10 mm for years 1995 to 2025	2.1	1.2

4.7 Defined Operational Conditions – Rainfall

September

Condition Level	Rainfall (mm/day)	Approx. Frequency (% of time)	Operational Guidance	Key Points for Planning
Optimal	≤ 1	~58%	Safe for full-scale drone operations. Light or no precipitation allows clear visibility and stable flight.	Most days are light or dry. September still experiences regular light rain but short-lived.
Sub-optimal	>1–10	~38%	Fly with caution. Reduced visibility and light moisture can affect sensors and optics. Limit flight duration.	Typical during frontal passages. Allow drying time for equipment after light showers.
No-fly	>10–25	~4%	Suspend all drone operations. Moderate to heavy rainfall creates unsafe conditions for takeoff, flight, and recovery.	Occasional heavier rain days; usually associated with passing cold fronts.

October

Condition Level	Rainfall (mm/day)	Approx. Frequency (% of time)	Operational Guidance	Key Points for Planning
Optimal	≤ 1	~70%	Fully suitable for flight operations. Minimal rainfall supports longer flight windows and safe equipment handling.	October is drier and more stable than September. Ideal for extended operations.
Sub-optimal	>1–10	~27%	Operate with caution during light showers. Maintain visual contact and assess water exposure on equipment.	Occasional light rain; often short-lived. Avoid over-water recovery during precipitation.
No-fly	>10–25	~3%	Ground all operations. Heavy rain severely limits visibility and can damage electronics.	Heavy rain days are rare; monitor forecasts to plan around them.

Combined Averages

Condition Level	Rainfall (mm/day)	Approx. Frequency (% of time)	Operational Guidance	Key Points for Planning
Optimal	≤ 1	~64%	Ideal for consistent flight scheduling with minimal precipitation interference.	Majority of operational days are dry or lightly damp; early-morning dew possible.
Sub-optimal	>1–10	~33%	Proceed cautiously; intermittent light rain may disrupt data capture.	Use water-resistant drones or delay until rainfall ceases.
No-fly	>10–25	~3%	Suspend all flights. Heavy rain significantly increases operational risk.	Rare but impactful; align operations around dry periods.

4.8 Wind-Rain Relationship at Cape Nelson

At Cape Nelson (and most exposed southern coastal sites in Victoria), windy days and rainy days are highly correlated because both are typically driven by passing low-pressure systems and cold fronts.

Key Points:

- Strong westerlies and heavy rain are part of the same synoptic event — frontal systems from the Southern Ocean.
- Calm, dry periods occur under high-pressure ridges between fronts.
- So, the same weather system that brings >40 km/h winds also produce most of the rainfall >10 mm.

4.9 Adjusted Interpretation of Deployment Opportunity

Given the correlation between wind and rain, the restrictions shouldn't be double counted. Instead, most "rain-restricted" days overlap with "wind-restricted" days.

Adjusted Combined Estimate (Factoring Overlap):

Condition	Combined (Wind + Rain)	Adjusted Occurrence	Operational Meaning
Optimal	Calm (<20 km/h) and Dry (≤1 mm)	**10-15%**	Excellent windows — clear, dry, and stable. Usually early morning under high pressure.
Sub-optimal	Moderate wind (20–40 km/h) and/or light showers (≤10 mm)	**55-60%**	Most common. Light drizzle or gusty periods, but often flyable. Pilot experience essential.
No-fly	High wind (>40 km/h) and/or moderate-heavy rain (>10 mm)	**25-30%**	Typically, the same frontal events. High turbulence, rain, and low visibility.

4.10 Summary

Analysis of long-term data from Cape Nelson Lighthouse (1995–2025) indicates that wind and rainfall restrictions are strongly interrelated. The site is highly exposed to Southern Ocean weather systems, where the passage of low-pressure troughs and cold fronts produces both elevated wind speeds and rainfall events. These systems typically generate westerly or north-westerly winds exceeding 40 km/h, coinciding with the majority of rainfall days (>1 mm). Consequently, days restricted by rainfall are usually the same days restricted by wind, rather than separate occurrences. In contrast, calm and dry periods occur under high-pressure ridges that follow frontal passage, resulting in stable, dry conditions with wind speeds typically below 20 km/h. These periods provide the most favourable conditions for drone deployment, offering clearer visibility, minimal turbulence, and reliable flight control.

When this overlap is accounted for, the combined analysis shows that approximately 70% of the September–October period is potentially usable for some level of drone operation. Within this window, 10-15% of days present fully optimal conditions - light winds (<20 km/h), dry weather (≤1 mm rainfall), and stable air - ideal for full-scale drone operations. The remaining 55-60% of the time falls into a sub-optimal but manageable category, characterised by moderate winds (20-40 km/h) or light showers. No-fly conditions (>40 km/h winds or >10 mm rainfall) are limited to approximately 25-30% of the time, typically concentrated around cold-front events.

Operational planning should therefore emphasise flexibility, with teams ready to mobilise rapidly during calm high-pressure intervals, which often persist for two to three consecutive days. Scheduling should avoid the days immediately surrounding frontal activity, when gusts and residual instability remain high despite clearing rainfall.

4.11 Full Operational Conditions Parameters

Optimal Conditions

Parameter	Optimal Conditions Threshold	Notes
Wind	≤ 10 kt (≤ 20 km/h) sustained, gusts ≤ 15 kt (28 km/h)	Stable hover and control; minimal gimbal movement.
Beaufort Sea State	≤ Bft 3 (wave height < 0.5 m)	Calm to slight seas; stable horizon reference for optical tracking.
Visibility	≥ 10 km	Full horizon clarity for long-range optical identification.
Precipitation	Nil	Dry airframe and optics; optimal camera performance.
Cloud Ceiling	≥ 300 m	Safe vertical separation and strong line-of-sight.
Glare / Sun Angle	Low or manageable	Good contrast for tracking and horizon definition.
Temperature	5–35 °C	Normal operational range for batteries and sensors.

Sub-Optimal Conditions

Parameter	Sub-Optimal Conditions Threshold	Notes
Wind	11–21.5 kt (21–40 km/h) sustained, gusts ≤ 23 kt (43 km/h)	Moderate turbulence; requires skilled pilot control.
Beaufort Sea State	Bft 4–5 (0.5–2.0 m waves)	Noticeable whitecaps; minor horizon instability.
Visibility	5–10 km	Haze or marine layer; maintain conservative range.
Precipitation	Light drizzle or 1-10 mm/day	Limit flight duration; monitor sensor moisture.
Cloud Ceiling	150–300 m	Lower clearance; operate at reduced altitude.
Glare / Sun Angle	Moderate glare	Use filters or adjust angle of approach.
Temperature	0–5 °C or 35–40 °C	Battery and sensor efficiency reduced; shorten flights.

No-Fly Conditions

Parameter	No-Fly Threshold	Notes
Wind	> 21.5 kt (> 40 km/h) sustained or gusts > 23 kt (> 43 km/h)	Unsafe for control; excessive drift and instability.
Beaufort Sea State	≥ Bft 6 (wave height > 2.0 m)	High seas; severe horizon instability and spray risk.
Visibility	< 5 km	Unsafe for navigation or VLOS/BVLOS flight.
Precipitation	> 10 mm/day (moderate to heavy rain)	Electronics and optics at risk; terminate flight.
Cloud Ceiling	< 150 m	Insufficient clearance for safe operation.
Glare / Sun Angle	Severe glare or low sun directly on horizon	Loss of horizon contrast; risk of sensor blinding.
Temperature	< 0 °C or > 40 °C	Exceeds manufacturer safety range; hardware failure likely.

4.12 Justification of Flight Environment Parameters

There are currently no legislated environmental parameters specific to Remotely Piloted Aircraft System (RPAS) operations in Australia beyond the overarching requirement under the Civil Aviation Safety Regulations (CASR) for operators to maintain safe control and operate within aircraft limitations. Accordingly, the environmental parameters defined in this report have been established using a combination of manufacturer specifications, aeronautical best practice, and empirical field experience obtained through extensive on-site observation and trial operations conducted by the project team at Cape Nelson during the current season, in preparation for next year's deployment.

The wind parameters are derived conservatively from the DJI Matrice 350 RTK / H30T system's manufacturer-rated maximum wind resistance of approximately 43 km/h (23 kt). Operating at or near this upper limit presents an unacceptable risk margin for coastal BVLOS operations, where mechanical turbulence, terrain-induced shear, and abrupt gusting are common. To ensure stable flight control, accurate telemetry, and reliable gimbal performance, the Sub-optimal category is limited to 40 km/h (21.5 kt) sustained wind, with any sustained or gust conditions above this level classified as No-Fly. This approach provides a buffer below the manufacturer limit, consistent with aviation risk-management principles that require operational ceilings below technical maxima.

Other environmental parameters, including Beaufort Sea State, visibility, cloud ceiling, precipitation, and temperature, have been benchmarked against CASA Beyond Visual Line of Sight (BVLOS) operational guidance under CASR Part 101 and associated Advisory Circulars, together with established industry best practice for over-water RPAS operations. These frameworks collectively require operators to define environmental limits that preserve safe control, telemetry integrity, and situational awareness equivalent to or better than Visual Line of Sight (VLOS) operations.

A minimum visibility of 5 km has therefore been adopted to ensure reliable sensor-based situational awareness and effective use of electro-optical and thermal payloads for target detection and tracking. The cloud-ceiling thresholds maintain adequate vertical separation from coastal terrain while preserving uninterrupted command-and-control links. Precipitation limits are based on payload manufacturer guidance and field observations demonstrating that even light moisture, glare, and refraction significantly reduce optical and thermal imaging performance and can impact electrical components.

Collectively, these parameters represent accurate, fair, and conservative operating envelopes for BVLOS marine drone operations at Cape Nelson and similar exposed coastal environments. They ensure flight safety, maintain data quality, and provide a transparent, defensible framework suitable for regulatory review and inclusion within the operator's Safety Management System and Operations Manual in the absence of formal legislative limits.

Appendix 2 – Technology Specifications – Drone and Camera

This section presents examples of proposed technology-types that may be used to support long-range aerial whale monitoring, including examples of commercially available drones and associated high-performance optical sensors/cameras for attachment to a drone, expected to be capable of meeting the operational requirements. While the exact makes and models have not yet been selected, the examples have been provided to demonstrate the general capabilities of systems currently available on the market. Sections 4.13 and 4.14 present indicative drone platforms and camera specifications (with links to publicly available technical data), while Section 4.15 illustrates how the proposed camera technology is technically capable of detecting and observing whales at distances of up to 25 km under suitable conditions.

4.13 Example of Drone Specifications -DJI Matrice 400

https://enterprise.dji.com/matrice-400/specs

4.14 Example of Camera Specifications - Zenmuse H30 Specs:

https://enterprise.dji.com/zenmuse-h30-series/specs

4.15 Demonstration that the H30T Tele Camera Can Visually Detect a Whale at 25 km

Demonstrate, on an optics-only basis (independent of radio link or endurance), that the Zenmuse H30T telephoto camera provides sufficient angular resolution to resolve a whale at a slant range of 25 km under clear atmospheric conditions and low sea state.

Basis and Parameters:

- Camera geometry: Zenmuse H30T tele module, horizontal field of view (HFOV) 15° with 8192 effective horizontal pixels.

  Per-pixel angular subtense $\alpha = \frac{15^\circ \times \pi/180}{8192} \approx 3.20 \times 10^{-5}$ rad/px.

- Target: Southern right whale; adult body length typically 14–18 m. To account for foreshortening, partial emergence, and non-broadsides presentation, adopt a conservative apparent dimension of 10 m.

- Range of interest: $R = 25{,}000$m.

- Identification criterion: Johnson/NATO electro-optical standards (50 % probability) require approximately 12–13 pixels across the critical dimension to achieve identification (recognition is ≈8 px; detection ≈2 px).

- Line-of-sight geometry: Operation at or below 120 m AGL (Above Ground Level).

Optical Resolving Power at 25 km

The target's angular extent at 25 km with a 10 m apparent dimension is

$$\theta = \frac{10}{25{,}000} = 4.0 \times 10^{-4} \text{ rad.}$$

Pixels across the target are:

$$N = \frac{\theta}{\alpha} = \frac{4.0 \times 10^{-4}}{3.20 \times 10^{-5}} \approx 12.5 \text{ px.}$$

Interpretation: Even under the conservative 10 m apparent size, the body spans ~12.5 px, which meets the Johnson identification threshold. Using the typical adult length (14-18 m) would yield ≈17.5–22.5 px at the same range, providing additional margin.

Line-of-Sight Constraint:

From 120 m AGL, the geometric horizon to sea surface is ~39 km (to the top of a 5 m blow ~47 km). A 25 km slant range is therefore well within the curvature-limited line of sight and does not constrain the optical result.

4.16 Conclusion

On an optics-only basis, the Zenmuse H30T tele camera provides ≥12 pixels across a conservatively modelled 10 m whale body at a slant range of 25 km, satisfying the Johnson identification criterion. Line-of-sight at ≤120 m AGL does not limit this range. Accordingly, a 25 km visual observation claim is conservative and technically supported by the camera's angular sampling.

Regia Marine Seismic Survey
Sound Source Verification Procedure

Appendix G6: REG-EP-047-G6

Rev 1

December 2025

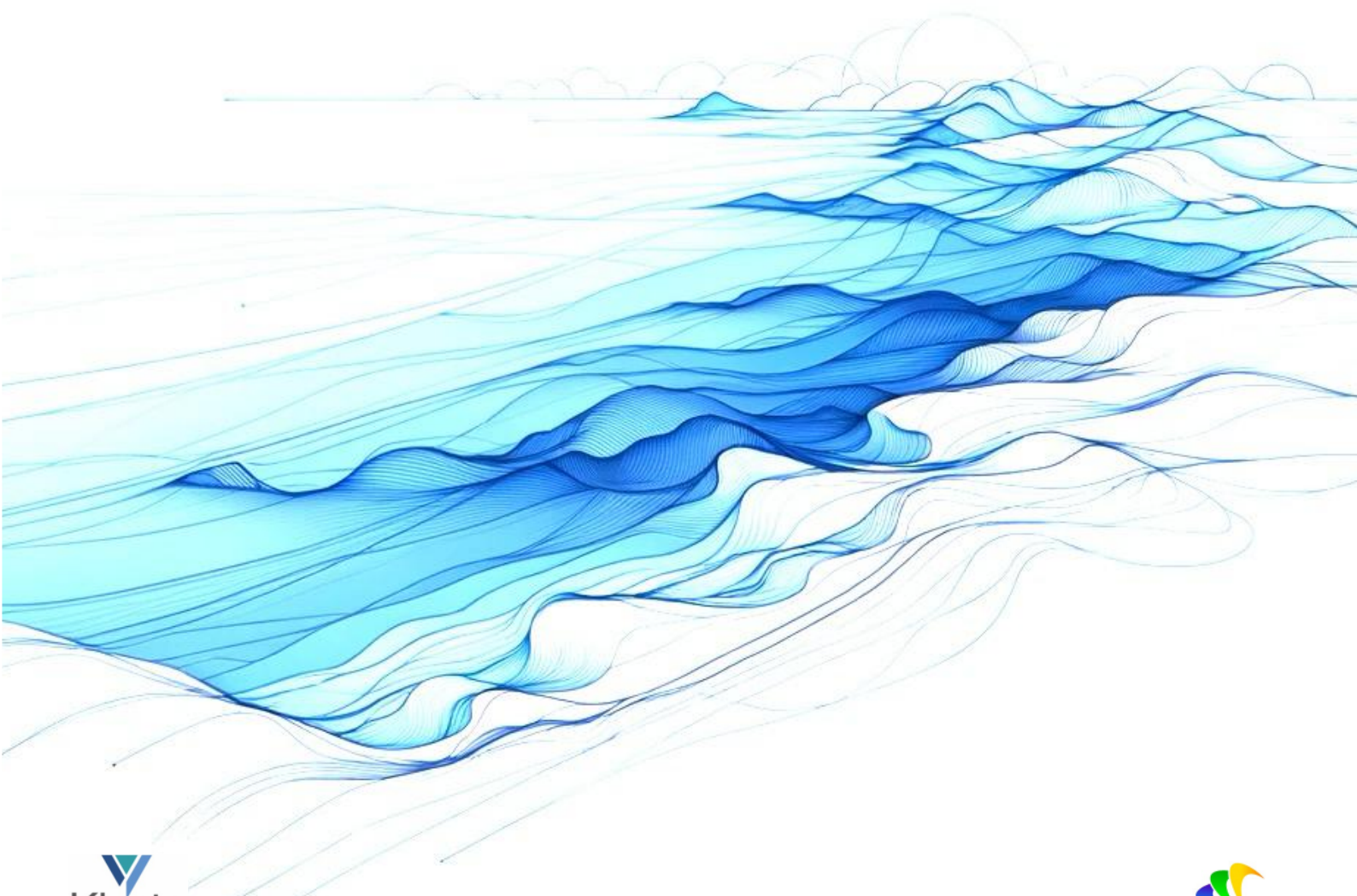

Table of Contents

1 Purpose 3
2 Scope 4
3 Responsibilities 6
4 Equipment 6
5 Procedures 7
5.1 Deployment of loggers for ambient sound recording. 7
5.1.1 Calibration of sound loggers 7
5.1.2 Quantification of mooring-related self-noise (e.g. line strumming). 7
5.1.3 Ambient background sound recording. 7
5.1.4 Logistical Details 7
5.2 Monitoring of the Seismic Sound Field 8
5.2.1 Logistical Details 8
5.3 Determination of sound breaches in the BIA 9
5.3.1 Warning System Methodology 10
6 Environmental and Safety Controls 12
7 Data Management and Reporting 12
8 Deliverables 13
9 Document Control 14

1 Purpose

This procedure describes the sound logging system which CGG has designed with the primary objectives being to:

a) obtain an empirical baseline of in-water ambient sound profiles.
b) to monitor sound profiles emanating from the Regia MSS.
c) Meet the EPO: Underwater sound emissions from the Regia MSS are empirically measured and validated through the sound source verification procedure to ensure they remain within levels that do not cause injury or unacceptable disturbance to Southern Right Whale.

The collection of on-location ambient sound data (which has historically been very sparse and not location specific) will enable further calibration and testing of existing acoustic model predictions. It will also allow for more informed impact analyses where sound masking is an important consideration.

It provides assurance that the EPO for sound source verification (SSV) can be met by ensuring that:

- Ambient sound levels are measured and recorded at representative sites.
- Hydrophone and mooring configurations function as designed.
- The Regia MSS sound source meets predicted received-level characteristics.

As these activities are within and/or near to the designated Biologically Important Area (BIA) for Southern Right Whales they are being conducted in accordance with Regulation 27 of the Marine and Coastal (Prescribed Consents) Regulations 2025 (Vic), with written approval obtained from the Director of Safe Transport Victoria.

2 Scope

Applies to all sound source verification (SSV) related activities within the Regia MSS Environmental Planning Area. All operations are governed by the CGG Marine Assurance System.

The sound monitoring program contains three primary components.

- Deployment:
    - Recording of ambient sound will be undertaken at 7 locations (see Figure G6-1) three of which will be via tethered PAMS and four of which will be via bottom mounted hydrophones (see Figure G6- 1 below).
- Sound Source Testing:
    - Multiple comparison tests will be made between logging units to ensure they are all listening and recording in a comparable way.
    - To better quantify the influence of noise from mooring systems in masking incoming sounds there will be multiple comparison tests between moored PAM units and free-floating PAM units to try and isolate the components of the ambient noise signal that are from movement of the mooring system.
- Data recoding:
    - Recording will start before the MSS and run throughout the survey period. Once the survey starts PAM data will be accessed multiple times daily to inform our monitoring of impulsive sound coming from the MSS.
    - To quantify and monitor the acoustic noise signal coming from the MSS there will be a regular sampling program undertaken throughout the survey period. This will involve obtaining recordings at a series of distances from the Regia MSS with the maximum distance defined by no seismic signal present. These distances will be set at increasing 5km increments out to 20km from the survey vessel, i.e. at 5km, 10km, 15km and 20km.

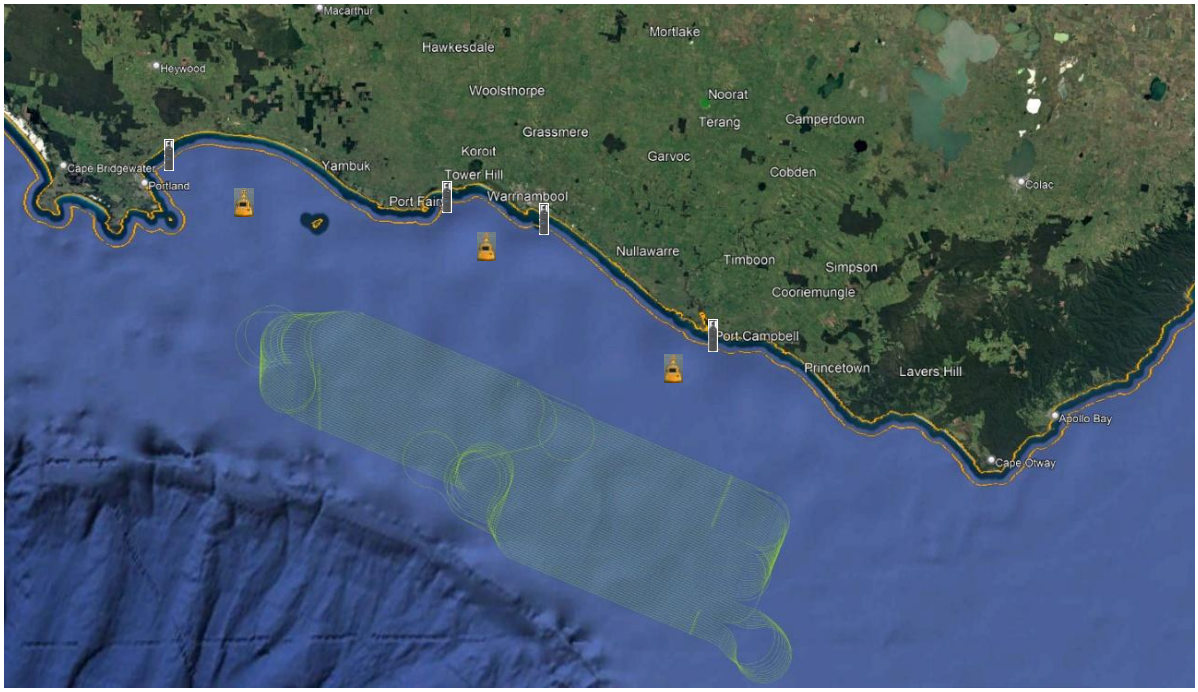

Figure G6- 1: Tentative locations of bottom mounted sound loggers (≤20m depth) and anchored PAM systems (40-50m depth).

3 Responsibilities

Roles and responsibilities for the Regia MSS apply and can be found in the Implementation Strategy (Appendix B3).

4 Equipment

Tethered SSV Buoys (©Sercel QuietSea)

- Three SSV buoys from Sercel with QuietSea technology, and real-time autonomous passive acoustic monitoring capability. These units have an integrated hydrophone, data logger, GPS, and telemetry (https://www.sercel.com/en/products/quietsea). Data will be retrieved at regular intervals through either a 4G connection or Satellite links.
- Buoys will be moored at pre-determined locations at Portland Bay (40-50 m depth), Logan's Beach (40-50 m depth), and Port Campbell (40-50 m depth). Precise GPS coordinates TBD (once actual deployment has occurred, but Figure G6-1 gives approximate locations).
- These systems will be deployed/recovered via a dedicated vessel with appropriate certified lifting gear, acoustic release systems, and mooring interface assemblies.

Bottom-Mounted SSV Loggers (© Ocean Instruments, SoundTrap)

- Four SoundTrap hydrophones from Ocean Instruments will be deployed at four locations (see Figure G6-1) where SRW mothers and calves are historically known to reside for extended periods. These loggers are for short term deployments of up to 3 months between battery changes.
- Data is recorded on 4 micro-SD cards and retrieved when the instrument is brought to the surface for battery renewal.
- The STD model (as opposed to High Frequency Model) used here has very low self-noise, ensuring clean recordings.
- A custom bracket has been developed which contains a clamping system. This enables the units to be retrieved by release of the clamping system, while the bracket remains attached to the bottom. Data is downloaded from the unit on the boat then the unit has its batteries replaced and is returned to the bracket and reclamped. Brackets will be permanently removed once sound logging is no longer needed.

5 Procedures

5.1 Deployment of loggers for ambient sound recording.

This section describes the sequence, controls, and responsibilities for deployment of the three tethered SSV buoys and the four bottom mounted hydrophones. These units will collect ambient sound measurements from the nearshore and midshelf regions which will be used for calculation of ambient baseline conditions prior to the Regia MSS acquisition phase. All units will continue collecting received sound measurements throughout the MSS acquisition period to help calibrate sound models. As the three SSV buoys have real-time access capability they will be used to monitor the far-field sound source from the MSS as it approaches the BIA.

5.1.1 Calibration of sound loggers

Prior to deployment all loggers will record data simultaneously with other recorders to ensure that sound measurements are comparable. This will be done by putting loggers close together while they simultaneously record for a minimum of 30 minutes.

5.1.2 Quantification of mooring-related self-noise (e.g. line strumming).

SSV buoys will produce their own sound signature through noise generated from the mooring, which will add confounding noise to the ambient sound recordings. Recording of ambient noise with a similar SSV buoy that is not moored will provide a means to calibrate the contribution that mooring noise makes to recordings. As an SSV is moored and starts recording a second SSV will be deployed, but not moored, to record from the same soundscape but at a distance far enough away to not have the signal contaminated by mooring noise. Recording will be for a minimum of 30 minutes. The mooring has also been designed to minimise noise effects as much as possible.

5.1.3 Ambient background sound recording.

The initial role of the sound logging system is to obtain ambient noise recordings when seismic is not being undertaken. This baseline information will be used to quantify the characteristics of the sound field adjacent and near to the SRW BIA. Such data is needed to enable masking effects to be incorporated into analysis of sound signatures emanating from the seismic survey. This data will also be augmented with a pre-existing dataset of ambient noise captured by the IMOS program from 2012-2017. This data was collected from loggers located approximately 20km off Portland in ~130-150m water.

The three surface moored SSVs will collect and transmit data for near real-time analysis during the MSS. They are effectively functioning as sentinels which stand between the MSS and the SRW BIA. If sound levels are detected above pre-determined thresholds and are determined to have come from a seismic source, then the SSV system will send a notification to this effect which will initiate responses as needed.

5.1.4 Logistical Details

Mobilisation and Transit

1. Load all buoys and mooring hardware at port. Candidate ports are Portland Port or Port Fairy.
2. Transit to Cape Nelson (Site 1) by ~ 1 August 2026.

Site 1 – Cape Nelson

3. Connect Buoy 1 to pre-installed mooring and commence ambient recording.

4. Deploy Buoy 2 for capturing sound field without mooring noise - should remain ~ 500 m distant to Buoy 1 (to ensure no mooring noise is being captured) and let drift past Buoy 1; record free-field ambient data for minimum 30 minutes.
5. Recover Buoy 2 and log all times, positions, and instrument diagnostics.
6. Transit to Site 2.

Site 2 – Logan's Beach

7. Connect Buoy 2 to pre-installed mooring and commence ambient recording.
8. Deploy Buoy 3 as per Site 1 instructions and allow to drift past Buoy 2; record free-field ambient data for minimum of 30 minutes.
9. Recover Buoy 3 and log all times, positions, and instrument diagnostics.
10. Transit to Site 3.

Site 3 – Cape Otway

11. Connect Buoy to pre-installed mooring and commence ambient recording.
12. Return to port once all deployments are verified.

Data Handling

Confirm recording integrity; back-up metadata; transmit summary to CGG Environment Advisor promptly.

5.2 Monitoring of the Seismic Sound Field

This section describes t the method and sequence for monitoring of the seismic sound field while the survey is acquiring.

The objective is to:

- Measure received sound levels at 5 km, 10 km, 15 km (and if necessary 20km) from the seismic source zone to obtain a real-time understanding of the sound envelope that is accompanying the acquisition process. This process will be repeated multiple times as the survey moves over different depths and habitat types. This real time measurement will provide an early warning system for potential sound violations into the SRW BIA as the spatial extensions of the sound envelope will be known in advance of approaching the closest point to the BIA.
- This data will also be used to check alignment of real data with modelled predictions for the Regia MSS source configuration.
- Demonstrate that operational control measures for sound source ramp-up and shutdown are effective and compliant with CGG's environmental performance outcomes (EPOs) for underwater sound.

5.2.1 Logistical Details

First recordings will commence within the first week of the seismic acquisition. Subsequent timing of recordings will be decided based on changing depth and bathymetry conditions. We anticipate at least 3 recordings will be undertaken across the duration of the MSS.

Deployment for Drift Recording

While the Seismic vessel follows pre-ordained transects the support vessel will travel to a position approximately 5 km, 10 km, 15 km (and 20km if needed) from the seismic vessel along a rhumb line running from the seismic vessel and meeting the coast at a perpendicular angle. At each nominal distance a sound logger will be deployed to record for at least 30 minutes. Once a recording is completed the support vessel will move to the next distance along the rhumb line and repeat. A

deployment will consist of a sound logger attached to a buoy and tether and free floating independent of the support vessel and far enough away to minimise support vessel noise being recorded (see Figure G6-2). Distance travelled will be noted and sound files verified before moving to a new location.

Figure G6-2: Schematic indicating how drift recording at staged distances from the seismic vessel will proceed.

5.3 Determination of sound breaches in the BIA

CGG will implement a precautionary and pro-active underwater sound monitoring program during the Regia MSS. This program draws directly on current best practice for characterising and managing underwater noise impacts (e.g., Marotte et al. 2022[1]).

The objectives are to ensure that:

- underwater sound levels remain within natural and/or acceptable levels as defined by ambient sound recordings from the area.

[1] Marotte et al (2022), provide a detailed description of relevant approaches to quantifying underwater noise impacts to North Atlantic Right Whales, which are clearly an appropriate proxy for Southern Right Whales. Conclusions are based on the collective response of 24 experts in fields relevant to such a topic e.g. underwater noise, impacts of noise on marine mammals, marine mammal hearing, policy and management etc. Moreover, seismic airguns were identified as a major acoustic stressor and hence there are detailed guidelines relevant to this type of disturbance.

- any statistically/biologically meaningful departures from natural and/or acceptable levels are detected promptly.
- The likely source of any such departures is promptly identified to determine if the signals can be directly attributed to the seismic survey; and
- Where the cause- effect pathway is identified as linked to the MSS, timely management actions are implemented to mediate any potential for disturbances.

To establish baseline distributions of ambient (natural) underwater sound levels, prior to acquisition, CGG will:

- Download and analyse data collected by the IMOS Passive Acoustic Observatories buoy array operating off Portland between 2009 and 2017. Sound data from the months September, October and November will be assessed from multiple years to establish a mid-shelf baseline dataset for the period appropriate to the MSS.
- Collect, download and analyse ~8 months of ambient sound data collected from multiple loggers deployed in the nearshore environment (~20m depth) within the SRW reproduction BIA. These data will establish a nearshore baseline dataset for the MSS.

5.3.1 Warning System Methodology

Ambient baseline data will be used to determine whether any unacceptable sound levels from the seismic survey reach the BIA. Having empirically derived ambient noise data for the area will enable masking effects to be incorporated into calculations which is a more realistic approach than only using received sounds. Warning parameters will be set based on violations of the ambient sound scape and its interaction with any masking effects (see Figure G6-3 for further details).

The MSS survey is scheduled to start from the 16 September 2026. At this time the moored SSV buoys will have been recording ambient sound conditions for at least 4 weeks which will provide the baseline spectral probability plot against which any seismic related incursions can be detected.

Active seismic will start approximately 70 km from the coast at the most southerly lines (refer to MAP-REG-EPM-040). Drift recording of the sound profile will be undertaken at this time and sound data captured at 5km, 10km, 15km and 20km (if needed) will be analysed to ascertain the extent of horizontal, seismic attenuation. This process will be repeated at least 3 times as the survey comes progressively closer to the coast and BIA boundary. This will serve as an early warning system - independent of the tethered PAMS – to indicate whether inappropriate levels of seismic sound may penetrate the BIA.

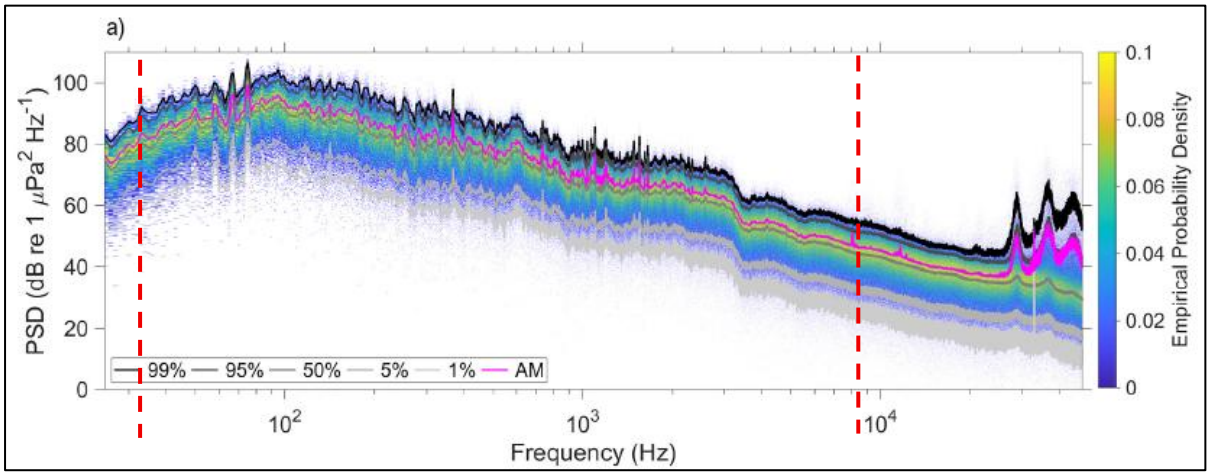

Figure G6-3: Example of a Spectral Probability Plot (SPP) with percentiles and the arithmetic mean (AM) represented.

This is from a 20-minute recording off Scotland in 2018 (van Geel et al 2022). These plots will be generated and updated multiple times each day from data uploaded from the moored PAMS. Warnings will be programmed into the PAM software to provide notice of any anomalous sound signals as defined by the running SPP. For the Regia MSS the calculations will be filtered to the frequency band between 7Hz and 36kHz (NOAA Technical Guidance 2024) – as indicated by the dashed red lines.

Having established the baseline ambient sound profile and then actively monitoring the seismic attenuation signal as the survey progresses, we then set the parameters on which an anomalous signal will be defined. We will be using sampling protocols as recommended by Marotte et al (2022)[2] and Southall et al (2023) for monitoring of behavioural changes and masking in baleen whales.

Specifically, a probability distribution of third-octave sound levels across the relevant weighted bands and established using a 0.1- second sound assessment window will be used. To capture short-term behavioural response thresholds for impulsive noise, the peak sound pressure level (PK) and the sound exposure level (SEL) from the individual impulses are calculated. The values will be averaged over a 3-min interval for checking against the set thresholds (Southall et al 2023). The target thresholds have been pre-determined with the lowest threshold set at an ultra-conservative 120 dB as calculated across the frequency band most applicable to hearing in LF cetaceans (see Figure G6-3).

If a significant breach is confirmed by the system, then the adaptive management protocols will be activated as described in Appendix G2- Fauna Management Plan.

[2] Marotte, Emmaline, Andrew J. Wright, Heather Breeze, et al. (2022). "Recommended Metrics for Quantifying Underwater Noise Impacts on North Atlantic Right Whales." Marine Pollution Bulletin 175: 113361. https://doi.org/10.1016/j.marpolbul.2022.113361.

Southall, Brandon L., Dominic Tollit, Jennifer Amaral, Christopher W. Clark, and William T. Ellison. (2023). "Managing Human Activity and Marine Mammals: A Biologically Based, Relativistic Risk Assessment Framework." Frontiers in Marine Science 10. https://doi.org/10.3389/fmars.2023.1090132.

6 Environmental and Safety Controls

- Comply with MARPOL Annex V – no discharge or disposal of materials overboard.
- Suspend activities if sea-state > 4 m or operating at night.
- If any whale is detected in relevant SDZs during soft start procedures, the acoustic source will be shut down, and another soft start cannot commence until all pre-acquisition criteria have been met again.
- Lost-gear notification to AMSA within 2 hours.
- Maintain 500 m separation between vessels during all manoeuvres.
- Adhere to CGG HSE-OMS stop-work authority and toolbox briefings before each phase.

7 Data Management and Reporting

- Verify logger clock synchronisation and sample rates.
- Store duplicate copies of datasets on encrypted drives and upload to Regia server as soon as possible.
- Submit SSV Validation Report summarising:
    - measured vs modelled received levels;
    - hydrophone calibration records; and
    - compliance statement against relevant EPOs (Underwater Sound, Section 1.8 of Appendix G1).

8 Deliverables

Deliverable	Responsible Party	Timing
Daily Operations Logs	Field Team Leader	During operations
Acoustic Datasets (5, 10, 15 km)	Acoustic Team	Within 48 hours of test
Ambient Baseline Data	Acoustic Team	Ongoing
SSV Validation Report	CGG Technical Ops Manager	45 business days after the conclusion of the survey.

9 Document Control

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.1	1 December 2025	AH, MS, CT, RS, EO	Document Created